

Change in climatic factors in khandesh region : A study for mitigation of climate change effect

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ABSTRACT:

Climate change is a major and very serious issue for all of us. The effect of climate change are different in different niches. But its effects are very severely seen in parts of dry lands.

Khandesh a well known region of North Maharashtra comprising of Jalgaon, Dhule and Nandurbar districts along with same parts of Burhanpur districts of Madhya Pradesh and parts of Nashik of Maharashtra state.

In the proposed study we are revisiting climate factor viz Temperature(Min,Max,Mean), Rainfall, PET, Relative Humidity and Wind Velocity and analysed the available data and try to find out assumed indicator for drought and its sever. This region is drought prone. In the proposed study we will also try to proposed different tools to mitigate the climate change at micro level.

We have collected different data for 100 years. This study will helpful in understanding of pattern of different climate factor in last 100 years and its probability of reoccurrence in the future.

Introduction:

Climate change is a major and very serious issue for all of us. The effects of climate change are different in different niches. The climate change is a global problem but its mitigation is possible if we work collectively at micro level. In India, above 70% of land mass comes under the dry lands. Most of the Maharashtra state comes under the dry land. The study area, which is Khandesh region agro-climatically, belongs to semi arid zone. This area is very fertile and a well known region for Banana, Cotton and Sorghum cultivation. In this region, the agriculture is Rainfed and like the any other sibling parts the Rainfall is unpredictable in quantum and duration.

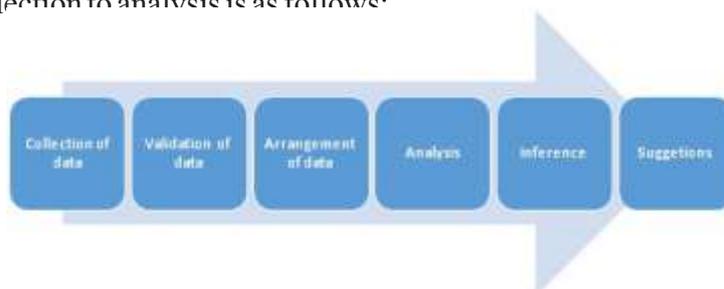
Climate change is a regular phenomenon but it is getting fasten due to anthropogenic effects. Still we can coup up this problem if we understand the factors responsible for this. In this regard we have attempted to understand the trends of climatic factors like Temperature, Rainfall, Wind Velocity, Relative Humidity, Cloud Cover and PET for last 100 years. The study of trend of these varies factors will be helpful in future prediction. This prediction will be of numerical in nature.

The prediction of weather and act accordingly is also a part of mitigation strategy.

In the proposed study we will try to find out the change in climatic factors specifically, Temperature, Rainfall, Cloud Cover and Potential Evapotranspiration (PET). We also try to propose different tools to mitigate the climate change at micro level.

Methodology:

We have collected secondary information from various authentic sources, web sites and web portals of government of India. We have collected data for the period of one century and from 1901 to 2000. The road map for collection to analysis is as follows:



1. Collection of data: The data for 100 years for Temperature, Rainfall, PET, Cloud Cover and some facts regarding study area were collected from different sources which are mentioned in references.

2. validation and Arrangement of data: All collected data arranged as per desired in scheduled table. In all tables major category is different attributes like Temperature, Rainfall, Wind Velocity etc and within it districts as minor category. We collect this data set for Khandesh i.e. Jalgaon, Dhule and Nandurbar districts for 100 years (1901-2000) from official website so there is no need of validation of data.

3. Analysis of data using different descriptive statistics: We have ample quantum of data which is being very useful in further analysis. We have applied different descriptive statistics like Standard Deviations. This is very helpful in understanding of dispersion of data in given format.

4. Inference: The analysis is followed by inference.
Analysis:

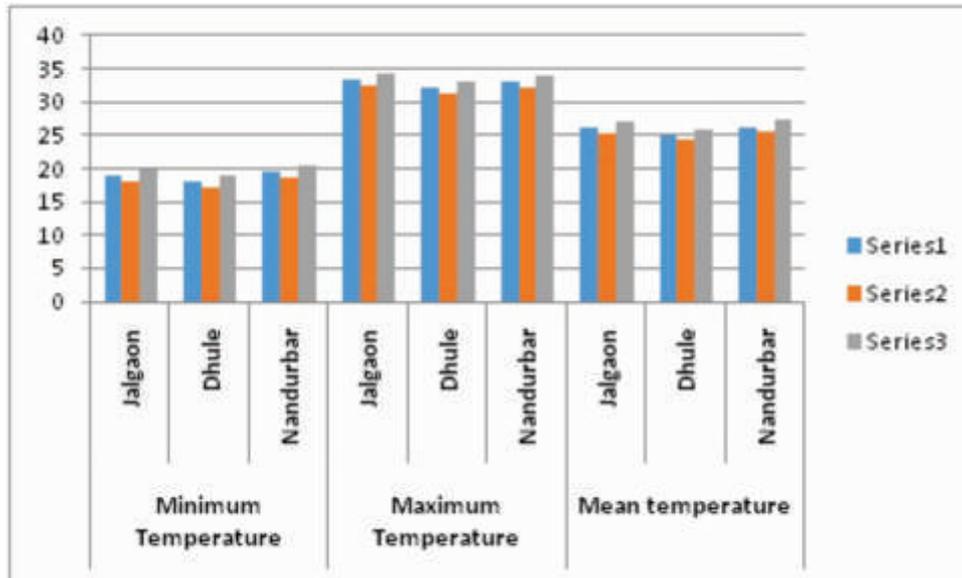
Temperature: The factors like Temperature, Rainfall, PET, Wind Velocity, Cloud Cover, Relative Humidity presented in the paper based on secondary data obtained from www.indiawaterportal.org and www.bhuvan-panchayat.nrsc.gov.in

Results:

Temperature:

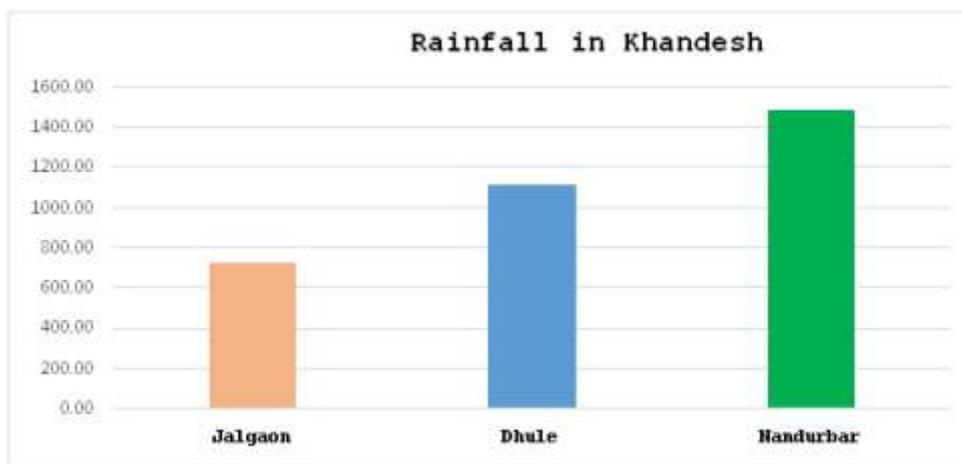
| Particulars | Minimum Temperature °C | | | Maximum Temperature °C | | | Mean Temperature °C | | |
|---------------------------|------------------------|-----------|-----------|------------------------|-----------|-----------|---------------------|-------|-----------|
| | Jalgaon | Dhule | Nandurbar | Jalgaon | Dhule | Nandurbar | Jalgaon | Dhule | Nandurbar |
| Average | 18.9 2 | 18.0 8 | 19.52 | 33.31 | 32.1 1 | 32.99 | 26.1 0 | 25.07 | 26.24 |
| Minimum Temp. | 18.0 3 | 17.2 9 | 18.70 | 32.42 | 31.3 2 | 32.17 | 25.2 1 | 24.29 | 25.42 |
| Maximum Temp. | 19.8 2 | 18.9 9 | 20.52 | 34.19 | 33.0 3 | 34.03 | 26.9 8 | 25.98 | 27.26 |
| Standard Deviation | 0.38 | 0.39 | 0.39 | 0.38 | 0.39 | 0.39 | 0.38 | 0.391 | 0.39 |

The above mention table shows that the average Minimum Temperature of Khandesh region is 18°C, Maximum is 33.75°C and Mean Temperature is 25.8 °C. Variation pattern of all three districts are almost similar.



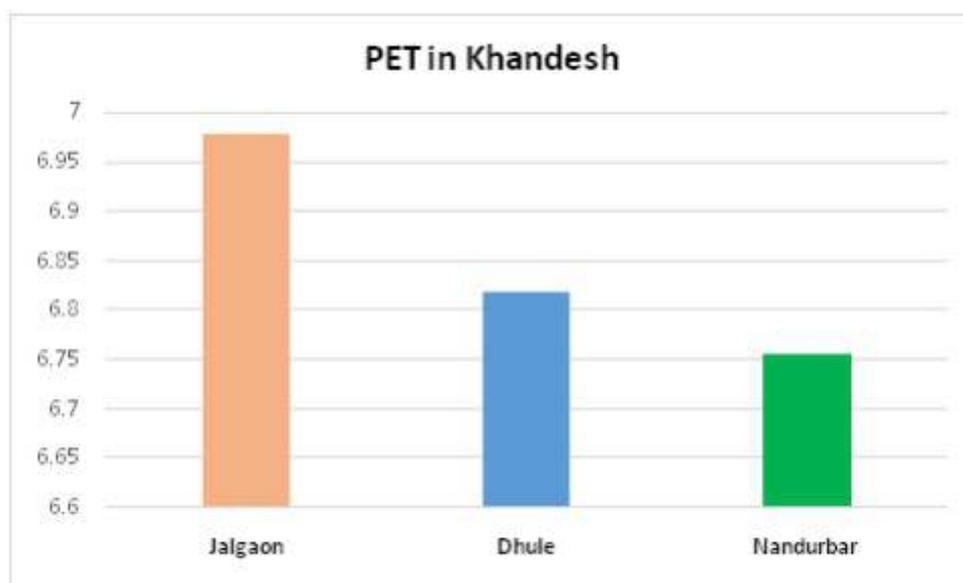
Rainfall:

| Rainfall (mm) | | | |
|--------------------|---------|---------|-----------|
| Particular | Jalgaon | Dhule | Nandurbar |
| Average | 721.82 | 1121.99 | 1490.43 |
| Minimum | 367.05 | 451.65 | 612.36 |
| Maximum | 1028.84 | 1699.69 | 2350.67 |
| Standard deviation | 148.255 | 248.52 | 364.9041 |



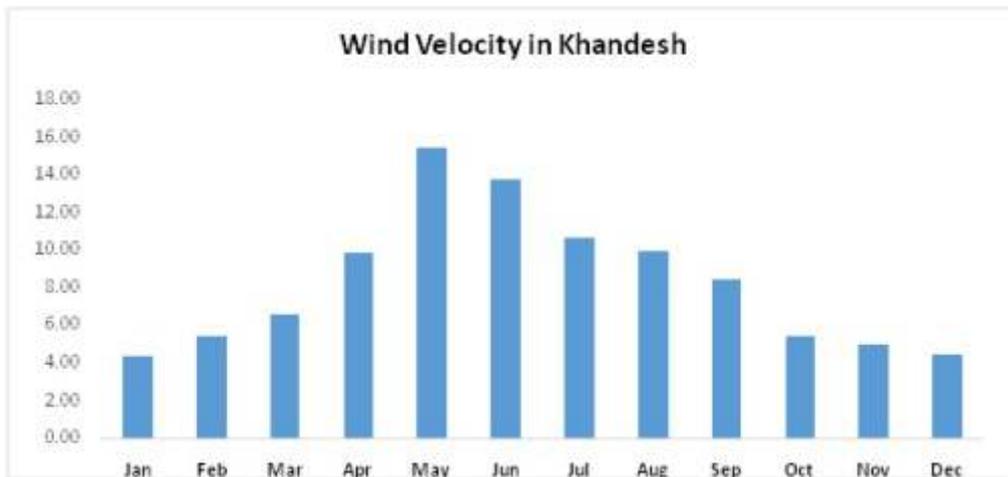
PET:

| PET (mm) | | | |
|------------|----------|----------|-----------|
| Particular | Jalgaon | Dhule | Nandurbar |
| Average | 6.978546 | 6.817549 | 6.755057 |
| Min | 6.768333 | 6.6125 | 6.55 |
| Max | 7.2 | 7.0325 | 6.966667 |
| Deviance | 0.431667 | 0.42 | 0.416667 |
| SD | 0.078288 | 0.077445 | 0.07434 |



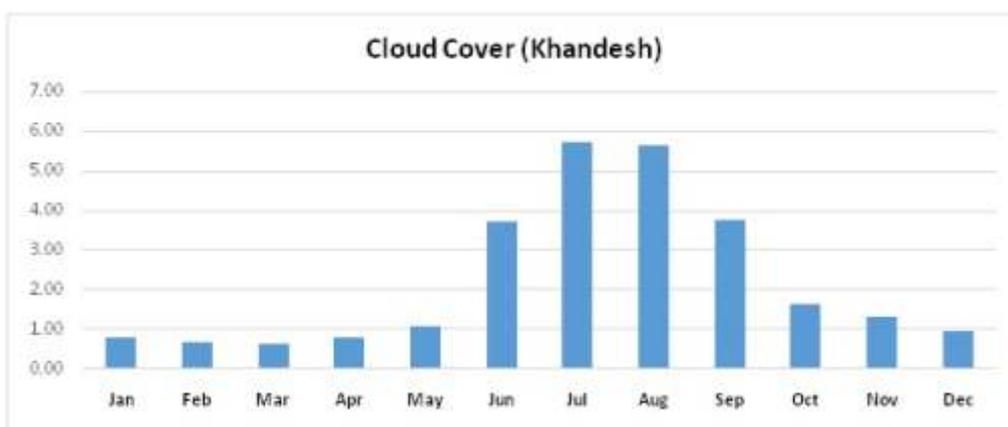
Wind Velocity:

| Wind Velocity in Khandesh | | | | | | | | | | | | |
|---------------------------|------|------|------|-------|-------|-------|-------|-------|-------|------|------|------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Average | 4.37 | 5.41 | 6.58 | 9.84 | 15.39 | 13.74 | 10.66 | 9.94 | 8.40 | 5.38 | 4.93 | 4.40 |
| Minimum | 3.53 | 4.10 | 2.83 | 7.07 | 11.13 | 9.73 | 8.60 | 8.43 | 5.90 | 3.97 | 3.90 | 3.43 |
| Maximum | 5.97 | 7.23 | 8.60 | 12.43 | 19.80 | 16.97 | 13.23 | 11.37 | 10.53 | 7.13 | 6.17 | 5.33 |
| Standard Deviation | 0.59 | 0.74 | 1.26 | 1.43 | 2.35 | 1.96 | 1.28 | 0.80 | 1.24 | 0.78 | 0.54 | 0.47 |



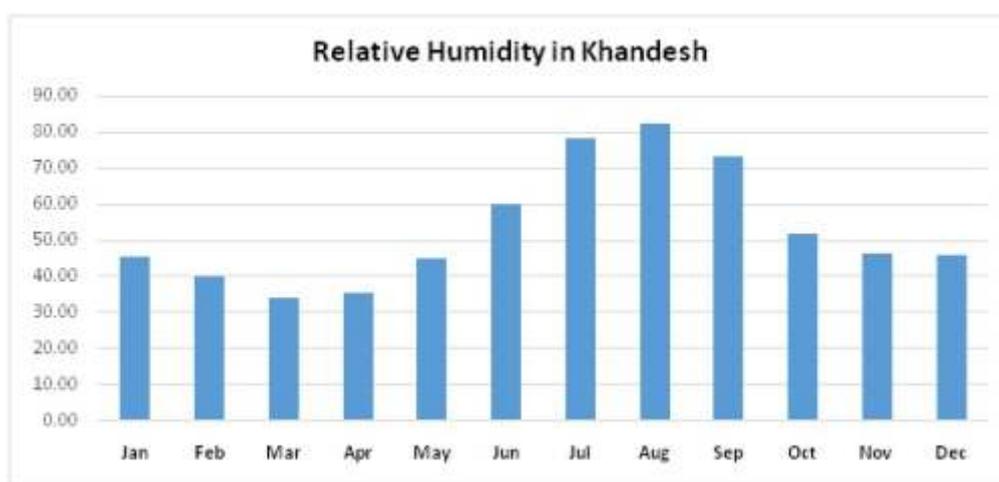
Cloud Cover:

| Cloud Cover in Khandesh | | | | | | | | | | | | |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Average | 0.82 | 0.70 | 0.65 | 0.81 | 1.06 | 3.74 | 5.73 | 5.65 | 3.77 | 1.66 | 1.32 | 0.96 |
| Minimum | 0.27 | 0.17 | 0.23 | 0.30 | 0.50 | 1.50 | 4.97 | 4.40 | 2.60 | 0.70 | 0.60 | 0.33 |
| Maximum | 1.37 | 1.23 | 1.10 | 1.80 | 2.00 | 5.50 | 6.43 | 6.60 | 5.50 | 2.80 | 1.93 | 1.73 |
| Standard Deviation | 0.27 | 0.28 | 0.25 | 0.31 | 0.36 | 1.09 | 0.37 | 0.48 | 0.69 | 0.53 | 0.40 | 0.36 |



Cloud Cover:

| Relative Humidity in Khandesh | | | | | | | | | | | | |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Average | 45.28 | 40.22 | 34.13 | 35.31 | 45.00 | 60.18 | 78.08 | 82.23 | 73.03 | 51.64 | 46.21 | 46.11 |
| Minimum | 40.17 | 35.17 | 28.33 | 30.67 | 37.50 | 51.17 | 73.17 | 78.50 | 65.50 | 43.33 | 40.67 | 41.17 |
| Maximum | 49.67 | 44.83 | 40.00 | 39.83 | 50.83 | 68.67 | 81.50 | 84.83 | 82.83 | 65.67 | 52.00 | 50.83 |
| Standard Deviation | 2.75 | 2.71 | 3.01 | 2.42 | 4.10 | 4.74 | 2.32 | 1.74 | 4.79 | 6.71 | 3.05 | 2.32 |



Conclusion:

The analysis of data shows that Jalgaon district shows more PET and less Rainfall compare to other districts; there is no significant difference Temperature; there is obvious change in Rainfall in three district; recurrence of better Rainfall in every three years; there is enough quantum of runoff available which is a good Potential for evenly spread water harvesting structure; we can mitigate the climate change effect at micro level by understanding the change in pattern of climatic factors and by executing small interventions at individual and community level.

Acknowledgements:

This work was financed by the KCE's MooljiJaitha College under Budding Research Scheme. The authors gratefully acknowledge the kind support and cooperation provided by the College as well as KCES' JalaSRI Watershed Surveillance and Research Institute, Jalgaon who provided data sets for paper.

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Statistical Analysis of Electricity Consumption in Jalgaon City

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ABSTRACT:

Electricity is one of the greatest innovations of mankind. It becomes a part of our daily life and we cannot live without electricity. Considering importance of electricity in our daily life we have analyzed electricity consumption data in Jalgaon city using Time Series Analysis. The statistical analysis presented in the paper is based on secondary data of electricity consumption by residential, commercial and industrial sectors. This data set is collected from Maharashtra State Electricity Board (MSEB) office from Jalgaon city. Initially exploratory data analysis tools used to analyze data. It is found that on an average 9.44 million units consumed by residential sector, 2.81 million units consumed by commercial sector and 19.71 million units consumed by industrial sectors per month in Jalgaon city. Multiplicative model is found best for consumption of electricity month-wise for study area. Seasonal indices computed for each month and based on fitted model for entire year 2019 electricity consumption is predicted month-wise. Error distribution is identified using distribution identification tool and It is found that error distribution is normal with mean -0.03 and variance 2.54.

Introduction:

In present modern days electricity is essential for growing economy. Without electricity no industry can run, discovery of electricity is a blessing to this world. Not only electricity helps to run industry but it also helps to human beings because it provides comforts and satisfies their needs. Electricity demands depends on number of factors which includes economic growth, household connectivity, energy efficiency and the electrification of the transport sector. An analysis of electricity demand at the national level indicates that the demand in the current year depends on last year's electricity consumption and economic growth in the current year. All India level demand projections in the stylised scenarios upto 2029–30 have been carried out by The Energy and Resources Institute (TERI) using the electricity demand and GDP data from 2001–02 to 2015–16. The study shows that the demand is likely to grow from 1115 BU in 2015–16 to 1,692 BU in 2021–22, 2,509 BU in 2026–27 and 3,175 in 2029–30. Per-capita consumption of electricity is projected to increase from the prevailing level of 1,075 kWh to 1,490 kWh in 2021–22, 2,121 kWh 2026–27 and 2634 kWh in 2029–30. These demand projections may go up or down depending on the success of the UDAY programme, Make in India initiative, deceleration in the use of captive power, energy efficiency, etc. As per Economic Survey of Maharashtra 2017-18 Aggregate consumption of electricity in the State during 2016-17 was 1,08,455 MU. The consumption of electricity by the industrial sector was largest (31.2 per cent), followed by agriculture (26.1 per cent) and domestic sector (24.8 per cent) in the State. As per the Prayas Energy Group publication (Dec 2016), regarding Residential Electricity Consumption (REC) in India, they have appeal researchers (both academic and non-academic) to use existing data or build data from local surveys to conduct various disciplinary and inter-disciplinary studies on the REC. As statisticians we have decided to study electricity consumption in Jalgaon city using suitable statistical methods. For collected data set regarding electricity consumption in Jalgaon city we have analysed data using time series analysis. Our main objective of this research is to identify best statistical model for electricity consumption in Jalgaon city and then use best fitted model to predict future electricity consumption.

Methods:

The statistical analysis presented in the paper is based on secondary data which is collected from Maharashtra State Electricity Board (MSEB) office from Jalgaon city. Received data set is in the form

of excel file under the title electricity consumption in Jalgaon city month-wise. Excel file contains seven columns which includes month, number of residential consumers, units consumed by residential consumers, number of commercial consumers, units used by commercial consumers, number of industrial consumers, units consumed by industrial consumers. The unit used in original data set for electricity consumed units by residential, commercial or industrial consumers is in million units. As per our objective we have requested for five year data of electricity consumption in Jalgaon city from MSEB but due to some reason MSEB has provided data only for two and half years. In the provided excel file first month is April 2016 and last month is Oct 2018, so overall electricity consumption data set is for two years and seven months period (April 2016-October 2018).

For statistical analysis point of view we have defined ten variables which divided in two sets, first set contains MSEB data and second set contains individual urban family data. In the first set, eight variables named as MSEB_MONTH, MSEB_NORESCON, MSEB_ECONBYRES, MSEB_NOCOMMCON, MSEB_ECONBYCOMM, MSEB_NOINDCON, MSEB_ECONBYIND, MSEB_TOTALECON. In the second set two variables named as IURBAN_MONTH and IURBAN_ECON. The analysis of second data set is given the project report.

The description of these variables is as follows:

1. MSEB_MONTH: MSEB data set months which started from April 2016 to Oct 2018.
2. MSEB_NORESCON: MSEB data set number of residential consumers in the month
3. MSEB_ECONBYRES: MSEB data set electricity consumed by residential consumers
.....
4. MSEB_TOTALECON: MSEB data set total electricity consumption by residential, commercial and industrial consumers in the month.

Keeping in mind our objective, suitable technique is time series analysis. A time series is a collection of observations made sequentially over time. In this paper we are using discrete time series, where the observations are taken at equal intervals. Time series analysis helps in the analysis of past behavior of above mentioned variables such as MSEB_ECONBYRES, MSEB_ECONBYCOMM. The analysis of past conditions is the basis of forecasting the future behavior of the variables under study. There are four components of time series, which are as follows:

1. Secular Trend or Trend (T)
2. Seasonal variations (S)
3. Cyclical variations ©
4. Irregular variations (I)

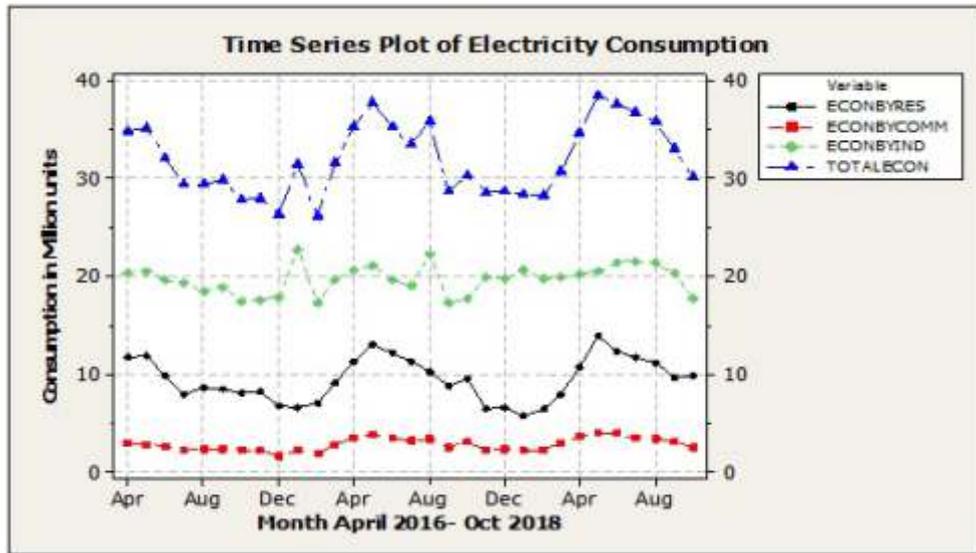
The following are the two models commonly used for the decomposition of a time series into its components. First one is additive model which assumes that the observed value is the sum of four components where as second one assumes that the observed value is the product of four components. It is noted that except the value of trend all the other component values are rates or index numbers. For analysis we have used time series analysis tools of MINITAB software.

Results :

1. Descriptive Statistics

| Variable | Mean | StDev | Minimum | Maximum | Range |
|-----------------|--------|-------|---------|---------|--------|
| MSEB_NORESCON | 88554 | 1111 | 86469 | 90204 | 3735 |
| MSEB_ECONBYRES | 9.439 | 2.229 | 5.674 | 13.968 | 8.294 |
| MSEB_NOCOMMCON | 11582 | 142 | 11260 | 11820 | 560 |
| MSEB_ECONBYCOMM | 2.809 | 0.634 | 1.668 | 3.956 | 2.288 |
| MSEB_NOINDCON | 2230.0 | 350.8 | 1180.0 | 3808.0 | 2628.0 |
| MSEB_ECONBYIND | 19.714 | 1.481 | 17.347 | 22.774 | 5.427 |
| MSEB_TOTALECON | 31.961 | 3.634 | 26.225 | 38.481 | 12.256 |

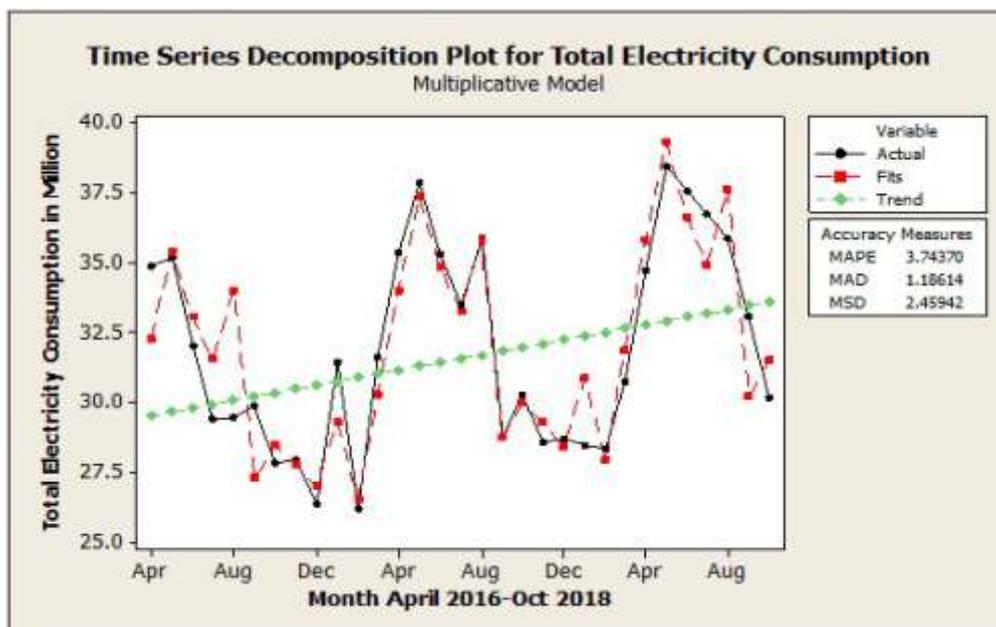
2) Timeseries Plot :



2. Time Series Decomposition Plot:

Fitted Trend Equation: $Y_t = 29.411 + 0.135*t$

| Seasonal Indices | | | | | |
|------------------|----------|----------|---------|----------|-----------|
| April | May | June | July | August | September |
| 1.09225 | 1.19411 | 1.10908 | 1.05320 | 1.12978 | 0.90345 |
| October | November | December | January | February | March |
| 0.93773 | 0.91159 | 0.88182 | 0.95301 | 0.85850 | 0.97549 |



Error follows normal distribution with mean -0.03 and variance 2.54

Conclusion:

Aggregate consumption of electricity in the Maharashtra State during 2016-17 was 1,08,455 MU. The consumption of electricity by the industrial sector was largest (31.2 per cent), followed by agriculture (26.1 per cent) and domestic sector (24.8 per cent) in the State. Our main objective of this research is to identify best statistical model for electricity consumption in Jalgaon city and then use best fitted model to predict future electricity consumption. Additionally estimation of proportion of electricity consumption, sector-wise which includes residential, commercial and industrial. Accuracy measures of Multiplicative model suggest that for total electricity consumption which includes consumption by residential, commercial and industrial; multiplicative model is the best fitted model. Using trend equation and seasonal indices given in result section predicted values for year 2019 month-wise computed. Predicted values are given below:

| Seasonal Indices | | | | | |
|------------------|----------|-----------|---------|----------|----------|
| January | February | March | April | May | June |
| 32.4133 | 29.3150 | 33.4416 | 37.5922 | 41.2598 | 38.4718 |
| July | August | September | October | November | December |
| 36.6758 | 39.4954 | 31.7054 | 33.0354 | 32.2381 | 31.3044 |

The consumption of electricity by the industrial sector was largest (61.5 per cent), followed by residential (29.5 per cent) and commercial sector (9 per cent) in the Jalgaon city. On an average in a month per household electricity consumption in residential sector is 107 units. We have focused on urban data only this is the limitation of this research. Future Scope of this research should be study of electricity consumption in Jalgaon district so it will consider rural as well as urban area.

Acknowledgments

This work was financed by the KCES's Moolji Jaitha College under Budding Research Scheme. The authors gratefully acknowledge the kind support and cooperation provided by the College as well as MSEB Jalgaon Office who provided data sets for paper.

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Transaction process analysis in a bank using capability indices: A case study

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ABSTRACT:

Stakeholders' point of view productivity of the cashier operation is one of the important areas in a bank. In order to analyze cashier operation process we have considered transaction (deposit/withdrawal) time in a bank as a quality characteristic. Using statistical Process Control methodology we have recorded data on transaction times in seconds from two public sector banks (bank A and bank B) from Jalgaon city. Applying process capability analysis as a tool and referring efficiency standard for specification limits for characteristic under study we have computed and interpreted process capability indices for two banks. Basic process capability indices assume that process distribution is normal but both banks transaction time data do not follow normal distribution. Using Johnson transformation we have converted original data into normal data and then each bank transaction process capability measured. It is found that bank A process is not actually capable and bank B process is highly capable.

Keywords: Capability indices, Transaction process, Johnson transformation, Normal distribution.

Introduction:

The process capability is the term very important in manufacturing industry as well as in service sector. Consumer wants quality satisfaction from manufacturing industry and from service sector. To achieve process capability more, the inherent variability in the process must be less. As Kotz and Lovelace (1998) stated "The enemy of perfect output is variation." In other words "no two things or two processes are alike." Motorola developed the six-sigma program in the late 1980s as a respond to the demand for their products. The focus of six-sigma program is to reduce variability in key product quality characteristics. Six-sigma has spread well beyond its manufacturing origins into areas including health care, many types of service business and government/public services. The reason for success of six-sigma in organization outside the traditional manufacturing sphere is that variability is everywhere, and where is variability, there is an opportunity to improve business or process performance.

To prophase in world market, Japanese spent considerable time to analyzing their manufacturing processes. As Japanese suffer from crippling after World War II they decided that the best way to overcome this is that to rebuild their economy, by meeting with well-known management consultant, like J.M.Juran and E.Deming.

Capability analysis has been used in many industries which includes service industry also. Process capability study has been applied in the field of medicine, to determine service operation for quality sustainability purpose. Process capability study helps to continue improvement and development of product as well as to achieve customer satisfaction. Process capabilities indices that have been widely used in the manufacturing industry include C_{pk} and $C_{p/C}$ to measure the performance of process.

Process capability analysis has considerable applications for non manufacturing organization, in both the public and private sectors. This paper focused on transaction process analysis in a bank using capability indices. Stakeholders' point of view productivity of the cashier operation is one of the important areas in a bank. In order to analyze cashier operation process we have considered transaction (deposit/withdrawal) time in a bank as a quality characteristic. Our main objective of this paper is to measure transaction process capability in both the banks using capability indices.

Method:

The statistical analysis presented in the paper is based on primary data which is recorded from public sector two banks which are named as Bank A and Bank B from Jalgaon city. In view of productivity of the cashier operations in bank A as well as bank B the data contains transaction time (in second) per customer. The transaction time is recorded for first seven customer of each working hour of a bank for three days from both the banks. The motivation behind applying this procedure of data collection is the requirement of statistical Process Control to monitor process. The data table contains 3 columns i) Sample number ii) transaction (deposit/withdrawal) time in bank A iii) transaction (deposit/withdrawal) time in bank B.

For transaction process capability analysis point of view we have defined two response variable named as TRAN_TIME_BANKA and TRAN_TIME_BANKB. The description of these variables is as follows:

X1=TRAN_TIME_BANKA: Transaction (deposit/withdrawal) time in bank A per customer

X2=TRAN_TIME_BANKB: Transaction (deposit/withdrawal) time in bank B per customer

Keeping in mind our objective; suitable technique is process capability analysis. In process capability analysis initially we check whether the process is in statistical control or not. If process is not in statistical control then identifying assignable cause we make process stable. Process Control chart is one of the important tools which are used to check whether the process is in statistical control or not and these charts provides signal of out control process. Alternatively A response variable that continues to be described by the same distribution when observed over time is said to be in statistical control, or simply in control. Second step in process capability analysis is identification of characteristic under study variable distribution. If characteristic under study variable follows normal distribution then using process capability indices we can measure capability of the process.

The basic Process Capability Indices widely used to determine whether a process is capable or not considering specification limits are defined below.

The index is defined as

$$Cp = \frac{USL-LSL}{3\sigma} \quad (1)$$

does not consider the location of the process mean and therefore measures only the potential capability of the process.

The index is defined as

$$Cpk = \min (Cpu, Cpl) \quad (2)$$

Where and are unilateral measures of process capability as they consider only a single specification limit and they are defined as follows

$$Cpu = \frac{(USL-\mu)}{3\sigma} \quad (3)$$

$$Cpl = \frac{(\mu-LSL)}{3\sigma} \quad (4)$$

Where are process mean, process standard deviation and specification limits respectively. If the process distribution is not normal then using suitable transformation we convert variable under study into normal to measure capability using above indices. For process capability analysis we have used MINITAB software.

Results:

1. Descriptive Statistics

| Variable | Mean | StDev | Minimum | Maximum | Range |
|-----------------|--------|-------|---------|---------|--------|
| TRAN_TIME_BANKA | 138.46 | 45.63 | 61.00 | 232.00 | 171.00 |
| TRAN_TIME_BANKB | 93.37 | 36.67 | 42.00 | 177.00 | 135.00 |

2. Distribution identification and Process Stability:

Using distribution identification tool it is observed that TRAN_TIME_BANKA as well as TRAN_TIME_BANKB do not follow normal distribution. It is also noted that no standard distribution best fitted for TRAN_TIME_BANKA as well as TRAN_TIME_BANKB.

1. Suitable Johnson transformation function for X1 (TRAN_TIME_BANKA) to convert it into normality is

$$Y1=0.342362 + 0.898393 * \text{Ln}((X1 - 50.2293) / (257.804 - X1))$$

2. Suitable Johnson transformation function for X2 (TRAN_TIME_BANKB) to convert it into normality is

$$Y2=0.427688 + 0.666112 * \text{Ln}((X2 - 41.1198) / (180.127 - X2))$$

| Variable | Mean | StDev | Minimum | Maximum | Range |
|----------|---------|--------|---------|---------|--------|
| Y1 | 0.0015 | 0.9808 | -2.2678 | 2.0962 | 4.3640 |
| Y2 | -0.0468 | 1.0086 | -2.9400 | 2.9400 | 5.8800 |

Here, all the sample points are not lie on reference line. Therefore, the variable under study of bank A do not follow normal distribution.

On similar lines Y2 follows normal distribution with above mentioned mean and standard deviation. P value for normality test is 0.473

So process is in control with respect to Y1. On similar lines Process is stable with respect to variable Y2.

3. Measurement of Process Capability using Capability indices:

Efficiency standard suggest that transaction should complete with a maximum of three minutes (180 seconds) for any one transaction. The process capability for bank A and bank B computed using capability index CPU as follows

$$\text{CPU}_A=(0.801958-0.0015)/(3*0.9808)=0.272043$$

$$\text{CPU}_B=(5.08859+0.0468)/(3*1.0086)= 1.69720$$

Conclusion:

Stakeholders’ point of view productivity of the cashier operation is one of the important areas in a bank. In order to analyze cashier operation process we have recorded transaction (deposit/withdrawal) time in two banks from public sectors as quality characteristics. It is found that on an average transaction time of bank A is 138.4 Seconds and average transaction time of bank B is 93.37. Transaction average times shows that there is significant difference between bank A transaction time and bank B transaction time. It is also reflected that bank B process is more capable as compare to bank A. While developing basic process capability indices to quantify process performance it is assumed that process distribution is normal, but our data from bank A as well as bank B do not follows normal distribution. So we cannot use basic process capability directly to measure transaction process capability. It is also concluded that no standard distribution best fitted for

TRAN_TIME_BANKA as well as TRAN_TIME_BANKB other than normal distribution. This point of view initially we have used Johnson transformation to convert data into normal distribution. Transformed data follows normal distribution for both variables which is verified by probability plot. Process stability is checked using charts considering transformed variables and it is found that processes are stable. To measure process capability of both banks we have used C_p index because specification limits are unilateral. Considering desirable values of capability index it is found that bank A process is not capable and bank B is highly capable. Comparison point of view bank B transaction process is highly capable and too superior as compare to bank A transaction process. Hence, the banks A need to improve to their process.

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A comparison between chemical synthesis of iron oxide nano-particles and biosynthesis

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ABSTRACT:

The synthetic Iron nanoparticles have different particle size distributions. We studied the properties of the Iron nanoparticles prepared by chemical methods compared with bacterial nanoparticles. The results show that crystallite size, particle size of chemically prepared with also biosynthesized nanoparticles. The products are characterized by UV, infrared (IR) spectra, and scanning electron microscopy (SEM). Further the antibacterial effect of iron oxide nanoparticles (Fe₂O₃ NPs) was evaluated against pathogenic bacteria which showed that the nanoparticles have antibacterial activity against pathogenic bacterial strains and retains potential application in pharmaceutical and biomedical industries.

Keywords: Nanoparticles, UV-Vis, FTIR, SEM and Antibacterial.

Introduction:

Nanoparticles are the simplest form of structure with size in the range of 1-100 nm. The synthesis and uses of Iron Oxide Nanoparticles (Fe₂O₃ NPs) are growing exponentially due to its wide application in different field of science and technology on the current research of nanoparticles by nanotechnology. Mostly, the many type of metal nanoparticle under investigation is of vital consideration, as in common organisms have developed resistance against very little numbers of metals, potentially limiting the choice of organism. However synthetic biology; a emerging field of science, is starting to deal with these issues in order to create more generalized chassis, able to synthesis more than one type of metallic nanoparticles using the same organism (Edmundson *et al.*, 2014). Currently, there is a growing need to use environmentally friendly nanoparticles that do not produce toxic wastes in their synthesis protocol. The most common methods for preparing all of these nanoparticles are wet-chemical techniques, which are generally low-cost and high-volume. Although their toxic effect is might be more as compare to biologically synthesized nanoparticle. However, the need for toxic solvents and the contamination from chemicals used in nanoparticle production limit their potential use in biomedical applications (Li *et al.*, 2011). Therefore, non-toxic way of synthesizing metallic nanoparticles is needed in order to allow them to be used in a wider range of industries. There are important links between the way nanoparticles are synthesized such as chemical and biologically with their potential uses (Nikolaos *et al.*, 2014; Panigrahi *et al.*, 2014; Vicky *et al.*, 2010).

An efficient way to estimate nano-toxicity is to monitor the response of bacteria expose to these particles. Resistant to bacteria to bactericides and antibiotics has increase in recent years due to the development of resistant strains. In the present study, an attempt has been made to synthesize iron-oxide nanoparticles by chemical co-precipitation method and bacterial biological method and characterize it by absorption spectrophotometer (UV- VIS), FTIR and scanning electron microscope (SEM) along with the evaluation of their antibacterial activity against human pathogenic Gram negative bacteria *Escherichia coli* and *Pseudomonas aeruginosa* with a view to explore their pharmaceutical applications. In the present study, an attempt has been made to synthesize Fe₂O₃ NPs by chemical and biological method comparison for characterization and antibacterial activity.

Materials and Method:

A. Chemical Synthesis of Fe₂O₃ NPs: Iron oxide nanoparticles were prepared by controlled oxidation of iron nanoparticles in the aqueous phase. Syntheses of NPs were carried out by Wang and

Zhang (1997) method. NPs was studied by Scanning Electron Microscope, FTIR, UV-Vis we are confirm the size, which size less than 100nm.with that, antibacterial activity checked by using *Pseudomonas aeruginosa* bacterial strain.

B. Biological Synthesis of Fe₂O₃ NPs: For experiment culture of *Pseudomonas aeruginosa* was grown in the 2ml of LB medium, which was subsequently proliferated into 100 ml of the same medium. After 48 h of the bacterial growth, filter sterilized solution of ferric chloride was added to the pre-grown *Pseudomonas aeruginosa* to the final concentration of 1mM. Synthesized NPs in culture medium and supernatant then further analyzed using FTIR, UV-Vis (Abhilash *et al.*, 2011). Whereas after that, antibacterial activities were check by using *E. coli* as another strain of bacteria.

Characterization:

1. Chemical synthesized

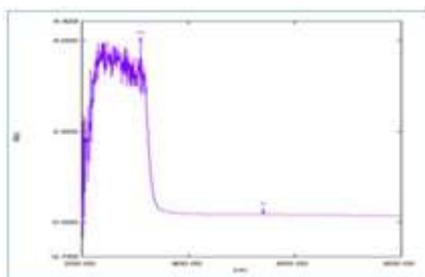


Figure 1. UV-Vis of Fe₂O₃

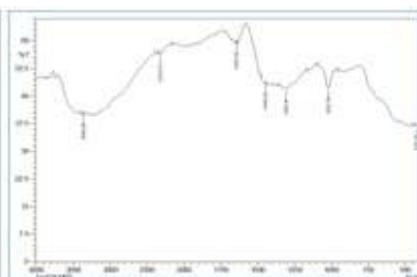


Figure 2. FTIR of Fe₂O₃

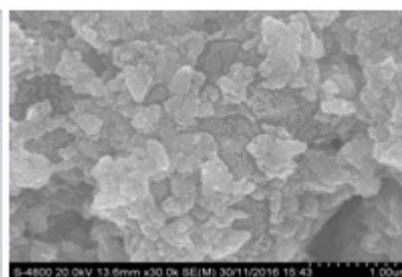


Figure 3. SEM of Fe₂O₃ NPS

2. Biological synthesized

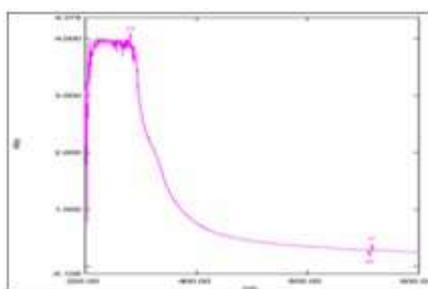


Figure 4. UV-Vis of Fe₂O₃

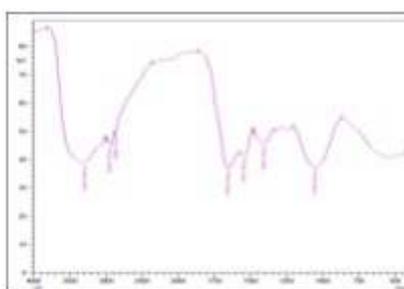


Figure 5. FTIR of Fe₂O₃ NPS



Figure 6. Determination FeNPS

Results and Discussion:

The results of this experiment synthesis of Fe₂O₃ NPs were observed. UV-Visible absorption maxima near 590 nm and 630 nm (Fig.1 and 4), which are close to the reported absorption maximum for chemically biologically synthesized Fe₂O₃ NPs respectively. Thus the above analytical characterizations clearly reveal that the bacterium Fig. 2 and 5 shows FTIR of Fe₂O₃ NPs. Fig. 3 represents the SEM images of Fe₂O₃ NPs. *Pseudomonas aeruginosa* when challenged with FeCl₂ results in the formation of a metallic iron and different oxides of Iron. Fig. 7 A and B noticed the Chemical synthesized Fe₂O₃ NPs Shows strong antibacterial activity against *Pseudomonas aeruginosa* with zone of inhibition 05 - 08 mm. whereas Fig. 7 C and D also reveals the biological synthesized Fe₂O₃ NPs show less moderate antibacterial activity against gram Negative *E. coli* with zone of inhibition ranging from 02 mm.



A. Control- *P. aeruginosa*



B. Chemical synthesized Fe_2O_3 NPs



C. Control- *E. coli*



D. Biological synthesized Fe_2O_3 NPs

Co-precipitation from aqueous solutions is one of the most frequently used methods. Synthesis of nanoparticles to have a better control over the particle size, distribution, morphology, purity, quantity and quality by employing ecofriendly economical processes, has always been considered a challenge (Abhilash *et al.*, 2011; Li *et al.*, 2011; Chokriwal *et al.*, 2014; Khande and Shahi 2016; Koushik *et al.*, 2010; Thakkar *et al.*, 2010) . Overall chemically synthesized NPs of around 100 nm size reveal very more toxicity that is also dose dependent, thus showing biocompatibility to the living cellular environment and biologically synthesized shows less toxic than chemically synthesized NPs. This is in accordance with the toxicity due to sized NPs may exhibit low toxicity that diminishes internalization (). These NPs can be exploited in a broad range of biomedical purposes Biological synthesis of metallic nanoparticles, Nanomedicine (Mandal *et al.*, 2004; Musarrat *et al.*, 2011).

Conclusion:

In the present study, we synthesized Iron Oxide Nanoparticles (Fe_2O_3 NPs) by chemical and biological method has been characterized by FTIR, UV-VIS, and SEM. The chemical synthesized Fe_2O_3 NPs is show strong antibacterial activity against pathogenic bacteria as compare to biological synthesized NPs. Results shows the chemically synthesized NPs are more toxic than biosynthesized NPs are less toxic and eco-friendly.

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Effect of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp on antioxidant defense system in alloxan induced diabetic fishes

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ABSTRACT:

The effect of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp on Antioxidant Defense system in Alloxan Induced Diabetic fishes (*Channa striata*) was studied.

The present study demonstrated that the hydroalcoholic extract of *S. cumini* seeds, juice and residual pulp possesses phytochemicals such as alkaloids, glycosides, phenolic compound and flavonoids and tannins. After 4th hr all test groups of animals significantly reduced elevated tissue glucose level compared to diabetic control. The extract of residual pulp at a 100 and 250 mg/kg concentration exhibits significantly ($p < 0.001$) increased 299.4 ± 1.878 and 332.1 ± 7.457 unit SOD activity respectively as compared with control group of animals. The extract of seed at 250 mg/kg concentration showed GPx activity (34.64 ± 1.299) which is nearly same as that of control group of fishes (35.26 ± 0.160 units). For peroxidase activity, seed extract at low concentration and residual pulp at high concentration showed equivalent antioxidant potential (3.228 ± 0.124 and 3.073 ± 0.005 unit) as that of control group of animals (3.607 ± 0.006 unit). Juice extract exhibited dose dependent catalase activity. The extract of juice at a 100 mg/kg concentration exhibits GSH activity (94.35 ± 1.006) nearly same that of control group of animals (95.62 ± 1.642). The present results exhibited that the extracts has potent antidiabetic and antioxidant activity.

Keywords: *Syzygium cumini*, Antioxidant, Diabetic and Alloxan

Introduction:

Diabetes mellitus is a syndrome characterized by abnormal insulin secretion, derangement in carbohydrate and lipid metabolism, and is diagnosed by the presence of hyperglycemia (Zimmet *et al.*, 1997). The currently suggested mechanism underlying diabetes and diabetic complications is Oxidative stress (Halliwell and Gutteridge, 1989). In recent years, much attention has been focused on the role of oxidative stress, and it has been reported that oxidative stress may constitute the key and common event in the pathogenesis of secondary diabetic complications (Ceriello, 2000). The role of free radical reactions in disease pathology is well established, suggesting that these reactions are necessary for normal metabolism but can be detrimental to health as well. During metabolism, oxygen consumption involves the constant generation of free radicals (O^{\cdot}) and Reactive Oxygen Species (ROS). There are many enzymatic and nonenzymatic antioxidant defense systems in the body that remove these toxic species. Enzymes such as superoxide dismutase, catalase, glutathione peroxidase, etc. are involved in this detoxification process (Clark *et al.*, 1985). Moreover, diabetes also induces changes in the activity of the antioxidant enzymes (Genet *et al.*, 2002). Accumulating evidence suggests that oxidative cellular injury caused by free radicals contributes to the development of diabetes mellitus (Baimbolkar and Sainani, 1995). Thus oxidative stress has been shown to have a role in the causation of diabetes type I and II and as such antioxidants may have a role in the alleviation of diabetes and related problems (John, 1991; Hunt *et al.*, 1990).

Recently, some synthetic antioxidants such as butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) have been suspected to be dangerous to human health (Safer and Al-Naghamigh, 1999). Therefore, there is an urgent need to search for novel antioxidants from natural sources, which could be used in medicine and additives to nutraceuticals (Thomas *et al.*, 2001). Plants often contain substantial amounts of antioxidants, such as carotenoids, flavonoids and tannins

(Larson, 1988) and they also suggest that antioxidant action may be an important property of plant medicines for treatment of diabetes. Many indigenous Indian medicinal plants have been found to be useful to successfully manage diabetes (Joy and Kuttan, 1999).

Syzygium cumini (L.) Skeels a polyembryonic species (family-Myrtaceae), is a tropical fruit tree of great economic importance (Chase *et al.*, 2009). Previous studies reported that, the bark of the plant has various properties like astringent, refrigerant, carminative, diuretic, digestive, antihelminthic, febrifuge, constipating, stomachic and antibacterial activity (Saravanan and Pari, 2008). The fruits and seeds are used to treat diabetes, pharyngitis, spleenopathy, urethrorrhea and ringworm infection (Saravanan and Pari, 2008). Potent antidiabetic activity of plant parts like the leaf, bark, stem and pulp of *S. cumini* were reported by various researchers (Chaudhary *et al.*, 2012; Kumar *et al.*, 2008; Leelavinothan and Saravanan, 2006; Farswana *et al.*, 2009; Bopp *et al.*, 2009).

Experimental animal models are one of the best strategies for the understanding of the pathophysiology of any disease to design and develop the drugs for its treatment (Rees and Alcolado, 2004). Numerous animal models have been developed over the past few decades for studying diabetes mellitus and testing antidiabetic agents that include chemical, surgical, and genetic manipulations (Srinivasan and Ramarao, 2007; Etuk, 2010).

Animal models of abnormal glucose metabolism are undoubtedly useful in this regard with their offer of new insights into T2DM. Numerous animal models of T2DM have been developed using:

1) spontaneous or planned genetic derivation; 2) dietary/nutritional induction; 3) chemical induction; 4) surgical manipulation; 5) transgenic/knock-out manipulation; or 6) a combination of the above. Most of the available models are rodent-based, which have drawbacks in that they are labour intensive and because of ethical issues, only small groups of animals can be used. To overcome these limitations, the zebrafish (*Danio rerio*) has been increasingly used to study diabetes and its related diseases, chosen because of the high similarities in organ physiology and metabolism between zebrafish and mammals. Recent studies have identified the zebrafish as an excellent system for the discovery and characterization of new diagnostic and therapeutic targets for metabolic diseases, including visceral adiposity and non-alcoholic steatohepatitis, atherosclerosis and diabetes. Several zebrafish models of diabetes have been established using toxin-mediated ablation of β -cells, ENU-induced mutagenesis screening and morpholino and gRNA/Cas9 mediated knockdown techniques (Zang *et al.*, 2017).

One of the most potent methods to induce experimental diabetes mellitus is chemical induction by alloxan and metformin hydrochloride. It is a well-known diabetogenic agent that is used to induce Type I and Type II diabetes in experimental animals (Viana *et al.*, 2004). This is the first report to study the effect of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp on Antioxidant Defense System in alloxan Induced Diabetic fishes.

Materials and Methods:

Collection of plant

Fruits of *Syzygium cumini* (Myrtaceae) were collected from Moolji Jaitha College, Jalgaon, (MS). The plant is identified by Dr. Maruti Deshattiwar, Department of Botany, Moolji Jaitha College, Jalgaon.

Preparation of extract

Fruits washed thoroughly with tap water and then distilled water to remove the debris. Then seeds (S) were separated from fruits. Obtained pulp was grind and from that juice (J) was separated by filtration and remains were labeled as Residual Pulp (RP). Then, all that, Seeds; Juice and Residual Pulp were shade dried. After complete drying, seeds were crushed and grinded to form coarse powder. Dried powder of Seeds, Juice and Residual Pulp were exhaustively extracted in Soxhlet apparatus with hydroalcohol (50:50). The solvent extracts so obtained were then filtered to remove any suspended

impurities. Extract were concentrated under reduced pressure and controlled temperature (55°C to 60°C). The extracts were preserved in dry, cool condition in desiccator. Obtained extracts were screened for their antioxidant and antidiabetic activities in fish model.

Experimental Animals

The Dok, *Channa striata* of both sexes were collected from Fish market at Amalner. The average body mass and length were 56.33 ± 8.2 g and 18 ± 3.8 cm respectively. The fish were immediately transported to special aquaria in the laboratory and acclimatized in the laboratory condition for 15 days in large glass aquaria (2' x 1' x 1') containing 40 L water. Stocking density were maintained at 12 fishes/40 L water to avoid overcrowding and the fishes were treated with tetracycline bath (0.012g/L) to prevent the outbreak of bacterial infection. The aquaria continuously aerated fresh water at $22 \pm 0.9^\circ\text{C}$. The fish were fed commercial pellets twice daily at a rate of 1% of their body masses.

Preliminary phytochemical screening: The qualitative chemical investigation of hydroalcoholic extracts of seed, juice and residual pulp were carried out to check the presence of various phytoconstituents (Harborne, 1986).

***In vivo* antidiabetic activity of allaxon induced fish (Perumal and Saravanabhavan, 2018)**

The *in vivo* study was performed in *Channa sp.* also known as snake headed fish. Fishes were collected from local cultivars from Jalgaon district. Animals were maintained under the control laboratory conditions of light and temperature and were fed with laboratory food and also phytoplanktons. Fishes of either sex and of approximately the same age, weighing between 60 ± 5 gm were selected and transferred to aerated aquarium tanks maintained under conditions identical to stock tanks. Fishes were fasted for 18h before the experiment. Except Group I, fish of all remaining groups were made diabetic by injections of alloxan monohydrate (200 mg/kg) in normal saline, intra peritoneal; twice - second dose was given after 7 hrs of first dose. Only hyperglycemic animals were used for further studies. After 18hours of alloxan treatment, Group III fishes were left untreated; while fishes of Group II received insulin injection at a dose of 1IU and fishes of Group IV (S1) and V (S2) received seed extract at concentration 100 and 250 mg/ml respectively. Group VI (J1) and VII (J2) received juice extract at concentration 100 and 250 mg/ml respectively. Group VIII (RP1) and IX (RP2) received residual pulp at concentration 100 and 250 mg/ml respectively. After 4 hours of test extracts administration all fishes were sacrificed.

The liver and pancreas were immediately removed, cleaned off gross adventitious tissue in 0.9% NaCl, pat dried and processed for biochemical measurement. Homogenates of tissue (10%w/v) was prepared in 0.1 M phosphate buffer (pH 7.4) using a Teflon Potter homogenizer at 4°C. The homogenates were centrifuged at 3000rpm for 20 min at 4°C and the resultant supernatant was used for glucose level estimation and antioxidant activity. Glucose level was estimated by using the standard glucose kit (Nirmal Laboratories, Chopda).

Antioxidant activity

Various enzymatic parameters like Assay of Superoxide Dismutase (SOD), Assay of Glutathione peroxidase (GPx), Assay of Peroxidase and Assay of Catalase and for non enzymatic, Assay of Reduced Glutathione (GSH) were carried out as per Nemade et al., 2011.

Results :

In this study, the secondary metabolites such alkaloids, glycosides, phenolic compound, flavonoids, terpenoids and tannin were screened in the hydroalcoholic extract of seeds, juice and residual pulp S. cumini. The results are presented in Table 1. From this analysis, it was found that glycosides, phenolic compound and flavonoids are present in all three extracts. However, terpenoids are absent in all extracts. Hydroalcoholic extract of seeds and pulp showed the presence of alkaloids. Tannin is absent

in hydroalcoholic extract of seed.

Table 2 reveals that the alloxan induced diabetic animals showed marked increased in the glucose level as compared with control group of animals, however all test groups of animals exhibited reduction in elevated tissue glucose level.

After 4th hr all test groups of animals significantly reduced elevated tissue glucose level compared to diabetic control. Seed extract at both the doses (100 and 250 mg/kg body weight) exhibited nearly equal glucose reduction, which are 51.82 and 50.72 mg/dl respectively. At higher dose, 250 mg/kg of juice reduced blood glucose level 59.13± 0.716 mg/dl. However, it is observed that at low dose (100mg/kg) of juice there was more reduction in elevated glucose level (51.53 ± 0.871 mg/dl). From all test groups, at 250mg/kg RP is more effective (45.83 ± 1.240 mg/dl) when compared to other test groups, which are reverted, back to near normal glucose level of control and standard groups of animal. Standard drug attains normal level with that of control group of fishes.

Table 1 Phytochemical screenings of hydroalcoholic extract of seeds, juice and residual pulp of *Syzygium cumini*.

| Photochemicals | Seed | Juice | Pulp |
|-------------------|------|-------|------|
| Alkaloids | + | - | ++ |
| Glycosides | + | + | + |
| Phenolic compound | + | ++ | + |
| Flavonoids | + | + | ++ |
| Terpenoids | - | - | - |
| Tannin | - | + | + |

+ = present, - = absent

Table 2 Effect of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp on glucose level in alloxan Induced Diabetic fishes.

| Groups | Glucose level mg/dl |
|------------------|---------------------|
| Control | 41.97 ± 0.660 |
| Standard | 42.97 ± 0.950 |
| Diabetic control | 68.99 ± 0.377 |
| S1 | 51.82 ± 0.871 |
| S2 | 50.72 ± 0.833 |
| J1 | 51.53 ± 0.871 |
| J2 | 59.13 ± 0.716 |
| RP1 | 54.26 ± 0.613 |
| RP2 | 45.83 ± 1.240* |

(S1=100, S2= 250 mg/kg body wt. of seed and J1= 100, J2= 250 mg/kg body wt. of juice and RP1= 100, RP2= 250 mg/kg body wt. of residual pulp of *S. cumini*) n=6; Mean ± S.E., *P<0.05 Vs Control

Antioxidant potential of hydroalcoholic extracts of seeds, juice and residual pulp of *Syzygium cumini* in alloxan induced Diabetic fishes were showed in Table 3. Level of SOD is decreased in Alloxan induced diabetic group of fishes (145 ± 0.523 unit) as compared with control group of fishes (216.9 ± 2.533 unit). The extract of residual pulp at a 100 and 250 mg/kg concentration exhibits significantly ($p < 0.001$) increased 299.4 ± 1.878 and 332.1 ± 7.457 unit SOD activity respectively as compared with control group of animals (216.9 ± 2.533 unit). The extract of juice at 250 mg/kg concentration exhibits significantly increased (312.4 ± 1.927 unit) SOD activity as compared with control group of animals (216.9 ± 2.533 unit). The activity of juice and residual pulp extracts showed slightly concentration dependent activity.

At low dose of seed (100 mg/kg) exhibited significantly ($p < 0.001$) increased SOD activity (277.10 ± 4.630). However, the activity of seed extract showed slightly decrease at high concentration, which is may be due to dependent on enzyme concentration present in it.

Table 3 Antioxidant activity of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp as in alloxan Induced Diabetic fishes.

| Groups | SOD | GPx | Peroxidase | Catalase | GSH |
|------------------|--------------------------|-------------------|-------------------|-------------------------|-------------------|
| Control | 216.9 ± 2.533 | 35.26 ± 0.160 | 3.607 ± 0.006 | 26.59 ± 0.166 | 95.62 ± 1.642 |
| Standard | 292.8 ± 1.634 | 43.05 ± 1.055 | 3.282 ± 0.041 | 14.54 ± 0.231 | 92.39 ± 1.023 |
| Diabetic control | 145.00 ± 0.523 | 12.82 ± 0.955 | 1.702 ± 0.029 | 06.20 ± 0.298 | 53.06 ± 3.422 |
| S1 | $277.10 \pm 4.630^{***}$ | 30.38 ± 1.622 | 3.228 ± 0.124 | $37.16 \pm 1.403^{***}$ | 82.47 ± 1.318 |
| S2 | 181.80 ± 0.968 | 34.64 ± 1.299 | 2.605 ± 0.005 | $37.24 \pm 0.403^{***}$ | 69.55 ± 1.195 |
| J1 | 181.50 ± 0.968 | 16.80 ± 0.707 | 2.481 ± 0.003 | $34.61 \pm 0.085^{**}$ | 94.35 ± 1.006 |
| J2 | $312.40 \pm 1.927^{***}$ | 25.89 ± 1.023 | 2.799 ± 0.008 | $72.95 \pm 1.048^{***}$ | 82.70 ± 1.260 |
| RP 1 | $299.40 \pm 1.878^{***}$ | 20.47 ± 0.598 | 2.800 ± 0.008 | 21.37 ± 0.264 | 80.28 ± 1.158 |
| RP 2 | $332.10 \pm 7.457^{***}$ | 23.95 ± 0.166 | 3.073 ± 0.005 | 25.07 ± 3.402 | 85.24 ± 1.318 |

(S1=100, S2= 250 mg/kg body wt. of seed and J1= 100, J2= 250 mg/kg body wt. of juice and RP1=100, RP2= 250 mg/kg body wt. of residual pulp of *S. cumini*) n=6; Mean \pm S.E., ***P<0.001, **p<0.01, Vs Control

The extract of seed at 250 mg/kg concentration showed GPx activity (34.64 ± 1.299) which is nearly same as that of control group of fishes (35.26 ± 0.160 unit). The extract of juice at a 100 concentration exhibits lowest GPx activity, 16.8 ± 0.707 unit. The extract of residual pulp at a both concentration confirmed GPx activity 20.47 ± 0.5984 and 23.95 ± 0.1669 unit respectively. Level of GPx is decreased in Alloxan induced diabetic group of fishes 12.82 ± 0.955 unit as compared with control group of fishes 35.26 ± 0.160 unit.

For peroxidase activity, seed extract at low concentration and residual pulp at high concentration showed equivalent antioxidant potential (3.228 ± 0.124 and 3.073 ± 0.005 unit) as that of control group of animals (3.607 ± 0.006 unit). However, the activity of seed extract showed slightly decrease at high concentration, which is may be due to dependent on enzyme concentration present in it. Remaining all groups of animals exhibited peroxidase activity ranges from 2.48 to 2.80 units.

Both concentrations of seed and juice extracts significantly confirmed the catalase potential when compared with control group of animals. Both concentrations of seed extract demonstrate equal catalase activity, 37.16 ± 1.403 and 37.24 ± 0.403 unit. On the other hand, juice extract exhibited dose

dependent catalase activity. Though, residual extract at high concentration not confirm significant antioxidant potential (25.07 ± 3.402 unit), it showed activity which is nearly equivalent to that of control group of animals (26.59 ± 0.166 unit). All tested groups of animals demonstrated catalase activity higher than standard group of animals.

The extract of juice at a 100 mg/kg concentration exhibits GSH activity (94.35 ± 1.006) nearly same that of control group of animals (95.62 ± 1.642). The lowest concentration of seed extract showed 82.47 ± 1.318 unit GSH activity, however high concentration of same extract exhibited low antioxidant activity (69.55 ± 1.195).

Discussion:

SOD and catalase activity in hepatopancreatic tissue homogenate showed significant increased in fish groups treated with hydroalcoholic extracts of seed, juice and residual pulp compared to the control group. This result is similar to results of Diab *et al.*, 2002, they found that use of garlic in fish farming enhanced the activity of non specific defense system in *O. neloticus*. Also the powder of garlic increased the antioxidant capacity in hamsters (Yaoling *et al.*, 1998).

Photochemicals are the primary and secondary chemical constituents of the plants. They can detoxify substances that cause various diseases. They neutralize free radicals, inhibit enzymes that activate carcinogens, and activate enzymes that detoxify carcinogen (Meagher and Thomson, 1999)

Phlorotaninins are polyphenolic compounds, besides their structural chemical and biological functions, they have been recognized over the years as promising bioactive compounds with potential health benefits in a wide variety of human diseases (Li *et al.*, 2011). Among them the capacity of these polyphenols to prevent the onset and to slow down the progression of diabetes mellitus, as well as to treat diabetes related complications has began to be explored in recent few years (Lopes *et al.*, 2017). Plant phenols are act as primary antioxidant or free radical scavengers (Polterait, 1997). Flavonoids are also play important role as antioxidant (Nemade *et al.*, 2011). Flavonoids enhance the effects of Vitamin C and function as antioxidants. Bioflavonoids are responsible for the stimulation of glucose uptake in peripheral tissues and regulation of the activity or expression of the rate-limiting enzymes involved in carbohydrate metabolism (Gupta *et al.*, 2011). Plant polyphenols and flavonoids are some of the naturally occurring antidiabetic agents which are known to show an inhibitory effect on carbohydrate hydrolyzing enzyme inhibition, by virtue of their capability to bind with proteins (Ganeshpurkar *et al.*, 2013, Béjaoui *et al.*, 2016). Plants often contain substantial amounts of antioxidants, such as carotenoids, flavonoids and tannins (Larson, 1988) and they also suggest that antioxidant action may be an important property of plant medicines for treatment of diabetes. The first line of defenses against free radicals groups these enzymatic systems (SOD, CAT, GPx) and are aided by micronutrients (copper, zinc, selenium) (Evans and Halliwell, 2001) as cofactors. The second line of defenses involves non-enzymatic antioxidants, such as naturally nutrients provided by food, with a scavenging effect (capture of free electron and formation of more stable entities), a stimulatory effect on endogenous antioxidant enzymes, or both (Pietta, 2000). Main molecules are GSH, vitamin E (the most active form: α -tocopherol), vitamin C (L-ascorbic acid), vitamin A (carotenoids), but also polyunsaturated fatty acids or exogenous flavonoids (quercetin, rutin, resveratrol, etc.), which can strengthen the antioxidant defenses of the body (Evans and Halliwell, 2001). For example, increasing concentration of GSH with these products can protect against cancer (Bounous, 2000) and diabetic complications (Thornalley *et al.*, 1996). The present studied plant having polyphenolic compounds and flavonoids reflect that it possesses antidiabetic and antioxidant potential.

Conclusion:

The present study demonstrated that the hydroalcoholic extract of *S. cumini* seeds, juice and residual pulp possesses phytochemicals such as alkaloids, glycosides, phenolic compound and flavonoids and

tannins which are of high therapeutic value. The present results exhibited that the extracts has potent antidiabetic and antioxidant activity. The study reveals that, cultivation of this plant increase socio economic status of the rural life furthermore, it proves its traditional medicinal utilization for the management of diabetes. Isolation of the active principle may help for further study.

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Fish gelatin and its application in selected cosmetic aspects

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ABSTRACT:

The demand for gelatin for cosmetics application is increasing because it is one of the most widely used active ingredients. Its applications in cosmetics manufacturing are very wide-ranging including enhancing the elasticity, firmness and consistency of products. In this study, gelatin was extracted from the skin of the freshwater fish namely *Cirrhinus Spp*. The fish skin is a prospective source of good gelatin with desired functional properties. The UV-VIS absorption spectra and Fourier transform infrared spectroscopy proved that the product is gelatin. The results suggest that, the potential to be an alternative source of gelatin for various applications in cosmetic application.

Keywords: Gelatin, *Cirrhinus*, UV-VIS, FTIR.

Introduction:

Gelatine is one of the most conventional biopolymers. It is tasteless and colourless solid substance derived from the fibrous protein collagen. Gelatine is translucent, colourless, brittle, flavourless food derived from collagen obtain from fish scale, skin, bones. Gelatine contains 62% calories, 1.2% protein and 14% carbohydrates. Gelatine is widely used in food, pharmaceutical, cosmetic and photographic applications because of its unique functional and technological properties. Generally, most of the commercial gelatines can be obtained from skin, scale, bones, ligament and tendon of porcine or bovine. Gelatin is obtain from degradation of collagen, thus collagen containing tissue are generally used as source of gelatine (See *et al.*, 2010). The use of fish by-products for the production of gelatine has several advantages. Gelatine, an important biopolymer, used as a jellying ingredient in shampoos, body lotion, face cream, hair spray, sun screen, classical food, photographic, cosmetic and pharmaceutical application etc (Sakr, 1997). Food grade fish gelatin is abstracted from fish scales and fish skins, simulating the mechanism of protein digestion in human body and using advanced directed enzymolysis biotechnology (Ali Aberoumand, 2010; Gómez-Guillén *et al.*, 2006). Scientific literature about different alternative sources and new functionalities of collagen and gelatin has experienced a boom in the last 10-15 years, in part due to the growing interest in the economical valorisation of industrial by-products (from the meat and fish industry), Jamilah, *et al.*, (2011) also recommended the environmental friendly management of industrial wastes, and the search for innovative processing conditions as well as potential novel applications. Hence, in the present study, the potential of gelatin extracted from freshwater fish *Cirrhinus Spp*, skin utilized as active ingredient in formulating cosmetic products. The problem with safety and efficacy of the cosmetic product will be explored throughout this research. These properties increase the demand of gelatin production in industries.

Materials and Methods:

A. Sample Preparation: *Cirrhinus Spp*, fish was bought from a vicinity of Jalgaon. The fish was stored directly in the refrigerator. The skin of fish had been removed by using a knife and homogenated by using a blender.

B. Gelatin Extraction: The extraction procedure was conducted according to Grossman and Bergman (1992), with slight modifications. 50 g of the skin had been washed with tap water for 1 h to remove superfluous material. Then, the skin was soaked in 100 mL of 0.4 (w/v) NaOH for 4 h to remove the non-collagenous protein. Extraction method result into gelatins with different functionality. In general, fish gelatin holds some characteristic properties that make it different from other sources.

Analytical Methods
Table No.1

| Sr No. | Parameter | Values |
|--------|------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1 | Determination of yield (Yield of gelatin (%) = (weight of dried gelatin [g] / wet weight of fish skin[g]) × 100) | 50 gm= 14.44 % |
| 2 | Determination of pH | 7.2 |
| 3 | Determination of Colour by Jamilah et al. (2011) | white |
| 4 | Viscosity (Cho et. al., 2006) | 6.67% |
| 5 | Clarity (ISO 7027:1999) | Milky white |
| 6 | Foam Formation Capacity and Foam Stability (Cho et. al., 2004) | 30 min |
| 7 | Water holding and Fat binding capacities (Cho et. al., 2004) | 1 hr |
| 8 | Determination of Melting point (Wainwright, 1977) | 60 0 C |
| 9 | Determination of Setting point and Setting time | 0 ° C |
| 10 | described by Muyonga et al., (2004). Gel strength determination described by (BS 757:1975). | 17 hrs |
| 11 | Determination of Odour (Muyonga et. al., 2004). | No odour |
| 12 | Determination of Moisture (Method 934.01: AOAC, 2000) | 4 hr 568.18 mg per ml |
| 13 | Determination of Crude Protein (Lowry: AOAC, 2000) | |
| 14 | Determination of Crude Fat (Method 991 .36:AOAC, 2000) | 3.32 mg per ml |

Characterization

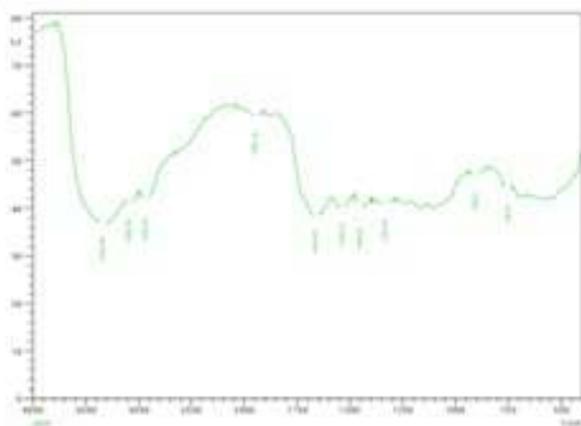


Figure 1.FTIR of Skin Gelatin

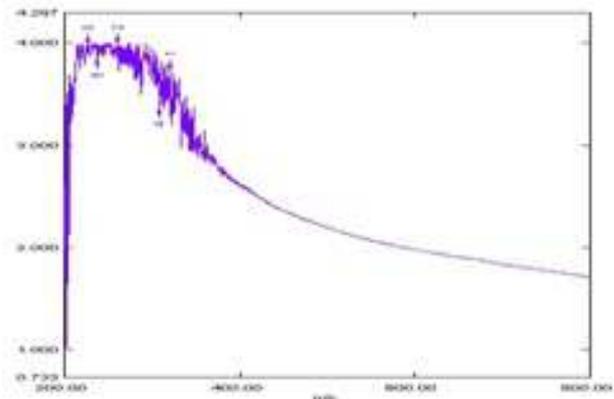


Figure 2. UV-Vis of Skin Gelatin

Results And Discussion

The parameters which were extracted from the freshwater fish skin are tabulated in Table No.1. In present study we successfully extracted gelatin from Skin of freshwater fish (*Cirrihnus spp.*), by acid treatment. As per result it is confirmed that sample was gelatin. Figure 1, shows Amide-A, Amide-I, Amide-II and Amide-III band of FTIR analysis and by UV spectrum. The spectrum shows maximum absorption at 230 nm in figure 2, Which shows characteristic of gelatin. The extracted samples were white in colour and crystalline in appearance.

The highest yield of 14.44% was obtained. Anchana Devi *et al.*, (2016) extracted gelatin from the different fish species of fresh water they reported highest yield of 8% obtained from the *Carcharhinus amblyrhyncho* and 6% from *Sphyraena barracuda*. Present work gives strong evidence with that of the industrial utilization of collagen or gelatin obtained from non-mammalian species is growing up in research in the last decade. It is used in classical food, photographic, cosmetic and pharmaceutical application which is based mainly on gel-forming properties of gelatin (Gómez-Guillén, *et al.*, 2011; See *et al.*, 2010; Sakr, 1997).

Application in cosmetics:

1. Gelatin + Hot Water + Lemon Juice = Face Glow.



Before

Treatment

After

2. For Black Heads = Gelatin + Charcoal + Warm Water.

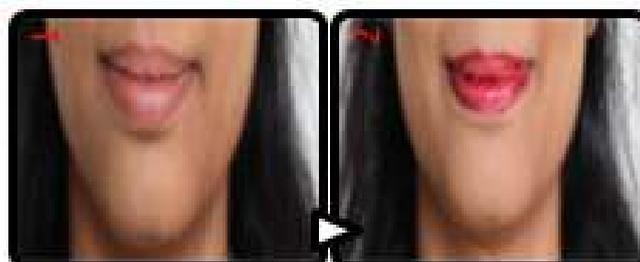


Before

Treatment

After

3. Hot water + Gelatin + Food colour = Natural Lipstick

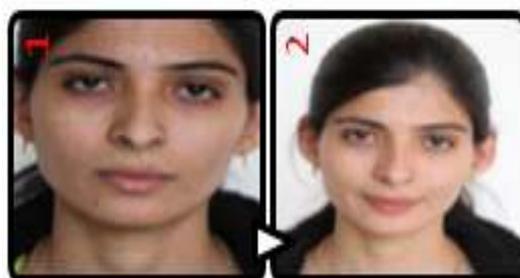


Before

213

After

4. Oatmeal+ Gelatin+ Honey=Face Mask



Before

After

Conclusion:

This study revealed the potential of skin of *Cirrhinus Spp*, as a raw material for gelatin production, giving relatively high yield. This study recommends doing the extraction process for the uses for face glowing, black head removal, as a natural lipstick, as a skin smoothening agent followed with acid extraction. In addition, *Cirrhinus Spp*, Fishskin gelatin could be applied as new alternative source in product processing as substitute alternative of cow and pig gelatin for Cosmetic applications. In brief, fish skin is a cost effective and environmentally friendly source of gelatin which can be used in various cosmetics industrial purposes.

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Hepatoprotective potential of fruit of *Syzygium cumini* on alloxan induced diabetes in fish

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ABSTRACT:

Diabetes mellitus is a syndrome characterized by abnormal secretion of insulin, alteration in the metabolism of carbohydrates and lipids, and is diagnosed by the presence of hyperglycemia. Several medicinal plants and their purified constituents have shown beneficial therapeutic potentials. The present work is carried out to investigate the Anti-diabetic, Hepatoprotective and Antioxidant activity of the seed, the juice and the residual pulp of *Syzygium cumini* in the alloxan induced diabetic fish *Channa striata*. The seed extract at a concentration of 100 and 250 mg/ml exhibits a Catalase activity significantly 37.16 ± 1.403 and 37.24 ± 0.403 unit respectively, compared to the Catalase activity of 6.205 ± 0.298 units of diabetes induced by Alloxan. The juice extract exhibits dose-dependent activity. The glucose level of *S. cumini* hydroalcoholic extracts of seed, juice and residual pulp were treated with alloxan-induced fishes were significantly increased (Seed 51.82 ± 0.871 , 50.72 ± 0.833 mg/dl, Juice 51.53 ± 0.871 , 59.13 ± 0.716 mg/dl and Residual pulp 54.26 ± 0.613 , 45.83 ± 1.240 mg/dl glucose at 100 and 250 mg/ml concentration), when the results were compared with control group 41.97 ± 0.660 mg/dl. Hepatoprotective results are also significant. We would like to propose that the seed, the juice and the residual pulp of *S. cumini* contain an appreciable amount of active principle(s) and would potentiate the antidiabetic, hepatoprotective and antioxidant activity synergistically.

Key words: *Syzygium cumini*, Antidiabetic, Hepatoprotective, Antioxidant, *Channa striata*

Introduction:

Aquaculture in India has a long history, with references to fish culture in Kautilya's Arthashastra (321–300 B.C.) and King Someswara's Manasoltara (1127 A.D.). As the second largest country in aquaculture production, the share of inland fisheries and aquaculture has gone up from 46 percent in the 1980s to over 85 percent in recent years in total fish production. Aquaculture in India has experienced a rapid expansion in the past decade. Availability of balanced supplementary feed for different life stages for diversified cultivable species and appropriate disease management measures are some of the important other developments. However, the increased rate of feed and incidence of various kinds of fish diseases has become one of the major obstacles for the further development of freshwater aquaculture. To control and prevent the said problem, a large quantity of protein feed replacement and antibiotics and chemicals has been put into the water environment and feeds, which may, in turn, cause problems for fish. Therefore, here an attempt has been made to investigate the effect of *Syzygium cumini* on Alloxan induced diabetic fish to check the effect of it as feed and liver toxicity.

The teleostean fish are generally considered to be glucose intolerant (Palmer and Ryman 1972; Furuichi and Yone 1980; Mommsen and Plisetskaya 1991; Wilson 1994; Wright *et al.*, 1998; Moon 2001). The hypoglycemic levels in the fish in response to glucose administration extend for 6–36 h (Palmer and Ryman 1972; Mazur *et al.*, 1992; Ottolenghi *et al.*, 1995; Wright *et al.*, 1998). These authors used different species as rainbow trout, Chinook salmon, channel catfish and tilapia. Moreover, administration of glucose in the fish *Clarias lazera* caused hyperglycemia for 24 h (Yanni 1964). On the other hand, in mammals, plasma glucose returns to baseline within 1–2 h after glucose administration. Wilson (1994) concluded that fish may be a good model of non-insulin-dependent diabetes, while Kelley (1993) suggested that fish generally suffer from insulin dependent diabetes. Insulin injection into fish improved glucose tolerance when given with glucose (Palmer and Ryman

1972). Furthermore, Panserat *et al.*, (2000) reported that one of the earlier hypotheses to explain the difficulty of rainbow trout to use high levels of dietary carbohydrate is a deficiency of the liver to actively convert the intracellular glucose to glucose-6-phosphate.

A problem in the development of complete artificial diets for fish is the high protein requirement of many species and this component contributes a high proportion of feed costs (Anderson *et al.*, 1984). Moreover, teleosts utilize carbohydrate poorly depending primarily on protein and lipid for energy production (Furuichi *et al.*, 1971; Nagai and Ikeda 1972; Walton and Cowey 1982; Wright *et al.*, 1998). So many workers search for cheap feed source for fish such as carbohydrate and how to help the fish to utilize diet rich in carbohydrates. Many studies used plant extract especially legumes to improve the glucose utilization in mammals (Lavigne *et al.*, 2000; Newairy *et al.*, 2002). Venancio *et al.*, (2003) reported that protein isolated from some legumes has the same molecular mass and amino acid sequence as that of bovine insulin. Furthermore, they showed that purified protein of legume reacts with anti-vertebrate insulin antibodies and lowers blood glucose levels in diabetic animals. Seeds of lupine (*Lupinus termis*) have a hypoglycemic action in diabetic animals (Abdel-Aal *et al.*, 1993; Eskander and Won Jon 1995; Newairy *et al.*, 2005) and in normal rats (Helmi *et al.*, 1969; Abdel-Aal *et al.*, 1993).

Diabetes mellitus is a syndrome characterized by abnormal insulin secretion, derangement in carbohydrate and lipid metabolism, and is diagnosed by the presence of hyperglycemia (Zimmet *et al.*, 1997). The currently suggested mechanism underlying diabetes and diabetic complications is Oxidative stress (Halliwell and Gutteridge, 1989). In recent years, much attention has been focused on the role of oxidative stress, and it has been reported that oxidative stress may constitute the key and common event in the pathogenesis of secondary diabetic complications (Ceriello, 2000).

Recently, some synthetic antioxidants such as butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) have been suspected to be dangerous to human health (Safer and Al-Naghamigh, 1999). Therefore, there is an urgent need to search for novel antioxidants from natural sources, which could be used in medicine and additives to nutraceuticals (Thomas *et al.*, 2001). Although a large variety of synthetic compounds have been found to be effective in reducing diabetic complications as well as organ protective action, there are relatively few compounds that are clinically successful, especially in regard of the organ protective function. This is due to undesirable side effects and poor pharmacokinetic profiles. Thus there is a great need to search for new molecules from nature, with plants remaining the most promising source due to the extraordinary biodiversity which yields an impressive variety of phyto-constituents.

Experimental animal models are one of the best strategies for the understanding of the pathophysiology of any disease to design and develop the drugs for its treatment (Rees and Alcolado, 2004). Numerous animal models have been developed over the past few decades for studying diabetes mellitus and testing antidiabetic agents that include chemical, surgical, and genetic manipulations (Srinivasan and Ramarao, 2007; Etuk, 2010)

Animal models of abnormal glucose metabolism are undoubtedly useful in this regard with their offer of new insights into T2DM. Numerous animal models of T2DM have been developed using: 1) spontaneous or planned genetic derivation; 2) dietary/nutritional induction; 3) chemical induction; 4) surgical manipulation; 5) transgenic/knock-out manipulation; or 6) a combination of the above. Most of the available models are rodent-based, which have drawbacks in that they are labour intensive and because of ethical issues, only small groups of animals can be used. To overcome these limitations, the zebrafish (*Danio rerio*) has been increasingly used to study diabetes and its related diseases, chosen because of the high similarities in organ physiology and metabolism between zebrafish and mammals. Recent studies have identified the zebrafish as an excellent system for the discovery and

characterization of new diagnostic and therapeutic targets for metabolic diseases, including visceral adiposity non-alcoholic steatohepatitis, atherosclerosis and diabetes. Several zebrafish models of diabetes have been established using toxin-mediated ablation of β -cells, ENU-induced mutagenesis screening and morpholino and gRNA/Cas9 mediated knockdown techniques (Zang *et al.*, 2017).

Among the thousands of medicinal plants, *Syzygium cumini* (L.) Skeels belonging to the family Myrtaceae, is deserving of special attention due to its antidiabetes potential. All parts of the tree can be used medicinally and it has a long history of use in traditional medicine. Various traditional practitioners in the Indian subcontinent use the different parts of this tree in the treatment of a wide range of conditions, including diabetes, blisters in the mouth, cancer, colic, diarrhea, digestive complaints, dysentery, piles, pimples and stomachache. In Unani medicine various parts of *S. cumini* are used and said to act as a liver tonic, enrich blood, strengthen teeth and gums and be able to remove ringworm infections of the head in a lotion form. Pharmacological studies have reported hypoglycemic properties of this medicinal species. Other experimental studies using different extracts of the plant reported that *S. cumini* possesses antioxidant activity, antihypertensive and anti-atherosclerotic potentials, cardio-protective effect and hepato-protective effect.

The reported constituents include Flavonoids (quercetin, rutin and 3,5,7,4-tetrahydroxy flavanone) phenolic acids (caffeic acid, ellagic acid, ferulic acid and Gallic acid), tannins (corilagin, 3,6-hexahydroxydiphenoyl glucose, 4,6-hexahydroxydiphenoyl glucose, 1-galloyl glucose and 3-galloyl glucose), terpenes (α -terpineol, β -pinene, β -terpinene and betulinic acid). A reportedly antidiabetic compound, mycaminose, was isolated from *S. cumini* seeds extract. The seeds are reported to contain jamboline, traces of pale yellow essential oil, chlorophyll, fat, resin, albumen, tannins (Jadhav *et al.*, 2009), phenolic compounds such as ellagic acid, gallic acid, caffeic and ferulic acids and their derivatives (Williamson, 2002) and flavonoids like rutin and quercetin (Sharma *et al.*, 2008). Based on such constituents, seed extracts are expected to possess excellent astringent and antioxidant potential, which may be beneficial in relieving gastroenteritis and liver inflammation.

This is the first report to study the effect of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp on Alloxan induced diabetic fish to check the effect of it as feed and liver toxicity.

Materials and Methods:

Collection and Identification: *Syzygium cumini* (Myrtaceae) (Fig. 1):

Fruits of *Syzygium cumini* (Jamun) were collected from Moolji Jaitha College, Jalgaon, (MS). The plant is identified by Dr. Maruti Deshattiwar, Department of Botany, Moolji Jaitha College, Jalgaon.

Preparation of extract

Fruits washed thoroughly with tap water and then distilled water to remove the debris. Then seeds were separated from fruits. Obtained pulp was ground and from that juice was separated by filtration and remains were labeled as Residual Pulp (RP). Then, all that, Seeds; Juice and Residual Pulp were shade dried. After complete drying, seeds were crushed and grinded to form coarse powder. Dried powder of Seeds, Juice and Residual Pulp were exhaustively extracted in Soxhlet apparatus with hydroalcohol (50:50). The solvent extracts so obtained were then filtered to remove any suspended impurities. Extracts were concentrated under reduced pressure and controlled temperature (55°C to 60°C). The extracts were preserved in dry, cool condition in desiccator. Obtained extracts were screened for their antioxidant and antidiabetic activities in fish model.



Fig. 1 *Syzygium cumini* (Myrtaceae)

Experimental animal (Fig. 2):

The Dok, *Channa striata* of both sexes were collected from Fish market at Amalner. The average body mass and length were 56.33 ± 8.2 g and 18 ± 3.8 cm respectively. The fish were immediately transported to special aquaria in the laboratory and acclimatized in the laboratory condition for 15 days in large glass aquaria (2' x 1' x 1') containing 40 L water. Stocking density were maintained at 12 fishes/40 L water to avoid overcrowding and the fishes were treated with tetracycline bath (0.012g/L) to prevent the outbreak of bacterial infection. The aquaria continuously aerated fresh water at 22 ± 0.90 C. The fish were fed commercial pellets twice daily at a rate of 1% of their body masses.



Fig. 2 *Channa striata*

Preliminary phytochemical screening: The qualitative chemical investigation of hydroalcoholic extracts of seed, juice and residual pulp were carried out to check the presence of various phytoconstituents (Harborne, 1986).

In vivo antidiabetic activity of allaxon induced fish (Perumal and Saravanabhavan, 2018)

The *in vivo* study was performed in *Channa* sp. also known as snake headed fish. Fishes were collected from local cultivars from Jalgaon district. Animals were maintained under the control laboratory conditions of light and temperature and were fed with laboratory food and also phytoplanktons. Fishes of either sex and of approximately the same age, weighing between 60 ± 5 gm were selected and transferred to aerated aquarium tanks maintained under conditions identical to stock tanks. Fishes were fasted for 18h before the experiment. Except Group I, fish of all remaining groups were made diabetic by injections of alloxan monohydrate (200 mg/kg) in normal saline, intra peritoneal; twice - second dose was given after 7 hrs of first dose. Only hyperglycemic animals were used for further studies. After 18hours of alloxan treatment, Group III fishes were left untreated; while fishes of Group II received insulin injection at a dose of 1IU and fishes of Group IV (S1) and V (S2) received seed extract at concentration 100 and 250 mg/ml respectively. Group VI (J1) and VII (J2) received juice extract at concentration 100 and 250 mg/ml respectively. Group VIII (RP1) and IX (RP2) received residual pulp at concentration 100 and 250 mg/ml respectively. After 4 hours of test extracts administration all fishes were sacrificed.

The Hepato-Pancreas (liver and pancreas) were immediately removed, cleaned off gross adventitious tissue in 0.9% NaCl, pat dried and processed for biochemical measurement. Homogenates of tissue (10%w/v) was prepared in 0.1 M phosphate buffer (pH 7.4) using a Teflon Potter homogenizer at 4°C. The homogenates were centrifuged at 3000rpm for 20 min at 4°C and the resultant supernatant was used for glucose level estimation and antioxidant activity. Glucose level was estimated by using the standard glucose kit (Nirmal Laboratories, Chopda).

Results

In this study, the secondary metabolites such alkaloids, glycosides, phenolic compound, flavonoids, terpenoids and tannin were screened in the hydroalcoholic extract of seeds, juice and residual pulp *S. cumini*. The results are presented in Table 1. From this analysis, it was found that glycosides, phenolic compound and flavonoids are present in all three extracts. However, terpenoids are absent in all extracts. Hydroalcoholic extract of seeds and pulp showed the presence of alkaloids. Tannin is absent in hydroalcoholic extract of seed.

Table 2 reveals that the allaxon induced diabetic animals showed marked increased in the glucose level as compared with control group of animals, however all test groups of animals exhibited reduction in elevated tissue glucose level.

After 4th hr all test groups of animals significantly reduced elevated tissue glucose level compared to diabetic control. Seed extract at both the doses (100 and 250 mg/kg body weight) exhibited nearly

equal glucose reduction, which are 51.82 and 50.72 mg/dl respectively. At higher dose, 250 mg/kg of juice reduced blood glucose level 59.13 ± 0.716 mg/dl. However, it is observed that at low dose (100mg/kg) of juice there was more reduction in elevated glucose level (51.53 ± 0.871 mg/dl). From all test groups, at 250mg/kg RP is more effective (45.83 ± 1.240 mg/dl) when compared to other test groups, which is reverted back to near normal glucose level of control and standard groups of animal. Standard drug attains normal level with that of control group of fishes.

Alloxan injection into *Channa striata* led to hyperglycemia after 5h. Also, Alloxan significantly elevated serum levels of alkaline phosphatase, SGOT and Glucose. On the other hand, alloxan decreased serum level of SGPT (Tables 2).

After the treatment of *S. cumini*, seed at the higher dose (250 mg/kg) and juice at the dose 100 mg/kg significantly ($p < 0.001$) increased serum level of alkaline phosphatase (0.8018 ± 0.027 and 0.4232 ± 0.019) as compared with control group of animals (0.117 ± 0.000577). Whereas, seed at lower dose and juice at higher dose exhibits very high activity. This is may be due to the substrate concentration and or enzymatic action of the test material.

The SGPT level decreased in Alloxan induced animal (4.5 ± 0.5627 unit) as compared with control group of animal (70 ± 0.8563 unit). At the 250 mg/kg dose of Seed and Pulp

Table 1 Phytochemical screenings of hydroalcoholic extract of seeds, juice and residual pulp of *Syzygium cumini*.

| Photochemicals | Seed | Juice | Pulp |
|-------------------|------|-------|------|
| Alkaloids | + | - | ++ |
| Glycosides | + | + | + |
| Phenolic compound | + | ++ | + |
| Flavonoids | + | + | ++ |
| Terpenoids | - | - | - |
| Tannin | - | + | + |

Table 2 Hepatoprotective effect of hydroalcoholic extract of *Syzygium cumini* seed, juice and residual pulp in alloxan Induced Diabetic fishes.

| Groups | Glucose level (mg/dl) | ALP (unit) | SGPT (unit) | SGOT (unit) |
|-----------|-------------------------|--------------------------|-------------------------|-------------------------|
| Control | 41.97 ± 0.660 | 0.117 ± 0.0005 | 70 ± 0.856 | 60.83 ± 0.477 |
| Standard | 42.97 ± 0.950 | 0.5957 ± 0.039 | 3.5 ± 0.428 | 41.67 ± 0.421 |
| Alloxan | 68.99 ± 0.377 | 0.4298 ± 0.015 | 4.5 ± 0.562 | 69.83 ± 0.945 |
| Seed 100 | $51.82 \pm 0.871^{***}$ | $4.041 \pm 0.298^{***}$ | $9.833 \pm 0.792^{***}$ | $33.33 \pm 0.714^{***}$ |
| Seed 250 | 50.72 ± 0.833 | $0.8018 \pm 0.027^{***}$ | $110.8 \pm 1.167^{***}$ | $31 \pm 0.577^{***}$ |
| Juice 100 | 51.53 ± 0.871 | $0.4232 \pm 0.019^{***}$ | $37.17 \pm 1.195^{***}$ | $75.83 \pm 1.046^{***}$ |
| Juice 250 | $59.13 \pm 0.716^{***}$ | $2.752 \pm 0.296^{***}$ | $27 \pm 0.577^{***}$ | $33.33 \pm 0.802^{***}$ |
| Pulp 100 | $54.26 \pm 0.613^{***}$ | $3.825 \pm 0.343^{***}$ | $20.5 \pm 1.232^{***}$ | $76.5 \pm 0.763^{***}$ |
| Pulp 250 | $45.83 \pm 1.240^{***}$ | $2.072 \pm 0.177^{***}$ | $109.2 \pm 1.167^{***}$ | $129.8 \pm 0.833^{***}$ |

n=6; Mean \pm S.E., , ***P<0.001 Vs Control

significantly ($p < 0.001$) confirm SGPT level (110.8 ± 1.167 and 109.2 ± 1.167 unit) when compared to control group of animals (70 ± 0.8563 unit). However, at the low dose (100 mg/kg) of juice exhibits high SGPT level (37.17 ± 1.195 unit) than at higher dose (250 mg/kg) SGPT level (27 ± 0.5774 unit). The lowest SGPT level was observed at 100 mg/kg concentration of seed extract (9.833 ± 0.7923 unit). The results of SGOT level significantly ($p < 0.001$) increased at 100 mg/kg of juice, and both doses of Pulp 75.83 ± 1.046 , 76.5 ± 0.7638 and 129.8 ± 0.8333 respectively when compared to control group of animals (60.83 ± 0.4773). The parallel results of SGOT level at both doses of Seed and 250 mg/kg dose of Juice extracts (33.33 ± 0.7149 , 31 ± 0.5774 and 33.33 ± 0.8028 unit respectively). The concentration of Juice and Pulp at 100 mg/kg concentration exhibited near about equivalent SGOT level (75.83 ± 1.046 and 76.5 ± 0.7638 unit respectively). The highest SGOT level (129.8 ± 0.8333 unit) was observed at 250mg/kg concentration of pulp.

Discussion

Goel (1977) studied Alloxan-induced diabetic fish during the first 100 h after drug administration and observed submassive necrosis of the liver in these animals. This author postulated that Alloxan altered the regular pathways of cellular metabolism, including the inactivation of certain enzymes, which led to liver damage and death. They suggested that focal or diffuse hepatic necrosis is only observed in animals that are sacrificed or die during an early phase. Kume et al., (1994) also reported acute morphological changes in the liver of mice treated with SZ, including hepatocyte hypertrophy, an increased number of intracytoplasmic acidophilus granules, and bile duct hyperplasia, which were also not observed in the livers of animals in this study. However, the results of these researchers suggest that the liver morphological alterations that are observed during the early stages of treatment with Alloxan or SZ may be more related to the toxic action of these drugs than to the effects of diabetes mellitus.

Clinical and experimental evidence suggests that diabetes mellitus (DM) affects the liver in addition to blood vessels, kidneys, retina and nerves (Evelson *et al.*, 2005, Verderese *et al.*, 2013). However, the recognition of diabetes mellitus as the primary cause of chronic liver disease is neglected in medical practice because of the wide variety of clinical, metabolic and hormonal conditions that can lead to obesity, malnutrition, intestinal malabsorption, dyslipidemia, thyroid disorders, and metabolic syndrome (Portincasa *et al.*, 2005).

Alloxan and streptozotocin (SZ) exert a toxic effect on pancreatic beta cells, which causes T1 diabetes mellitus, but this effect extends to the kidneys and livers of animals of several species (Shaw *et al.*, 1943, Junod *et al.*, 1967). However, the systemic toxicity of these drugs is closely related to species, age and body weight of the animals used and the hydration status, route of administration, infusion rate and duration of fasting for drug administration (Lukens, 1948).

Mahmoud and Al-Salahy (2004) demonstrated that hyperglycemia plays an important role in the genesis of liver injury by inducing an enlargement of sinusoids, dilation of cisterns and a loss of rER ribosomes in the hepatocytes of fish treated with repeated doses of glucose and fish that received Alloxan only. These authors also showed that normalization of blood glucose levels, using an aqueous suspension of lupine seeds, restored most histological and ultrastructural lesions in the livers of these animals.

Cellular oxidative stress (OS) plays an important role in the genesis and progression of chronic diabetic lesions on vessels, kidneys, retina, nerves, and likely the liver of diabetic humans and animals (Evelson *et al.*, 2005, Khan *et al.*, 2006, Roskams *et al.*, 2003). Haque and Sanyal (2002) postulated that the increased oxidation of free fatty acids (FFAs) by the liver can generate reactive oxygen species (ROS), which induce lipid peroxidation and cause structural and functional changes in the cells and cell death. The body's antioxidant defenses neutralize the harmful effects of these substances under physiological conditions. However, this metabolic balance is broken under pathological

conditions, such as in diabetes, which initiates oxidative stress. The maintenance of hepatic oxidative stress triggers adaptation responses to chronic stress in the liver, which include the activation and/or inhibition of several molecular sites that transduce and transcribe signals that regulate the biological cell cycle (Yang *et al.*, 2001). Changes of the biological cell cycle ultimately compromise replication ability and liver regeneration, which leads to apoptosis or cell death. However, an excessive amount of FFAs in the liver alone may induce apoptosis of hepatocytes, which is likely one mechanism of cellular injury that is commonly observed in patients with NAFLD (Wigg *et al.*, 2001).

Lucchesi *et al.*, (2013) showed that T1 diabetes mellitus changed the oxidative balance in the liver of Alloxan-induced diabetic rats over the long-term, which was characterized by a significant increase in ROS in liver tissue and markedly reduced defense antioxidants. These results suggest that changes in blood liver enzymes (AST and ALT) and the morphological and ultrastructural lesions found in the livers of animals in this study are closely correlated to diabetes mellitus-induced chronic stress in liver cells.

The present study showed that alloxan markedly increased SGOT. This result probably reflect a rise in the activity of gluconeogenesis which partially responsible for the hyperglycemia. Inui and Yokote (1975a) did not found any change in liver AST and ALT in response to alloxan injection into the fish, however, they correlated between gluconeogenic activity and liver transaminases. In turn, insulin injection suppresses activity of gluconeogenic enzymes in fish (Inui and Yokote 1975b) Moreover, the marked rise in the serum transaminases may be due to the leakage of the enzymes from the destructive cells as a consequence of cytotoxic effect of alloxan in liver rather than other tissues. Similar result was obtained in alloxan-diabetic rats (Navarro *et al.*, 1993; Mansour *et al.*, 2002). In *Anguilla anguilla* alloxan led to occasional focal necrosis in liver after 3 days of treatment (Inui and Yokote 1975a). The levels of serum urea and transaminases were normalized in the alloxanized fish after administration of ALSS. Similar result was obtained in alloxan-treated rats (Mansour *et al.*, 2002). Also, the administration of ALSS in alloxan-treated fish exhibited normalization in serum total protein. Thereby, it could be suggested that ALSS treatment may increase insulin release suppressing protein catabolism and/or it may counteract the toxic effect of alloxan in this fish.

Conclusion:

The present study demonstrated that the hydroalcoholic extract of *S. cumini* seeds, juice and residual pulp possesses phytochemicals such as alkaloids, glycosides, phenolic compound and flavonoids and tannins which are of high therapeutic value. The present results exhibited that the extracts has potent Hepatoprotective, antidiabetic and antioxidant activity. The study reveals that, cultivation of this plant increase socio economic status of the rural life furthermore, it proves its traditional medicinal utilization for the management of diabetes. Isolation of the active principle may help for further study. Thus, it can be conclude that the extract has Hepatoprotective, antidiabetic and antioxidant activity of seed, juice and residual pulp of *S. cumini* along with it contribute in food formulation.

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Larvicidal activities of earthworm extract on mosquito larvae

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ABSTRACT:

The present study evaluates the larvicidal activity of earthworm extract against the mosquito larvae. It is the first attempt of evaluation of larvicidal activity by using earthworm extract. Mosquitoes are today's big problem since responsible for number of diseases like Malaria, Dengue, Amoebic dysentery, Filariasis etc. Some methods such as fumigation and spraying of insecticide like DDT, Gammexane, and Pyrethrum at breeding places of mosquito. This issue badly impact on environment. Some plant extract prove as good insecticidal properties, however, the environment affected by over harvesting of plant fauna. There is needed to be a supplementary remedy for control the overproduction of mosquito. The earthworm is cheap source for this purpose. Earthworms are abundantly available and easy to culture. In present study the earthworm extract use against 4th instar larvae of mosquito. The concentration of earthworm extract use for larvicidal activity are 500, 1000, 1500, 2000, 2500 mg/L. The mortality percentage at 500 and 2500 mg/L is $26.67 \pm 4.22\%$ and $83.33 \pm 6.15\%$ respectively, with treatment of earthworm extract after 24 hours. The mortality percentage at 1000 and 2000 mg/L is $43.33 \pm 6.15\%$ and $80.00 \pm 5.16\%$ respectively, with treatment of earthworm extract after 48 hours. The LC₅₀ value at the 24 and 48 hours 1584.89 and 1188.50 mg/L respectively; is capable to control the mosquito larvae. On the basis of results, the present study reveals that the earthworm extract has an ability to kill the mosquito larvae.

Key words: Earthworm extract, 4th instar larva, LC₅₀ value.

Introduction:

Mosquito is one of the powerful vectors which cause much life threatening disease, according to the World Health Organization report of 1996a malaria is one of the disease burden in terms of the death and suffering. Moreover, *Aedes aegypti* is a vector of four distinct viruses which caused dengue fever, sever influenza, dengue, and hemorrhagic fever. About 2500 million people are at risk of infection by *Aedes aegypti*. World Health Organization (WHO) stated that about 2/5 of the global human population are currently threaten of dengue and the best way to control the transmission of dengue virus is fight the mosquitoes that cause the disease (WHO 2005). In the Disease Control Programmes [NHM] annual report describe the vector strategy for prevention and control of vector borne diseases under NVBDCP i.e. Integrated Vector Management which comprises use of Indoor Residual Spray (IRS) in selected high risk areas, Long Lasting Insecticidal Nets (LLINs), use of larvivorous fish, antilarval measures in urban areas including bio-larvicides (Disease Control Programmes [NHM], Annual report 2015-16). The biological control play pivotal role in control of modern vector control program. There will be need to develop less harmful eco-friendly vector control methods. Some plant origin insecticide is preferred as effective control on insect. According to the Emily (2008) report on medicinal plant at risk, the overharvesting or over collection of species create significant threat to some wild species of plant. Similarly over-harvesting, land conversion, and habitat loss increasingly threaten a considerable portion (approximately 15,000 species, or 21 per cent) of the world's MAP species and populations (SCHIPPMANN et al. 2006). Therefore, we think that; can animal origin product works as supplementary insecticide? There will be need to develop supplementary larvicide which is animal origin, as a result conservation of the wild plant species by reducing their load of single source of larvicide and pesticides will be achieved. The earthworm, which play central role in medicine as well as in soil fertility is consider for the present study. Since, it is inexpensive, abundantly available and easy for the rearing. In this account the present study has been taking into

consideration to evaluate the larvicidal activity of earthworm extract.

Materials and Methods:

Collection of Earthworm: Earthworm brought from vermicompost unit which established in laboratory of Department of Zoology, Moolji Jaitha College, Jalgaon.

Preparation of earthworm sample: Earthworms washed with tap water. Kept in annelid saline for 2- 3 hrs to allow removing the cast from alimentary canal of earthworm. Weight the cleaned earthworm and use for further extraction procedure.

Earthworm saline

| | | |
|------------------------------------------|---|----------|
| Sodium Chloride (NaCl) | : | 6.00 g/L |
| Potassium Chloride (KCl) | : | 0.12 g/L |
| Calcium Chloride (CaCl ₂) | : | 0.20 g/L |
| Sodium Bicarbonate (NaHCO ₃) | : | 0.10 g/L |

Earthworm homogenate: Washed earthworm kept in annelid saline for 2 hours to remove the cast from alimentary canal. Cleaned earthworms were then proceeding for homogenate in 20mM phosphate buffer (pH 7.4). This homogenate was use for further study at various concentrations.

Collection of Mosquito larva: All Mosquito larvae were collected from drainage of waste water from Moolji Jaitha College, Jalgaon. All larvae were collected in to glass bowl.

Identification of Mosquito Larvae: Larva identified by using the identification mark and Identification Key stated in thesis of Swan (2015). Forth instar larvae were chosen for larvicidal activity.

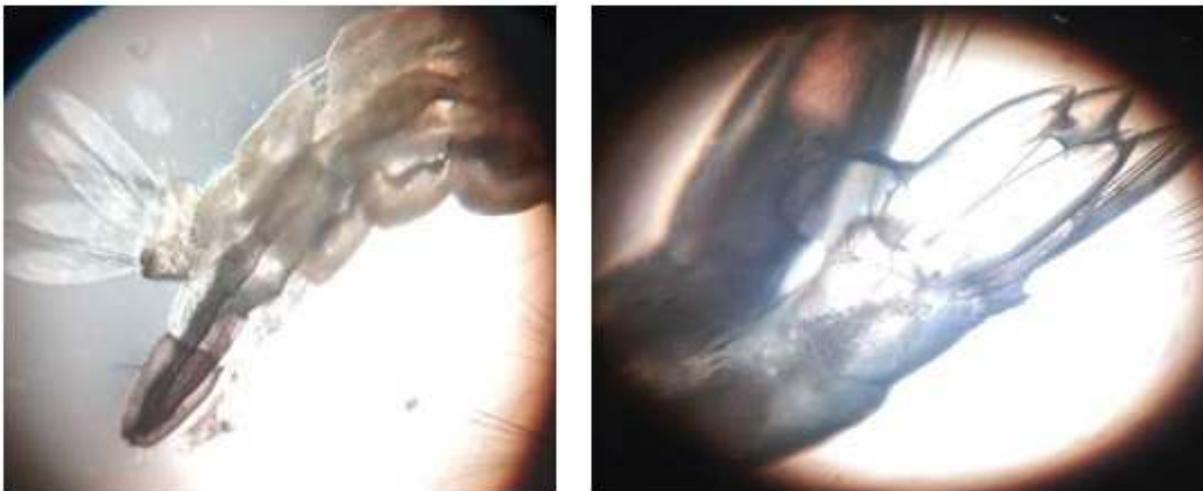


Fig. 1 Fourth instar larvae showing 8-12 narrow, sharp pointed comb scales and anal gills have rounded tip, larger in length than anal segment.

Larvicidal activity

Larvicidal activity evaluated by referring the method stated as Anitha *et al.*, (2012). The six larvae kept in each group. The larvae were treated with various concentrations of earthworm extract like 500, 1000, 1500, 2000, 2500 mg/L in annelid saline. The control was maintained without extract. Each treatment replicate three times. The observations of mortality of mosquito larvae were noted at 24 hrs and 48 hrs. The percentage of mortality of larvae was calculated by using following formula,

$$\text{Percentage of mortality} = \frac{(\text{Number of dead larvae})}{(\text{Number of Larvae introduce})} \times 100$$

Statistical analysis

The Probit analysis was performed to calculate LC₅₀ values to determine lethal concentration of the earthworm extract on mosquito larvae after 24 and 48 hours of treatment.

Results:

Table 1 Percentage mortality and LC₅₀ value of mosquito larvae in the treated groups after 24 hours.

| Sr. No. | Concentration (mg/ L) | Percentage (%) | LC50 value (mg/L) |
|---------|-----------------------|----------------|-------------------|
| 1. | Control | 00.00 ± 0.00 | |
| 2. | 500 | 26.67 ± 4.22 | |
| 3. | 1000 | 36.67 ± 6.15 | 1584.89 |
| 4. | 1500 | 46.67 ± 6.67 | |
| 5. | 2000 | 63.33 ± 6.15 | |
| 6. | 2500 | 83.33 ± 6.15 | |

Table 2 Percentage mortality and LC₅₀ value of mosquito larvae in the treated groups after 48 hours.

| Sr. No. | Concentration (mg/ L) | Percentage (%) | LC50 value (mg/L) |
|---------|-----------------------|----------------|-------------------|
| 1. | Control | 00.00 ± 0.00 | |
| 2. | 500 | 30.00 ± 4.47 | |
| 3. | 1000 | 43.33 ± 6.15 | 1188.50 |
| 4. | 1500 | 63.33 ± 6.15 | |
| 5. | 2000 | 80.00 ± 5.16 | |
| 6. | 2500 | 93.33 ± 4.22 | |

Values expressed as Mean ± S. E.

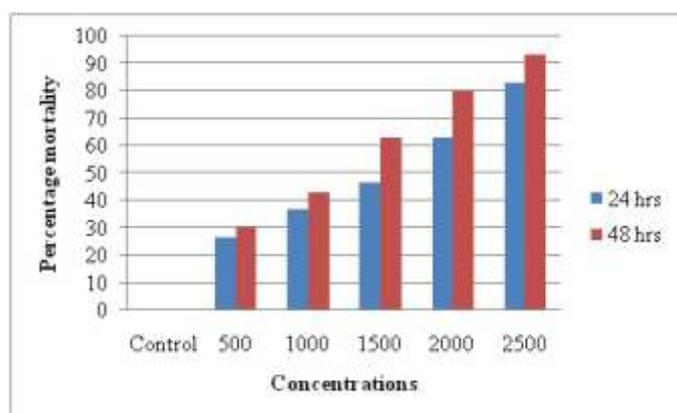


Fig.2 Percentage Mortality of Mosquito larvae treated with the various concentrations of the Earthworm extract groups after 24 and 48 hours.

The larvicidal activity of the earthworm extract against the larvae of the mosquito was determined through mosquito larval bioassay. The mortality of the mosquito larvae were noted in the 500, 1000, 1500, 2000 and 2500 mg/L concentrations of the earthworm extract after 24 and 48 hrs of exposure. Table 1 shows the percentage mortality of mosquito larvae treated in five various concentrations of earthworm extract and control group after 24 hrs of treatment. The 50% mortality was observed in between 1500 and 2000 mg/L concentration of earthworm extract are 46.67 and 63.33% respectively after 24 hrs, the highest percentage mortality 83.33% was observed at 2500 mg/L concentration of earthworm extract after 24 hrs. Table 2 shows the percentage mortality of mosquito larvae treated in five various concentrations of earthworm extract and control group after 48 hrs of treatment. Here also, the 50% mortality rates observed in between concentration of test extract 1000 and 1500 mg/L are 43.33 and 63.33% respectively after 48 hrs. However, highest mortality 93.33% was observed at 2500 mg/L concentration at 48 hours. The zero percentage mortality was noted in the control group. It reveals that all tested concentrations of the earthworm extract caused mortality of mosquito larvae in comparison to those in the control group.

LC₅₀ value

The LC₅₀ values of earthworm extract on mosquito larvae after exposures at 24 hours is 1584.89 mg/L and 48 hrs is 1188.50mg/L.

Discussion:

The vector control is the serious threat, though mosquito develops the resistance to conventional synthetic insecticide. Chandre *et al.*, (1998) reported the Pyrethroid resistance development in *Culex quinquefasciatus* in West Africa. Bowers *et al.*, (1995) reported that a considerable number of plant derived insecticide are effective against mosquito. Over-harvesting, land conversion, and habitat loss increasingly threaten a considerable portion (approximately 15,000 species, or 21 per cent) of the world's MAP species and populations (Schippmann *et al.* 2006). To overcome said problem, the present study has made first attempt for the larvicidal activity by using earthworm extract, which is animal origin. The larvicidal activity of earthworm extract on mosquito larvae after 24 and 48 hrs of exposure at the 500, 1000, 1500, 2000, 2500 mg/L showed that, the lethal concentration (LC₅₀) are 1584.89 and 1188.50 mg/L. Pedro *et al.*, (2014) study on the larvicidal activity of plant species, they obtained excellent larvicidal activity due to the presence of phytochemicals such as Saponins, Steroids, Alkaloids, Terpene, etc., though these substances serve as plant defence mechanism against microorganism and insect. The response of phytochemicals as larvicidal and insecticidal were also reported by Rawani *et al.*, (2009) and Roopa *et al.*, (2012). Some biochemist investigated the lipids from earthworm and discovered earthworm fatty acids that enter into therapeutics, Cooper *et al.*, (2004). Moreover, the earthworm exhibits proteolytic enzyme, effective as Antimicrobial, Anti-inflammatory, Anti pyretic potential Hossam *et al.*, (2012). In present study earthworm shows good larvicidal activity, it may reveals that the presence of lipid, fatty acid, proteolytic enzymes and some bioactive compounds that are potential for their action on mosquito larvae.

Conclusion:

On the basis of results the present study reveals that the earthworm extract has an ability to kill the mosquito larvae. The LC₅₀ values at the 24 and 48 hours are 1584.89 and 1188.50mg/L is capable to control the larvae. Some biochemicals present in earthworm may contribute in mortality of mosquito larvae. Further study is needed to study on this aspect of action of earthworm bioactive compounds which are responsible for the death of the mosquito larvae.

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SECTION B

**Commerce &
Management**

A study of investment behavior of women professors in share market and mutual fund with reference to colleges of jalgaon city

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ABSTRACT:

Usually women's prefer the bank deposits and investments in gold and silver as the safest way to invest their money. Even working women specially women professors do not invest in share market and mutual funds because of lack of knowledge in share market, trading and myths of trading in shares. Present research is a study of women professor investment behavior in share market and mutual funds. Primary data is collected from 10 women professors of 10 colleges in jalgaon city. The collected data were classified, tabulated and analyzed using Excel. Study saws lack of share market and mutual fund trading knowledge and fear of losing money are the main reasons for not investing or trading in share market. Research work gives the measures to bring awareness and promote women professors for share market investment and fruitfulness of the same.

Keywords- Women, Investment, Mutual Funds, Share Market

Introduction:

Usually women prefer the bank deposits and investment in gold and silver as the safest way to invest their money . Even working women's specially professors do not invest in share market and mutual funds, because of lake of knowledge in share market, trading and myths of trading in shares .Present research is a study of women professors investment behavior in share market and mutual funds.

Review of literature:

There are number of studies available, which have discussed the financial behavior of woman's investors and the factors which influence this behavior. Women give a lot of priority and importance to the advices given by Financial Advisors (FA) and depend on them for guidance than men. Female investors are more detail oriented; and want to read more and understand financial matters better and they ask more questions than male clients.

There are number of studies which favor the existence of gender biasness in investment Patterns. Most of the studies conclude that women invest more conservatively than men (Yao, R. & Hanna, S.D., 2005) and that the women are more risk adverse (Julie R. Agnew, 2005). Some studies also contend that women are less confident about their investment decisions and earn less return in compare to men (Barber B and Odean T., 2001). The overall purpose of this research is to gain knowledge about key factors that influence investment behavior and way.

These key factors impact investment decision-making processes among women. It further explores types of educational processes and materials that can transform investment behaviors among woman. The study gives an insight about the investing pattern of women. Women are perceived as risk adverse. So, this project aims at understanding the investment behavior of women investors by taking their responses on various factors like risk, return etc

Objectives:

- 1) To study Risk Behavior of women investor.
- 2) To identify preferred investment avenue by women investor.
- 3) To study share market and mutual fund awareness among women professors.
- 4) To suggest means for promoting share market and mutual fund investment by women professor.

5) To study the extent of awareness about mutual fund among women professors.

Research Methodology: Primary data is collected from the below mentioned selected ten colleges of Jalgaon City. Therefore the scope of research is restricted to Jalgaon city only.

1) Primary data- Primary data is collected from 100 respondents (10 respondent each from 10 colleges) through systematically frame questionnaire respondent were selected. Data was analyze by using excel by using simple random sampling technique

2) Secondary Data- Secondary data charts historical study regarding in the sub matter were collected from journal, magazine, websites, newspaper etc.

Results and Discussions: Data was analyzed in MS-Excel. The results and discussions are mentioned below

There are 100 women professors respondents for their annual income. In out of them 42% women professors are less than 100000 annual incomes ,31% women professors are between 100000 to 200000 annual income and only 27% women professors are above 200000 annual income

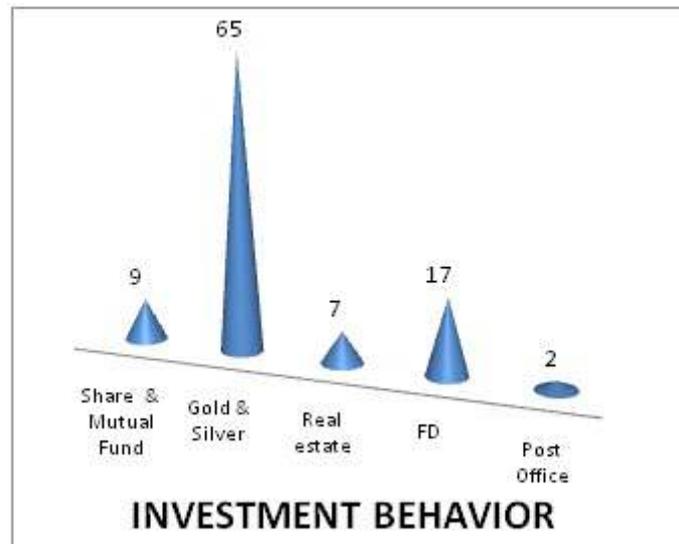


There are various factors regarding investment decisions advice of women’s professors. In out of 100 women professors 18 women take their investment decision advice from professional adviser, 27 from friend, 30 from husband and 33

Majority of women professors are of the opinions that in share market and mutual fund investment is high risk high earning. Very few women professors were found to be negative towards investing in such securities. Out of 100 respondents 32 women’s professors thinking that share market and mutual fund is good investment source of earning



Most of the women's professors prefer to invest in gold and silver the highest percentage indicate that most of the women investing their money in gold and silver. And think about the share market and mutual fund there are very poor percentage of woman investing their money. Out of 100 respondents 9 respondents are investing in share and mutual fund and others invested their money in gold and silver, FD, real estate, post office etc.



Findings and Conclusion :

According to the study, different demographic factor such as age, marital status and education does not have much significant impact on investment behavior of women professors. The most important criteria that is considered while investing in Share Market and Mutual Fund for women professor is investor's risk. However, a very less percentage of women professors have enough investment experience in share market and mutual fund. Women professors are also optimistic for their current and future investments and usually invest in Bank Deposits, Gold and Silver and Government Securities that are considered to be safer investment avenues. Women professor's poor trend of Share Market or Mutual Fund Investment opens raising need of spreading awareness of Share Market or Mutual Fund investment among women professors. If such money is invested in share market then it can accelerate industrial growth & economic development of India.

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A study of student's performance and employability prediction through data mining

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ABSTRACT:

To systematically review the work done in the field of Education. Performance prediction and employability prediction of students in higher education. This Study explains higher education has become an exciting field of research and why the prediction of academic performance and employability is beneficial for the institutions. We also explain the ways to higher education is being provided world-wide. Then we discuss the work done in both the areas of prediction. This study explains existing research highlights and finds that prediction of academic performance has progressed a lot but employability prediction is yet to mature.

Keyword : Data mining, Student, Education, Student Performance.

Introduction:

In the present knowledge-based approach, education plays a major role in the progress of a nation's economy and development. Higher education plays a key role in strengthening a nation's economy as it is an industry in itself and it supports the rest of the industry by providing a trained workforce. Higher education is the foundation for fostering the talent, the key factor in increasing national human capital quality, and the main way to upgrade a nation's competitive status. Thus, the research on development of higher education is an important work and is actually required. Educational institutions generate and collect huge amount of data. To get an edge over each other, institutions are applying cutting edge technologies like data mining on the huge data generated in class room including academic, behavioral, demographic data of students and faculty data as well. The data generated in educational set up can give deep insight into educational process. This large data set is basically a storehouse of information and must be explored to have a strategic edge among the Educational Organizations. Predicting student employability can help identify the students who are at risk of unemployment and thus management can intervene timely and take essential steps to train the students to improve their performance.

Literature Review:

1. Tripti Mishra, Dharminder Kumarand, Sangeeta Gupta (2017)“Student's Performance and Employability Prediction through Data Mining:A Survey”,Indian Journal of Science and Technology. In their paper they have stated that, the survey explain show of higher education has become an exciting field of research and why the prediction of academic performance and employability is beneficial for the institutions. We also explain briefly in how many ways higher education is being provided world-wide. Then we discuss the work done in both the areas of prediction. It further suggests few parameters that have not been considered so far in predicting the performance or employability.

Data Mining:

Data mining is very promising as a new effective technique for decision making processes. Through Educational data mining is an analysis of discipline to developing the methods for exploring the unique types of data from educational settings and it is used for improvement of students in better way. Data mining techniques are applied in higher education more and more to give insights to educational and administrative problems in order to increase the managerial effectiveness. However, most of the educational mining research focuses on modelling student's performance. Data mining technique can give the input for the teachers and students about the student academic

results. This technique can analysis the database patterns to forecast student performance, so this allows the teachers to prepare like a remedial program (needing extra help for learning) or more additional assignments for the students.

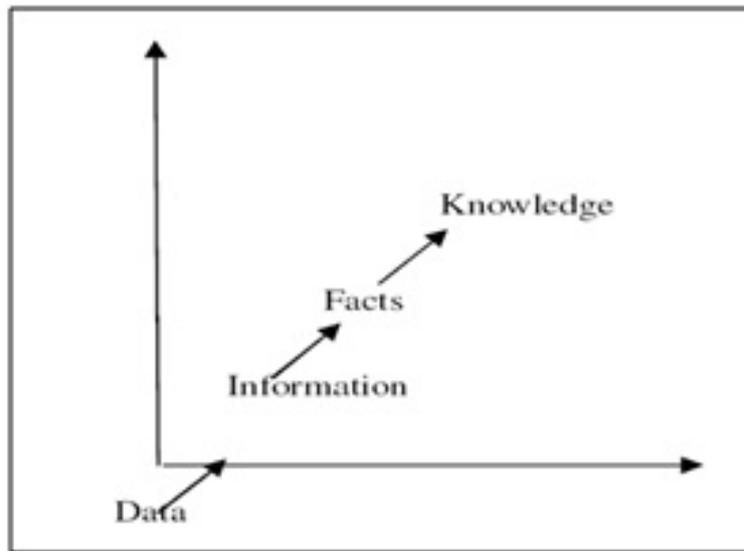


Fig. Levels Of Data

Objectives:

1. To study prediction of academic performance of students.
2. To study employability prediction.
3. To study ways of higher education provided in today’s educations system.

Data Mining Tool:

Decision tree :

Decision trees are powerful and popular tools for classification. A decision tree is a tree-like structure, which starts from root attributes, and ends with leaf nodes. Generally, a decision tree has several branches consisting of different attributes, the leaf node on each branch representing a class or a kind of class distribution. Decision tree algorithms describe the relationship among attributes, and the relative importance of attributes. The advantages of decision trees are that they represent rules which could easily be understood and interpreted by users, do not require complex data preparation, and perform well for numerical and categorical variables.

Data Collection:

PRIMARY DATA:

In the present study, we have collected primary data by filling questionnaire from College Students by directly communicating with them through questionnaire method.

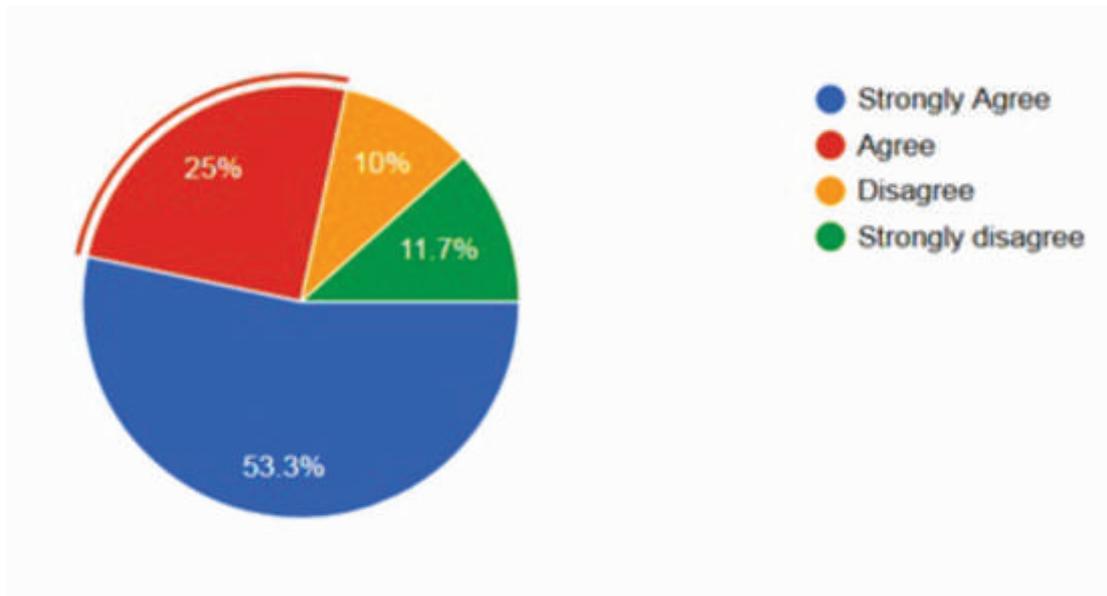
SECONDARY DATA:

The major source of secondary data for present study are:-

- a. Internet
- b. Website
- c. e-literature

The secondary data gets adopted duly recorded in the end of Review of Literature and in References.

Analysis:



53.3% students think that data mining has a strong impact on predicting students' academic performance and employability.

Conclusion:

Data mining techniques are effective for implementation on educational data sets. The data generated in educational systems gives deep information about the educational process. Educational data mining (EDM) means data generated by educational systems for academic performance is a primary prediction of employability. So all the factors affecting academic performance also affect employability. Prediction of both academic performance and employability helps management to identify students who have poor academic performance.

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Cryptography – Need of digital world

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ABSTRACT:

In present age, message communication security is one of the most important features and the process of cryptography plays an important role to provide the security to the networks. Today's cryptography is vastly more complex than its predecessor. In internet, message communication security is one of the most important features and the process of cryptography plays an important role to provide the security to the networks. The main aim of this approach is awareness of message communication security among the common computer users. A number of cryptographic techniques are thus developed for achieving a secure communication.

Keywords: Digital security, Network and Secure Communication.

Introduction:

Cryptography is a common component of any Information Security infrastructure, whether it is for the encryption of large files for secure long term storage or ensuring that communication lines are safe for the transfer of confidential information. In the present knowledge-based approach, Cryptography is the study of information hiding and its substantiation. It includes the protocols, algorithms and strategies to securely and consistently prevent or delay unauthorized access to sensitive information and enable verifiability of every element in communication.

Literature review:

Neal Koblitz-“Cryptography– Need of Digital World”

In his paper, he stated that, the assessment explains use of cryptography has become an exciting field of research and this is why the prediction of academic performance and security is beneficial for the institutions. He also explains, momentarily in how many ways higher communication security is being powered world-wide. Then we discuss the work done in both the areas of prediction. It further proposes few constraints which have not been considered so far in predicting the performance or employability.

Objectives:

Providing confidentiality is not the only objective of cryptography. It's also used to provide solutions for other problems. The goal of modern cryptography is to **ensure the preservation of information properties** through mathematically sound means. There are many attributes of information that can be assured in this way, but here are the big ones:

1. **Confidentiality:** Only the authorized recipient should be able to extract the content of the cypher. In addition, obtaining information about the content of the message (such as a statistical distribution of certain characters) should not be possible, once the cryptographic analysis becomes easier.
2. **Message integrity:** the recipient must be able to determine if the message was altered during transmission.
3. **Authentication of the sender:** the recipient should be able to identify the sender and verify if it was him who sent the message.
4. **Irrevocability of the sender:** it should not be possible to deny the authorship of the message.

Data Collection:

Primary Data:

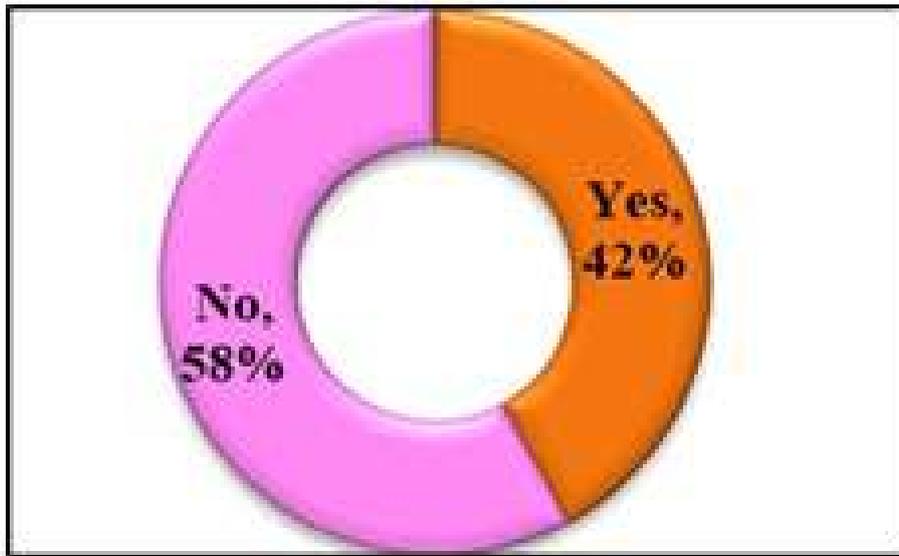
In the present study, we have collected primary data by filling questionnaire from College Students by directly communicating with them through questionnaire method.

Secondary Data:

The major sources of secondary data for present study are:-

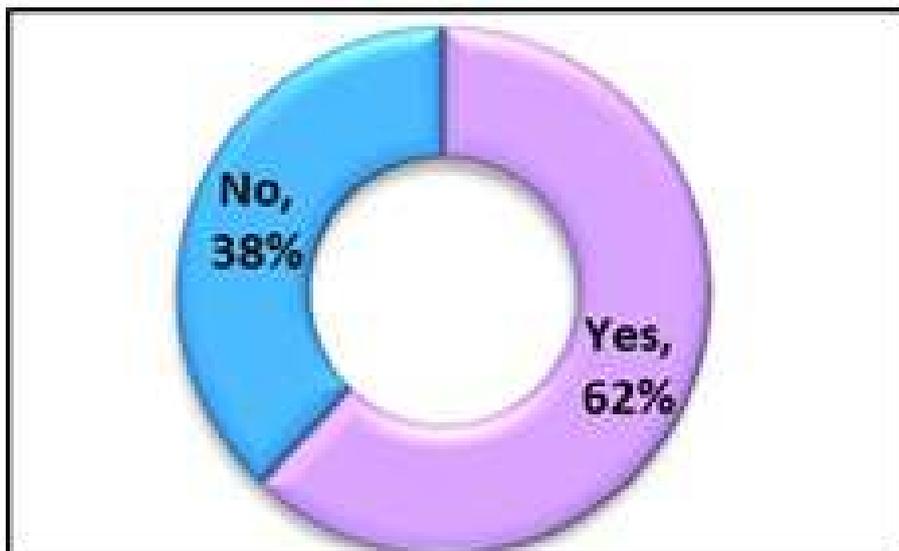
- a. Internet
- b. Website
- c. E-literature

1. Have you ever changed the secret key in your social media? Do you know about this feature?



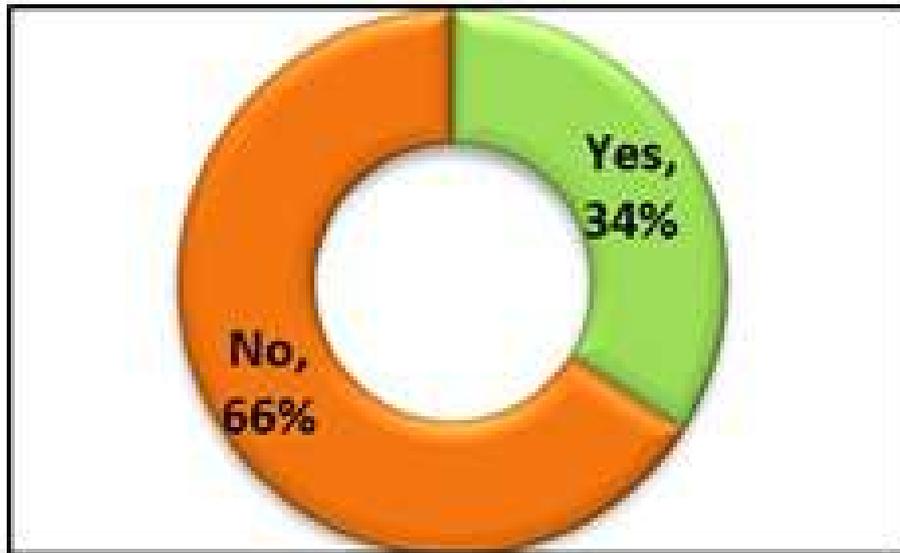
Very few students know about this feature and its use.

2. In your opinion, can you maintain privacy of your data with the help of cryptography?



Some Students think Cryptography can help in improving privacy.

3. Do you ensure your online presencere mains private or accounts remain secure?



Only Some Students keep their account privacy and security up to date.

Conclusion:

As we headed for a society where computerized information resources are increased and cryptography will continue to increase in significance as a security mechanism. I have considered some of the core concepts involved in cryptography and cryptographic protocols. Though, I have omitted a considerable amount of work done in this field, due to its vastness. It is clearly apparent that it is no longer possible to be an expert within Information Security but rather an expert in one of its subsidiary fields. Cryptography is a field of great interest both academically and economically and the intelligent use of cryptography will lead to improved user satisfaction and safety when using networks to perform confidential tasks. The information security can be easily achieved by using Cryptography technique. Cryptography allows people to keep confidence in the electronic world. Cryptography is the solution to many of the security challenges that are present in the Internet.

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Study of Security Solutions in Data Mining

Authors & affiliations:

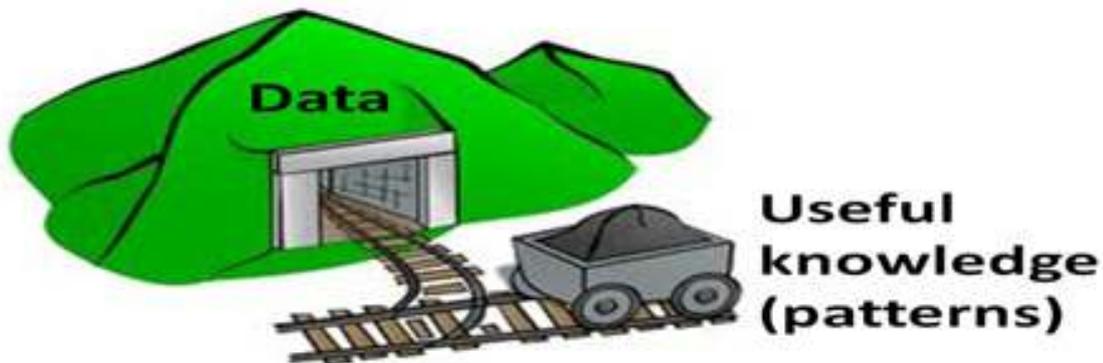
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ABSTRACT:

The enhancing data techniques are used in the user database for secure their database from another unauthorized user. This technique is useful for privacy preserving; securely share data among N number of parties. And also apply data mining approach on web service. Data mining can be defined as the process of mining for implicit, formerly unidentified, and potentially essential information from awfully huge databases by efficient knowledge discovery techniques. The privacy and security of user information have become significant public policy anxieties and these anxieties are receiving increased interest by the both public and government lawmaker and controller, privacy advocates, and the media. In this paper we focus on key online privacy and security issues and concerns, the role of self-regulation and the user on privacy and security protections, data protection laws, regulatory trends, and the outlook for privacy and security legislation. Naturally such a process may open up new assumption dimensions, detect new invasion patterns, and raises new data security problems. Recent developments in information technology have enabled collection and processing of enormous amount of personal data, such as criminal records, online shopping habits, online banking, credit and medical history, and driving records and almost importantly the government concerned data.

Keywords: Data Mining, Data Security, Risk, Social Media

Introduction:



In today's era technology is used in almost every field. From business to medical. But the most important thing to make profit in any field is customer satisfaction. Knowing what a customer needs or require was a huge challenge before technology took over. Now all one has to do is take user's feedback which is made easier with the help of technology. Data mining is becoming increasingly common in both the private and public sectors. Industries such as banking, insurance, medicine, and retailing commonly use data mining to reduce costs, enhance research, and increase sales. When a user provides data, this data is collected through analyst and important data is further provided. This analyzing important data from collection of large number of data is known as Data Mining. Data mining derives its name from the similarities between searching for 'gold mines'. In gold mines, we search for tiny particles of gold in tons of soil similarly, in data mining we search for valuable information from huge amount of data collected in various ways. In other words, it is about finding new information from lot of data. The data obtained from data mining is hopefully both new and important.

Objectives:

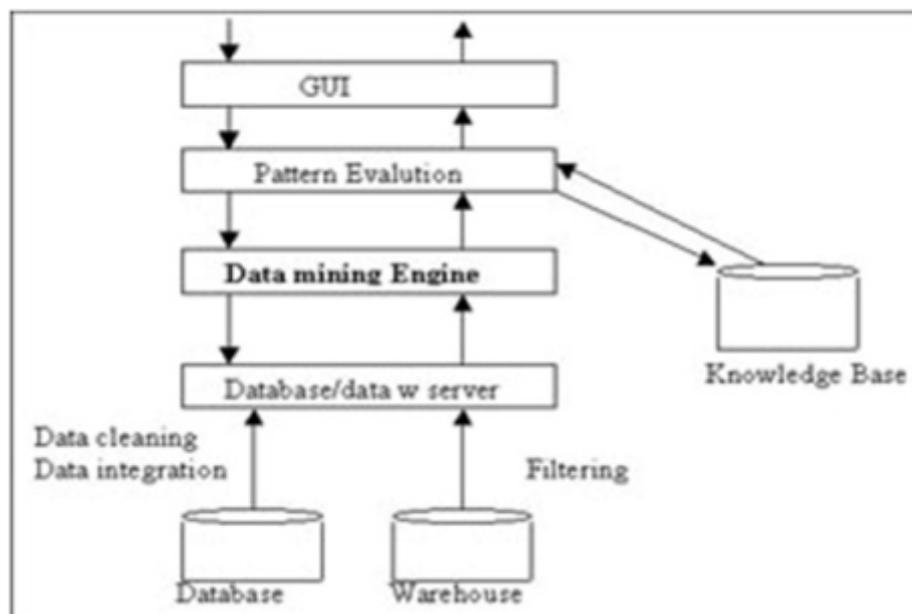
- The main objective is to study security solutions of data mining.
- To introduce how data mining works.
- To study interesting challenges faced by data mining.
- To spread awareness of security threat through data mining.
- To know why maintaining one's privacy is important.
- To study consequences of privacy violation

Literature Review:

Data mining is process of discovering interesting patterns and knowledge from huge number of data. The term '*Data Mining*' is often treated as synonym for another term known as '*knowledge discovery from data*' (KDD) which highlights the goal of the mining process. Data mining has attracted more attraction because of 'Big data' concept. Big data is a term used to refer to data sets that are too large or complex to deal with. Many organizations in various industries are taking advantages of data mining including manufacturing, marketing, chemical, aerospace... etc., to increase their business efficiency. It is used by companies to turn raw data into useful information. By using software to look for patterns in large batches of data, businesses can learn more about their customers to develop more effective marketing strategies, increase sales and decrease costs. Data mining depends on effective data collection, warehousing and computer processing. Data mining programs analyze relationships and patterns in data based on what user's request. For example, a company can use data mining software to create classes of information. To illustrate, imagine a restaurant wants to use data mining to determine when it should offer certain specials. It looks at the information it has collected and creates classes based on when customers visit and what they order. In other cases, data miners find clusters of information based on logical relationships or look at associations and sequential patterns to draw conclusions about trends in consumer behavior.

Architecture of Data Mining:

Data mining is described as a process of discover or extracting interesting knowledge from large amounts of data stored in multiple data sources such as file systems, databases, data warehouses... etc. This knowledge contributes a lot of benefits to business strategies, scientific, medical research, governments and individual. The architecture contains modules for secure safe-thread communication, database connectivity, organized data management and efficient data analysis for generating global mining model.



Data Mining Implementation Process:

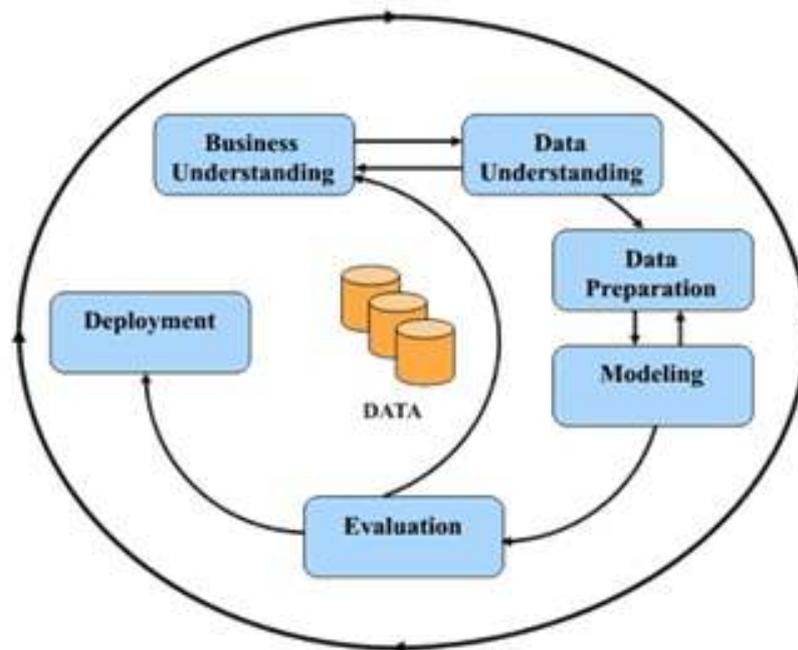
1. Business Understanding: In this phase, objectives and data mining goals are established. First one has to understand business and client objectives and what they want. Important factors of a business are considered and a detailed plan is made which defines data mining goals.

2. Data Understanding: Sanity check on data is performed to check if it's appropriate for data mining goals. Objects of different data are compared as they're taken from different databases. Properties of acquired data is checked in such a way that it acquires all the queries and objectives.

3. Data Transformation: Unwanted data is removed, summary operations are applied to data, acquired data is generalized i.e. low-level information is replaced by higher level concepts with the help of concept hierarchies and attributes are formed. Result of this process is final data set.

4. Modeling and Evaluation: Mathematical patterns are used to determine data patterns and these identified patterns are evaluated against business objectives. Based on this, a decision is made whether or not to move model to deployment phase.

5. Deployment: Data mining discoveries are shipped to daily business operations and final project report is created based on the information gained through data mining.



Benefits of Data Mining:

- Data mining technique helps firms to urge knowledge-based info.
- Data mining helps organizations to create the profitable changes operational and production.
- The knowledge mining could be a cost-efficient and economical resolution compared to alternative applied mathematics data applications.
- Data mining helps with the decision-making method.
- Facilitates automatic prediction of trends and behaviors likewise as automatic discovery of hidden patterns.
- It may be enforced in new systems likewise as existing platforms
- It is the speedy method that makes it simple for the users to investigate immense quantity of information in less time.

Conclusion:

Four different user roles that are commonly involved in data mining applications, i.e. data source provider, data receiver, data explorer and determiner has its own privacy concerns. For data source provider, his privacy-preserving objective is to effectively control the amount of sensitive data revealed to others. For data receiver, his privacy-preserving objective is to release useful data to data miners without disclosing data source provider's identities and sensitive information about them. For data explorer, his privacy-preserving objective is to get correct data mining results while keep sensitive information undisclosed either in the process of data mining or in the mining results. For determiner, his privacy-preserving objective is to make a correct judgment about the credibility of the data mining results he's got.

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SECTION C

HUMANITIES

Crossing threshold through fiction: Indian women fiction writers in english

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ABSTRACT:

Indian women have long been the victims of prejudice and discrimination. They have been denied their basic rights. They have been tortured into believing that all the misdeeds, the tortures are quite normal and is an inevitable part of women's lives, which is needed to be accepted as their fate. "My life, their choices plus their tyranny" would be an apt statement for the condition of Indian women's lives. Their world lies inside the threshold, their very own *Lakshmanrekha*. Many women dared to cross the thresholds through fiction. Their characters revolted against these patriarchal notions and crossed all kinds of thresholds burdened upon them on existential level, for the world inside the *Lakshmanrekha* is more dangerous than the world out there. These women authors and their characters strive to see the world beyond this threshold. They want "free expression".

Keywords: Indian women, fiction, characters, feminism, patriarchy, stereotypes, discrimination, threshold

Patriarchy and misogyny—while the whole world is expostulating against these institutions, an ordinary Indian woman is still unheard of these words. Indian women are consciously kept ignorant, for the wisdom might ignite the flame of their basic instincts and desires. Again there is religion, caste system and marriage institution to ensure the patriarchal dominance. Women are not humans. They are mothers, sisters and wives. These roles were assigned to keep women busy with their respective duties of serving the patriarchs inside the threshold of their homes. The ignorance makes them believe that these duties are put upon them by God's grace and the only God they know is their husband. They must behave like a woman. They must dress properly in order to cover their oozing beauty from prying eyes. They must wear *Sindhur* and *Mangalsutra*—the symbols of their chaste. They are timid, pathetic and untrustworthy creatures. Only place they should know is, like *Lakshmi*, in the feet of their *Vishnu*. They can either be a *Sati Savitri* or a prostitute. There is no in between existence.

Amid all these years of oppression, India bore some extra-ordinary Women who shunned this ignorance. They had that third eye of looking at things, the perspective that could bring the change. They observed the socio-cultural norms. They knew the follies in Indian society. They themselves crossed the thresholds, learned and started writing fiction.

Indian fiction in English began as the aftermath of introduction of English Education in India in early nineteenth century *Rajmohan's wife*, written by Bankim Chandra Chattopadhyaya in 1864, is considered as the first Indian English novel. After some years, an Indian woman, Toru Dutt, who had mastered herself in Bengali, English, French and Sanskrit, in her mere twenty one years of life, wrote *Bianca or The Young Spanish Maiden* and became the first woman to cross the threshold in the literary world of Indian English fiction. Though the novel was unfinished, it is fascinating as the romantic story is set in England with Spanish characters. The plot of Bianca centres around Bianca and Henry who want to have a love marriage. Love marriages are loathed in Indian society as they are considered to bring disgrace to the family especially the girl's. That might be the reason she chose England as the setting. Other earliest significant Indian women novelists in English include Kripabai Sathianandhan and Shevantibai Nikambe. Kripabai wrote two autobiographical novels *Kamla: A Story of Hindu Life* (1894) and *Saguna: A Story Of Native Christian Life* (1895). Kamla is an account of married life of Kamla after her child marriage. Kamla has multifarious themes like

education of women and pros and cons of nuclear family system. Kamla is shown in rebellious light as she firmly stands for herself against the illicit affair of her husband. Saguna begins with cruel hardships faced and tolerated by Saguna's mother Radha and in contrast with her, is shown her daughter Saguna who is fierce and independent. She wants to be treated like her brothers. She chooses her career and rejects various marriage proposals. Education of women are the common concerns of both Kripabai and Shevantibai. Shevantibai wrote *Ratnabai: A Sketch of a Bombay High Caste Hindu Wife* (1895). Ratnabai is a married girl, whose husband is staying abroad, is encouraged by her father Vasudeorao for further education against the opposition of her mother, aunt and in-laws. Her husband Prataprao, after returning, also supports her education as he finds her wiser and more compatible than before. One thing to note here is that the literature changes with the demands of changing times. As the concept of feminism broadened with time, it brought subsequent changes in the nature and themes of women's writings. So it would be foolish to expect modern concepts of feminism in earlier women's fiction.

The arrival of twentieth century brought golden days to Indian women's Fiction in English. The gamut of themes varied as these women dug deep into the psyche of their female protagonists. These female protagonists belong to different strata of the Indian society. Some are upper class, highly educated women while some are from middle or low class but all of them carry their own share of crises and conflicts. Some women writers adhere to the traditional approach while some demand abject liberty.

A Traditional feminist at heart, Shashi Deshpande concentrates on the Middle class women like Sarita in *Dark Holds No Terrors*, who is a victim of discrimination by her own parents and physical abuse by her egoistic husband and Jaya in *That Long Silence*, who is expected to keep silence despite of the wrongdoings around her. To the absolute disparity is the modern feminist Shobha De who challenges all kinds of stereotypical images of an ideal woman in India with her protagonists like Asha rani in *The Starry Nights* who has total seven lovers in the novel including one lesbian lover though it is not for the first time that these taboo subjects were discussed. Ismath Chughtai, a Muslim authoress, back in 1940s had dealt with the subjects like sexual desires of women and lesbian relations in her works like *Lihaaf*. Chughtai's works were criticized in the name of indecency and shamelessness and so as Shobha De 's in modern times. Then there is Manju kapur who somewhat blends traditional and modern feminism in her novel *Difficult Daughters* in which the protagonist Virmati leaves all the customs in her conservative family to elope with a married professor. Arundhati Roy also converses on how women are prohibited from seeking love and comfort for themselves in *The God of Small Things*. No one pays heed when Ammu is physically abused by her husband but suddenly she is raised eyebrows upon when she seeks her solace in her relationship with Velutha, a Dalit servant. Arundhati Roy blasts the hypocrisy in Indian society where all kinds of decencies and moralities are expected from women while men like the vendor, the policeman and Ammu's husband can dare to hit women, grab their breasts and molest them. In the end of the novel, the fraternal twins Rahel and Estha are shown to have sex breaking all the "love laws". *The God of Small Things* rejects the discrimination on the basis of caste, race and gender.

There are some women novelists who chose to write the horrifying Reality of the poverty ridden families. Kamla Markandaya in her *Nectar in a sieve* puts forward a petrifying image of the extent to which hunger and starvation can drive a person. The situation of Rukhmini's family is like the animals who loiter through many dumpsters in search of food. Rukhmini's daughter Ira has to turn to prostitution in order to feed her dying brother. Anita Desai's most famous novels deal with the dreadful effects of alcoholic fathers (abundant in poor families) on the delicate senses of children. Raka in *Fire on the Mountain* throws herself into the shell of solitude and fantasies while Lila in *The Village by the Sea* has to untimely become an adult to support her family financially. Mahasweta Devi's Moyna who is fondly called *The Why, Why Girl* for her habit of constantly asking questions puts forward a much needed picture of a poor tribal girl who takes the goats out to feed and fetches

wood in her schoolgoing age.

Twentieth century brought a lot of changes in political scenario of India. People were confused whether they should accept or reject these rapid changes. These internal conflicts find place in the works of Nayantara Sehgal and Kiran Desai. In Sehgal's *Rich Like Us*, there are two female protagonists—Rose, an immigrant in India who tries to blend herself in this new soil and Sonali, who is stuck between Indianness and newly founded Englishness. Much alike Sonali, the characters in Kiran Desai's *The Inheritance of Loss* like Sai, her grandfather, Biju, Gyan are bewildered with the same question—should they stick to their Indian roots or adapt to the English ways.

There are many expatriate women who wrote about experiences of an immigrant, changes in the cultural scenarios around them, their attempts at assimilation in the foreign land and their role confusion. Bharati Mukherjee minutely observes the troubled psyche of immigrant women in her novels like *The Tiger's daughter, wife* and *The Holder of the World*. She lets her protagonists glide through the plot and leaves the judgements on the readers. She doesn't herself comment on which cultural scenario is ideal. Jhumpa Lahiri seems inclined to her Indian roots in her writings. Gogol in her *The Namesake* hates all the strings he has with India. He even changes his name and rebels against his parents and their Bengali customs. but in the end he returns to his Indian identity. Gauri in *The Lowland* gets so engrossed in the foreign land that she forgets she has a daughter and a husband from India. Chitra Banerjee, on the contrary, seems inclined to the foreign land. Tilo in her *The Mistress of Spices* chooses her American lover over the power of spices. Anju and Sudha in *Sister of My Heart* start their married lives in America and India respectively but Sudha leaves for America fade up of her husband, her in-laws and her own family who are unwilling to accept her girl child.

Besides this, there are many other women like- Swarnakumari Ghosal, Cornelia Sorabji, Ashapoorna Devi and Chhaya Datar who contributed in Indian women's fiction in English. The importance of translated works of Kamla Das, Amrita Pritam and Krishna sobti is also undeniable.

Conclusion:

These women brought forth the various social evils prevalent in Indian society. They provided vent to the repressed feelings of women through their works. They exposed the contrast between ostentatious worshipping of women on one hand and physically and mentally torturing them on the other. They unveiled the hypocrisy of Indian society, which claims to be modern but uses the Indian culture as shield to impose their conservative beliefs. These women crossed the thresholds through their fiction. Though not all these works centre around the emancipation and liberation of women, these works do reflect the Indian society with all its prejudices.

Today's era believes in ridiculing feminism. People need to understand that feminism is about men as well. It is for the male victims of rape, domestic violence and the similar forms of violence. It strives to break the ideal image of manhood too. It is not the movement of women only. It has recently become the movement of men and women who don't fit in the ideal images, gender roles and beauty stereotypes. It has become the movement of homosexuals and transgender. It is the cry of every person who can't be true to his self under societal pressure. It is not just the liberation of women, it is the liberation of every individual.

When people will appreciate this movement, they will be able to read these women's writings with an open mind. They will not feel any obscenity or indecency in them. And they will start encouraging all the women in their lives to cross the thresholds just like these women and their characters did.

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Questioning the social structures of Indian society: A study of the movie text PK

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ABSTRACT:

Now the domain of literature has increased with the inclusion of a variety of other texts such as; movies, advertisements, pictures, various socio-cultural, and political events and contexts. The movie PK in 2014 by Rajkumar Hirani performs the role of entertainment at the same time of social education. It attempts to discuss the basic institutional problems of Indian society. The institutions such as Language, Religion, Marriage, and overall culture become hurdles in the way of multicultural Indian society. The movie overtly is the criticism of the social and cultural structures of Indian society but at broader level the criticism suggests the universal community to grow as tolerant and humane as possible.

Keywords: Structure, Multiculturalism, Cosmopolitanism, Diversity.

The domain of literature is now not limited to literary books only. In postmodern time the phenomenon such as movies, documentaries and even advertisement are created as text to be read by society. The mentioned texts have the potential to talk of human experience, issues and solutions to them. Film Studies is an academic discipline that deals with various theoretical, historical, and critical approaches to the films. Films are the indivisible part of human life and human society. Films reach a wide audience across different sections of society. Considering this many universities and colleges have opened the departments of Film Studies. The movie PK in 2014 by Rajkumar Hirani performs the role of entertainment at the same time of social education. It attempts to discuss the basic institutional problems of Indian society. The institutions such as Language, Religion, Marriage, and overall culture become hurdles in the way of multicultural Indian society.

Summary of the movie text PK :

An alien astronaut from somewhere in universe lands on earth from an UFO. He lands naked on a research mission. In the beginning only his gadget (Remote Control) gets stolen by a human being on earth. He runs after the thief but gets nothing apart from thief's cassette recorder. In sub plot Jaggu (Anushka Sharma) in Germany meets a Pakistani boy Sarfaraj. Both fall in love but her parents oppose to the marriage. The family Guru Tapasvi Maharaj also talks with Jaggu and predicts that the Pakistani boy will dupe her and run away. Determined to prove them wrong Jaggu asks Sarfaraj to marry her the next day. At the wedding chapel, she is heartbroken when she receives an unsigned letter, believing it is from Sarfaraz, calling off the marriage due to cultural differences.

Returning to India Jaggu becomes a TV reporter. She meets the alien and is intrigued to see him distribute leaflets about the "missing" God. (PK, 2014). In order to get a story for her news paper Jaggu helps the alien a couple of times and requests him to share his story. The alien believes her to be a good human being and so he shares his story with her. After his remote was stolen he met Bhairon Singh, though him only he got into contact with a prostitute and copied Bohjpuri language by holding her hands for one whole night. There from he came to Delhi because Bhairon Singh told him that the stolen things are generally sold in Delhi. He tried every possible legal way to get his remote but due to his strange behavior, people assume him to be drunk and call him "peekay" (Hindi for drunk). The alien names himself PK. People tell him that only "God" can help him find his remote. He sincerely goes to every temple, mosque, dargarh, and the religious place. He even donates money, punishes himself, and does every odd kind of thing which are done by the blind religious followers, but all his efforts fail him to reach to the remote. Without remote he cannot send signal to his people. Jaggu promises PK that she will recover his remote and he can go back home.

As the Tapasvi pretended to have regular communication with God, PK conjectures that Tapasvi and other god men must be dialling a "wrong number" to communicate with God and are advising the public to engage in meaningless rituals. Jaggu organizes a talk between Tapasvi and PK in which the fraudulent nature of Tapasvi is exposed. In the end Jaggu and Sarfaraj also meet together because of PK. In the end PK returns to his own people with the help of his remote control. (Wikipedia)

Analysis and Discussion of the movie text PK:

Language:

Language is used as a medium of communication but it has its own inherent problems like ambiguity, duality and randomization. In one of the scenes when PK is talking with jaggu in police cell, he tells her that he is from another planet. Listening to this jaggu is surprised and asks what kind of language is used on his planet, whether Bhojpuri is the language of his planet? While answering to her he says the human society of his planet did not use language, they read the minds for communication. It was mind to mind communication without the intervention of language. Because of this all the confusions were avoided only truth was shared nothing else but truth only. PK finds the language on earth very confusing, as it has much of duality and ambiguity. He explains his confusion with the example of the word "Accha". He says;

"Aise mundi hilao aur bolo 'Achha hain....achha hain'. Matbal sab theek thaak hai.. bery good. Aankh badi kar ke bolo aacha hai matbal shack ma hai.. Tumri amma ka accident ho gaya hai! Achhaaa!.. Shack..

Phir gussa aata hain to aawaz loud ho jaati hain. 'Achhaaaa humko sikha rea hain?' aacha..

Aur jab sochte hain to lamba waala achha. Achhhhhhaaaaaaa..." (PK, 2014)

From the above example it is underlined that the language has been much politicized because of having a limited set of vocabulary above all because of duality and ambiguity. Human beings created language for the sake of smooth communication but when it is probed it is found that it does not facilitate a smooth communication, sometimes it creates confusion. PK also points out that language as a social institution is encumbered with ambiguity, duality and randomization. The institution should be attended with this consciousness only

Religion:

PK shows that Religion; an inseparable part of human society has been wrongly presented by its managers. The Priests and the god-men, and clerics capitalize on the religious credulity and the beliefs of people. People have been caught in the complex and exploitative network of present day religion. PK passes a message that people should break out this trap and come out of it and explore their love towards god without any intermediaries. We should remove Money, Self interest, Selfishness from this structure to maintain its purity. In movie it is shown that there is no specific mark on anyone's body that shows which particular religion he/she belongs to. New born baby doesn't know its religion. It comes to have a religion of community in which it is born and grows up.

When PK listens to many saying that they are not God, he understands that God of this earth can do anything, He can retrieve his remote also. A policeman says to him; "Humans are not Gods". (PK, 2014). After listening to the discourse around him he comes to believe that different Gods had opened their companies on earth and their clerics, and god men managed these companies right from their offices. Now he wants to find out as to which God would help him get his remote back. In order to find to which company he belongs PK starts following different traditional and ritual practices of different religions. His helplessness has been well expressed through the song in the movie;

*"Hai suna ye poori dharti tu chalata hai
Meri bhi sun le araj, mujhe ghar bulaata hai
Bhagwan hai kahaan re tu, aye khuda hai kahan re tu
Main pooja karoon, ya namaazein padhoon
Ardaas karoon din rain
Na tu mandir mile, na tu girje mile*

*Tujhe dhoondhein thake mere nain
Tere naam kayi, tere chehre kayi
Tujhe paane ki raah hain kai..
Har raah chala, par tu na mila
Tu kya chaahe main samjha nahi”*(PK, 2014)

While confronting Tapasvi in the programme “Ek Sawal Aur ” PK says that earth is very small as compared to universe. For getting the right address of God and religion; “Keep the God who created us and remove the fake one which you have created for your benefit.” (PK, 2014). PK gives a message that, Religion is the combination of ritualistic as well as scientific practices but we only consider ritualistic practices as a part of religion. The scientific approach to religion is told by nobody. Religious issues now are being answered by diverse ways. The stakeholders such as; society, intellectuals, thinkers, Priests and others along with literature, media, and movies are coming forward to solve them. (Mid-day)

Culture

Bhikhu Parekh says; Culture is, “a system of beliefs and practices in terms of which a group of human beings understand and regulate and structure their individual and collective lives. It is a way of both understanding and organizing human life... culture encompasses more or less the whole of human life.”(Parekh 143) In other words it is a way of life of a particular society. The said way of life consists of family, relations, rituals, dress codes, and such practices. Together all these things make a culture. Over a period of time this way of life becomes the identity of that cultural group. These cultural groups vary on ground of the world view and the cultural practices they adopt. India is a land of diverse cultural groups. These different cultural groups are also divided in to different religions.

Here in India and by extension everywhere else one culture reveres its own way of life but does not respect in the same way that of others way of life. This is the reason why different cultures do get into conflictual relationship. PK also gets confused by different cultural practices. The white dress worn by Hindus suggests a sad ceremony, whereas the same dress worn by a Christian woman suggests a happy event. The Black dress in Christian religion suggests a sad event whereas the same colour in Muslim religion has different connotation. Later on he comes to know that different religions are different just because they follow different fashions. Once in order to ask a question regarding the authenticity of a religious belonging he gets five people and asks them to disguise themselves in the dresses of different religions apart from their own. A Muslim wears a dress of Sikh, A Sikh wears a dress of a Hindu, a Christian comes in the dress of a Jain, and a Hindu comes in ina dress of a Muslim lady. Tapasvi on the basis of dress codes identifies them. Upon this PK says a religion and thus even a culture is identified on the basis of dress code. This discrimination is man-made and not God-made. Indirectly he makes a point that different religious and cultural groups should live amicable, they should accept and respect one another.

For the harmonious living experience and cultural integration everyone should respect the others religion and culture.

Marriage

In general the institution of Marriage is assumed to be under the control of the other institutions such as; family, religion, culture, and sometimes even geographical territories. This is the most unnatural part of man woman relationship. A marriage should be the union of two individuals irrespective of caste, religion, and colour, but here in human society it is very much a social and cultural phenomenon.

In the movie Jaggu falls in love with Sarfaraj in Belgium. When she tells her parents about their relationship, they object to their relationship only because Sarfaraj was a Pakistani Muslim whereas Jaggu was a Hindu from India. Her father consults the god man; Tapasvi who being a hard core Hindu tells her that Sarfaraj would deceive her. Because of the unnatural divisive lines across the man-

woman relationship, Jaggu and Sarfaraj do not come together until end of the movie text. In the context of the institution of Marriage balance between nature and culture should be attained. During the confrontation between PK and Tapasvi in the programme “Ek Sawal Aur” PK advocates for a greater autonomy for the institution of Marriage.

Conclusion

PK makes a case for the acceptance of difference of opinions, religions, dress codes, cultural codes and ways of life. The language as a social institution is encumbered with ambiguity, duality and randomization. It creates a lot of confusion in social communication. The institution should be attended with this consciousness. Religious and cultural diversity are also the causes of confrontation in Indian society. The diversity should be respected and welcomed with the intention of common wellbeing to enrich our living experience. The institution of Marriage should be open to diversity for the cause of multicultural and universal social existence. By questioning the authenticity and righteousness of the structural basis of human society, PK exposes the fraud mankind has created in the name of culture and civilization. PK stands out as a deconstructive angel in this regard.

The movie overtly is the criticism of the social and cultural structures of Indian society but at broader level the criticism suggests the universal community to grow as tolerant and humane as possible.

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भरतमुनींच्या नाट्यगृहाची संकल्पना आणि आधुनिक नाट्यगृह

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ABSTRACT:

प्रस्तावना:

“धर्मतर्ह्य यशसं च सोपदेशं ससंग्रहम्।
भविष्यतश्च लोकस्य सर्वकामोनुदर्शकम्॥” १

सर्वसामान्याच्या मनोरंजनासाठी नाटकाची निर्मिती झाली नाटकाशी संबंधीत असलेल्या वेदाला नाट्यवेद म्हणतात. या वेदाची निर्मिती ब्रम्हदेवाने केली या वेदाचा मूळ विषय म्हणजे नाटक होय. नाटक हा काव्य प्रकार दृश्य व श्राव्य स्वरूपाचा असल्यामुळे त्याचा आस्वाद हजारो लोक एकाच वेळी घेत असतात. २ नाटक हा मनोरंजनात्मक कला प्रकार देवतांच्या काळापासूनच चालत आलेला आहे.

“देवतांना मनुष्यांना राजा लोक महात्मनाम्।
पुर्ववृन्तानुचरित नाटकं नाम तद् भवेत्॥” ३

नाटक म्हटले तर त्या भाषा, पात्र, वेशभूषा यांचा समावेश होतो. नाटकात या गोष्टीला जितके महत्त्व असते तितकेच ते देखाण्यालाही असते. आणि यांवरच नाटकाची परिणामकारकता अवलंबून असते. नाटकाचा प्रयोग होत असताना प्रक्षकांना कलाकाराचे दर्शन, त्याचा आवाज सर्वांना ऐकू येईल अशी सोय असणे आवश्यक आहे. रसिक मनास रुझविण्यासाठी सोईस्कर असे स्व म्हणजे नाट्यगृह होय. नाटक आणि नाट्यगृह यांचा अत्यंत निकटचा संबंध आहे हे जाणूनच भरतमुनींनी आपल्या नाट्यशास्त्र ग्रंथ दुसर्या मण्डपविधान नामक अध्यायात नाट्यगृहाला आद्यसन प्रदान केलेले आहे.

“इहादिर्नाट्ययोगस्य नाट्यमंडप एव ही।” ४

या अध्यायात नाट्यमंडपाचे प्रकार, त्यासाठी योग्य भूमी, लक्षणे सांगून भरतमुनींनी आधुनिक शिल्पशास्त्रज्ञांना भविष्यकाळात नाट्यमंडपाची निर्मिती करण्यासाठी मार्गदर्शन केलेले आहे. यातूनच त्या काळातील ऋषी मुनींची समाजविषयी असलेली सहजगता दिसून येते. प्रस्तूत शोधनिबंधाद्वारे मी भरतमुनींनी कन केलेली नाट्यमंडपाची संकल्पना आणि त्या दृष्टीने आधुनिक काळात तयार झालेले नाट्यगृह (संभाजी महाराज नाट्यगृह, जळगाव) याची तुलना करणार आहे.

उद्दिष्ट्ये :

- १) नाट्यमंडपाचे स्वरूप व प्रकार अभ्यासणे.
- २) जमिनीची परीक्षा

नाट्यमण्डप बाधावयाचे म्हणजे योग्य जागा शोधण्यासाठी जमिनीची परीक्षा करणे आवश्यक ठरते मातीची परीक्षा तिच्या वर्ण, गंध, रस, ध्वनि आणि स्पर्शावरून करतात.

“सिता, रक्ता च पीता च कृष्णा चैव क्रमान्मही।
विप्रादीनां हि वर्णानां सर्वषामयाव हिता॥” ५

२) भरतमुनींनी कन केलेली नाट्यमंडपाची संकल्पना आणि त्या दृष्टीने आधुनिक काळात निर्माण झालेले (संभाजी महाराज नाट्यगृह, जळगाव) यांची तुलना करणे.

नाट्यमण्डपाचे प्रकार

“विकृष्टश्चतुरस्रश्च त्र्यस्रश्चैव तु मण्डपः।
तेषां त्रीणि प्रमाणानि ज्येष्ठं मध्यं ता ऽवरम्॥” ६

| आकार | प्रकार | परि | उपयोग |
|-------------------|---------|-----------|-----------|
| विकृष्ट मण्डप | ज्येष्ठ | १८०*६४ | देवातार्थ |
| | मध्यम | ६४*३२ | नृपार्थ |
| | कनिष्ठ | ३२*१६ | लोकार्थ |
| चतुरस्र मण्डप | ज्येष्ठ | १०८*१०८ | देवातार्थ |
| | मध्यम | ६४*६४ | नृपार्थ |
| | कनिष्ठ | ३२*३२ | लोकार्थ |
| त्र्यस्र मण्डप | ज्येष्ठ | १०८ समभुज | देवातार्थ |
| | मध्यम | ६४ समभुज | नृपार्थ |
| | कनिष्ठ | ३२ समभुज | लोकार्थ |

संभाजी महाराज नाट्यगृह जळगाव

“नाट्यं भिन्नरुचेर्जनस्य बहुधाप्येकं समाराधनम्।” ८

नाटक हे वेगवेगळ्या प्रकारच्या लोकांना आवड निर्माण करणारे आहे. कालिदासाच्या या ओळीतील हे महत्ता जाणूनच संभाजी महाराज नाट्यगृह, जळगाव या नाट्यगृहाच्या रंगपीठावरिल भिंतीवर लिहिलेले आहे हे खरोखर योग्य आहे आणि यातूनच त्या नाट्यगृहाचे वैशिष्ट्य निर्दर्शनास येते. नाटक, नृत्य, गायन इ. मनोरंजनात्मक कला प्रकाराचे सादरीकरण या नाट्यगृहात होत असते.

नाट्यगृहाची लांबी-रुंदी : संभाजी महाराज नाट्यगृह हे आयताकृती असून त्याच्या संपूर्ण बिल्डिंगची लांबी-रुंदी १००*४२ मीटर आहे.

रंगपीठ : भरतमुनींच्या नाट्यगृहातील ज्या भागाला रंगपीठ किंवा रंगशीर्ष अशी संकल्पना देतात त्याला आधुनिक काळात (डब्ल्यू) असा इंग्रजी शब्द वापरल्या जातो. संभाजी महाराज नाट्यगृहाचे रंगपीठ हे १२ मीटर लांब वर २४ मीटर रुंद आहे. रंगपीठ हे नाट्यगृहाच्या अगदी पश्चिमेला आहे. रंगपीठाच्या मागे पुरुष आणि स्त्रीयांना सजण्यासाठी म्हणून दोन स्वतंत्र खोल्या आहेत.

स्त्रीयांसाठी असलेली खोली : रंगपीठाच्या मागे दक्षिणेला १२*४.२० मीटर मापाची खोली कलावर्गातील स्त्रीयांना सजण्यासाठी किंवा त्याच्या तयारीसाठी बनविलेली आहे.

पुरुषांसाठी खोली : रंगपीठाच्या मागे उत्तरेला ११.६०*४.२० मापाची खोली पुरुषवर्गाच्या तयारीसाठी आहे.

प्रेक्षागृह : भरतमुनींच्या नाट्यगृहातील प्रेक्षागृहाप्रमाणेच संभाजी महाराज नाट्यगृहाचे प्रेक्षागृह देखिल पुर्व दिशेलाच आहे. त्या गृहाची रुंदी ३५ मीटर आहे. गृहात प्रेक्षकांची बसण्याची व्यवस्था ही चढत्या क्रमाने केलेली आहे. सुरवातीला काही प्रमुख पाहुण्यासाठी म्हणून खूर्च्या आहेत, तर त्यामागे इतर खूर्च्यावर प्रेक्षकांच्या बसण्याची सोय आहे. प्रवेश व्दारातून आत प्रवेश केल्यानंतर उत्तर-दक्षिण दोन्ही बाजूला प्रेक्षकांच्या बसण्याची व्यवस्था आहे.

मतवारणी : नाट्यगृहात रंगपीठाच्या दोन्ही बाजूस पाच-पाच मतवारण्या आहेत. त्यालाच (थक्छत्र) म्हणतात.

व्दर : संभाजी महाराज नाट्यगृहास एकूण अकरा दरवाजे आहे. यामध्ये प्रवेशासाठी पाच दरवाजे असून बाहेर पडण्यासाठी सहा दरवाजे आहेत.

प्रवेशव्दार : प्रेक्षकांना प्रवेश करण्यासाठी नाट्यगृहाच्या पूर्वेस रंगपीठाच्या अगदी समोर एक व्दार आहे. अशा प्रकारे संभाजी महाराज नाट्यगृह हे आधुनिक काळात निर्माण झालेले पण भरतमुनींच्या संकल्पनेतीलच नाट्यगृह आहे.

संदर्भसूची

| पुस्तकाचे नाव | अध्याय | श्लोक | पान नंबर |
|-------------------------------------|--------|-------|----------|
| १) नाट्यशास्त्र खण्ड १ | १ | १३ | ६ |
| २) भारतीय नाट्यप्रयोगविज्ञान | | | १० |
| ३) भारतीय संस्कृती कोश चौ खंड | | | ७५४ |
| ४) भरतमुनींचे नाट्यशास्त्र | | | २० |
| ५) अभिजात संस्कृत साहित्याचा इतिहास | | | |
| ६) नाट्यशास्त्र खण्ड १ | २ | ८ | ३४ |
| ७) नाट्यशास्त्र खण्ड १ | | | १४ |
| ८) मालविकाग्निमित्रम् | अंक १ | ४ | ७ |

संदर्भसूची

- १) भरतमुनीप्रणीत स्वायम्भुव
नाट्यशास्त्र खण्ड १
काव्यलक्षण खण्ड
- सम्पादक, अनुवादक, टिप्पणीकार
महामहोपाध्याय
आचार्य रेवाप्रसाद व्दिवेदी

भारतीय उच्च अध्ययन संसन शिमला आर्यन बुक्स इन्टरनेशनल नई दिल्ली. मुद्रक = बी. बी. एन. प्रिंटेर्स नई दिल्ली.

- २) श्रीमन्महाराधिराजश्रीभोजदेवविरचित
समरागडणसूत्रधार
अपरनाम वास्तुशास्त्रम्
- डॉ. सुधाकर मालवीयः
पं. चित्तरञ्जन मालवीयः

प्रकाशक = चौखम्भा संस्कृत भवन वाराणसी

- ३) बृहत्संहिता (वराहमिहिरकृत)
मूळ संस्कृत श्लोकांसह
संपूर्ण मराठी भाषांतर (सन १८७४)
- भाषांतरकार
कै. जनार्दन हरि आठल्ये.

मुद्रक व प्रकाशक = श्री. ह. अ. भावे (वरदा बुक्स) पुणे
मुद्रणस्थळ = हायलाईट प्रिंटेर्स १३११, कसबा पेठ पुणे-४११०११

- ४) भरतमुनींचे नाट्यशास्त्र
दुसरी आवृत्ती १९६३
प्रकाशन = पॉप्युलर प्रकाशन, मुंबई
- गोदावरी केतकर

- ५) भारतीय नाट्यप्रयोगविज्ञान
प्रकाशन = स्नेहवर्धन पब्लिशिंग हाऊस पुणे.
- अ. म. जोशी

Effect of pranayama on emotional intelligence of school student

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Introduction :

We are in an era of science and technology developing our selves predominantly at the intellectual level. The left brain development is fantastic, probably unseen over centuries. However, we have started realizing that our right brain related to emotions is hardly trained. We often get stuck with emotions such as grief hatred, jealousy and selfishness. We want everything for ourselves. Selfishness has increased and there is no concern and love for others. In present day lifestyle, although modern technology has helped to protect us from physical damages like, injuries, infections, we are phased with many emotionally demanding situations in all fields of life, such as high level competition, unemployment, high expectation, adjustment in family, dealing with difficult personalities causing anxiety and stress, hypertension which result in distressful negative emotions such as aggressive behavior anger fair distress, irritability.

An emotion is defined as a mental and physiological state associated with a feelings, thoughts and behaviors and appears to play a central role in many human activities. Emotional intelligence is the mental process involve in the recognition, use, understanding and management of one's and other's emotional state require to solving problem and regulating behavior, ,make thoughtful decision resolve conflict, set goal, self- awareness. Students are viewed as leaders of tomorrow and are expected to perform various rolls with competence and efficacy. It is essential to develop the level of emotional intelligence right from the schooling without a strong emotional foundation, intelligence alone was not enough to create a successful and balance life. The ultimate aim of yoga is to control over one's emotions. Yoga was originally developed as a practice for achieving optimal mental, emotional and physical health. Yoga considered as a holistic science provides multifarious benefits to its practitioners practice of yoga not only enhances the overall development of the mind, increase personal power and self- awareness, attention, focus and concentration, reduce stress and tension by activating the parasympathetic nervous system.

Objective :

To study the effect of pranayama on emotional intelligence of School Students.

Hypothesis :

H0 : There is no difference in pre & post- test mean.

H1 : There is difference in pre & post- test mean.

Research Methods

Research Design: Keeping in view the nature of the present study, the experimental method was considered to be the appropriate one. In the present study 'Pre -Test and Post-Test Design' was followed. The duration of the experimental work was of Three months.

Sample : The sample of the present study was 7th std. students of Orion CBSC School, Jalgaon .The sample of the study was consisted of 47 students including 18 girls and 29 boys.

Tools Used: Keeping in view the nature of the problem, the researcher used the following tools for collection of data:

1. For the measurement of emotional intelligence (31 S Q Scale Questionnaire) EIS - SANS test of Dr. A. K. Singh & Dr. S. Narain was used.

Procedure of Data Collection: The present study was carried out on 47 school students. Pre- test was administered on experimental group. Test (EIS - SANS) were administered for pre-test before applying yogic practices. In the second phase, the investigator applied yogic practices on the 7th std. school students . Students participated in 20 min yoga session daily for 3 months. Each session included omkar chanting, prayer,deep breathing, Bhramari and Anulomvilom pranayama. In third phase, after completion of yogic practices, investigator carried out the post-test of 31 SQ scale questionnaire.

Variables: In the present study, three types of variables were worked upon. These variables were independent variable, dependent variables and intervening variables. Different variables in each of these categories have been detailed out.

Dependent Variables: The dependent variables used in the present study to see the effect of independent variable were as follow: Emotional States

Independent Variable: The independent variable was manipulated in order to see the effect on the emotional states of school students. There is an only one independent variable i.e. yogic practice.

Intervening Variables: Certain variables which cannot be measured directly may have an effect on the outcome. In the experimental study like this there are many intervening variables but in the present study 7 intervening variables i.e. teacher, school, socio-economic status, physical environment of school , food, study habits, were considered. All these variables were either controlled experimentally or statistically or equalized.

Design Of Yogic Practices: The yogic practices were scheduled for a period of three months. The time for the scheduled programme was an 20 Min each day. The following order lists the sequence of events that were taken up during the practice period. Omkar chanting, Prayer, Deep Breathing, Pranayama (Bhramari&Anulomvilom), Discussion and Guidance.

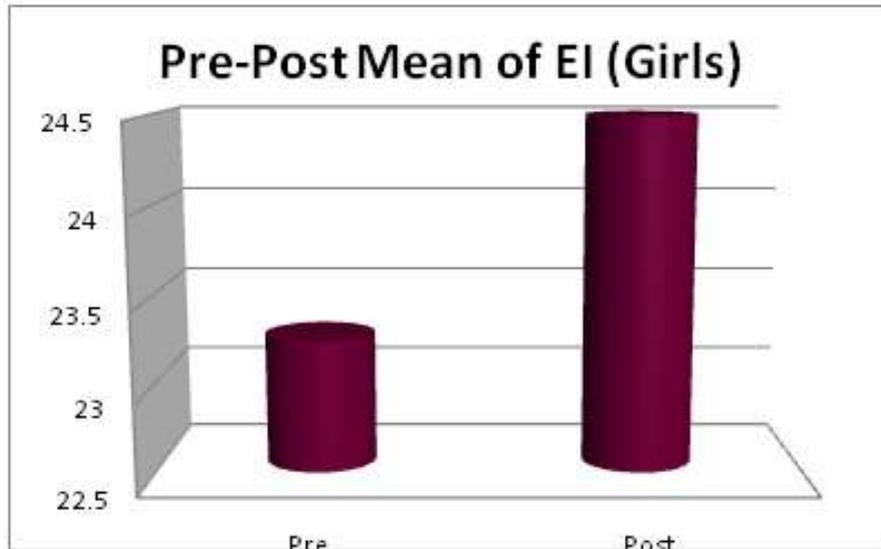
Result And Analysis:

This section splits in two subsections. First subsection gives descriptive statistics of Emotional Intelligence of girls and second subsection gives descriptive statistics of Emotional Intelligence of boys.

1.Descriptive statistics of Emotional Intelligence of 7th std. girls.

| Test | No.of girls | Mean | S.D | Max | Min | P-Value |
|------|-------------|-------|------|-----|-----|---------|
| Pre | 18 | 23.25 | 3.35 | 28 | 18 | 0.032 |
| Post | 18 | 24.5 | 2.87 | 30 | 20 | |

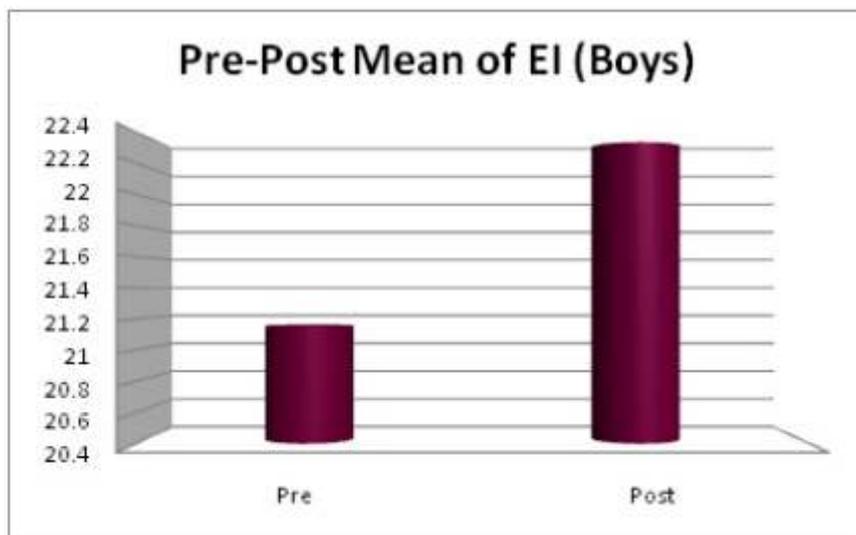
On the basis of descriptive statistics we claim that, the Standard Deviation column reflects variability in pre–post test and Mean column in the table shows increase in average of post-test. Hypothesis is tested, using SPSS Software and applied “t-test”. Here P-value is $0.03 < 0.05$, so we reject null hypothesis (H_0) and accept alternative hypothesis (H_1).



2. Descriptive statistics of Emotional Intelligence of 7th std. Boys.

| Test | No of Student | Mean | S.D | Max | Min | P-Value |
|------|---------------|-------|------|-----|-----|---------|
| Pre | 29 | 21.14 | 4.63 | 28 | 13 | 0.04 |
| Post | 29 | 22.33 | 4.27 | 31 | 15 | |

On basis of descriptive statistics we claim that, Mean column in the table shows increase in average of post-test. Hypothesis is tested, using SPSS Software and applied “t-test”. Here P-value is $0.04 < 0.05$, so we reject null hypothesis (H_0) and accept alternative hypothesis (H_1).



Conclusion:

This study has shown that application of pranayama brings positive change on emotional intelligence of these school students. Pranayama helps with energizing and strengthening the nervous system, improving lung capacity and helping with emotions. Control over breath help to control over emotions, Calming the mind and developing deeper focus. When students are educated to be emotionally and socially intelligence, their general performance can be improve. Yoga helps to refine and redefine the students/ their vision and thus laying a better foundation of the Nation tomorrow.

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शालेय विद्यार्थ्यांच्याया सर्जनशीलतेवर (Creative Thinking) प्राणायामामुळे होणाऱ्या परिणामांचा अभ्यास करणे.

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ABSTRACT:

प्रस्तावना: विद्यार्थ्यांमध्ये अनेक प्रकारच्या कल्पना उपजतच असतात. परंतु हि कल्पना शक्ती बहुतेक वेळा सुप्तावस्थेत पडून असते. विद्यार्थ्यांमध्ये असलेल्या या सर्जनशील शक्तीला पुरेसा वाव दिला गेला पाहिजे. त्यासाठी शालेय अवस्थेतच विद्यार्थ्यांमधील सर्जनशीलतेस योग्यरीतीने वाव दिल्यास त्यांना त्यांच्या भावी आयुष्यात खूप चांगल्या प्रकारे उपयोग होऊ शकतो. योग आणि प्राणायामामुळे विद्यार्थ्यांमधील कल्पना शक्तीला चालना मिळते.

विवरण(योगिक प्रक्रिया, साहित्य, पद्धती, इत्यादी):

या अनुषंगाने १२ ते १५ वर्ष वायोगटातील विद्यार्थ्यांच्या सर्जनशीलतेवर प्राणायामाचा होणारा परिणाम अभ्यासण्यासाठी ९० दिवसांचा प्रायोगिक उपक्रम राबविण्यात आला.

यामध्ये संध श्वसन, दीर्घ श्वसन, अनुलोम-विलोम आणि भ्रमरी प्राणायाम नियमित १५ ते २० मिनिटे जळगाव येथील ओरीयन स्कूल ऑफ सी.बी.एस.ई.च्या आठवीच्या विद्यार्थ्यांवर हा प्रयोग करण्यात आला.यासाठी प्रयोगात्मक संशोधन पद्धतीतील पूर्वपश्चात चाचणी पद्धतीचा अवलंब केला.

निष्कर्ष: सांख्यिकीय विश्लेषण करून प्राणायाम प्रक्रियांचा सकारात्मक परिणाम विद्यार्थ्यांमधील सर्जनशीलतेवर दिसून आला.

पार्श्वभूमी:

विद्यार्थ्यांमध्ये अनेक प्रकारच्या कल्पना उपजतच असतात. परंतु हि कल्पना शक्ती बहुतेक वेळा सुप्तावस्थेत पडून असते. विद्यार्थ्यांमध्ये असलेल्या या सर्जनशील शक्तीला पुरेसा वाव दिला गेला पाहिजे. त्यासाठी शालेय अवस्थेतच विद्यार्थ्यांमधील सर्जनशीलतेस योग्यरीतीने वाव दिल्यास त्यांना त्यांच्या भावी आयुष्यात खूप चांगल्या प्रकारे उपयोग होऊ शकतो. योग आणि प्राणायामामुळे विद्यार्थ्यांमधील कल्पना शक्तीला चालना मिळते.

आवश्यकता:

विद्यार्थ्यांना त्यांची सर्जनक्षमता कळल्यास भावी आयुष्यासाठी विद्यार्थी त्याचा योग्यप्रकारे उपयोग करून घेऊ शकेल.काही विद्यार्थ्यांमध्ये बुद्धिमत्ता कमी असते त्यामानाने सर्जनशीलता अधिक असते. अशा विद्यार्थ्यांना त्यांच्या सर्जनक्षमतेची जाणीव झाल्यास त्यांच्यात कमी बुद्धिमत्तेमुळे येणार न्यूनगंड वाढीस लागणार नाही व ते आपल्यात असलेल्या गुणांकडे सकारात्मक दृष्टीने बघतील.

ज्यावेळी विद्यार्थ्यांना बुद्धिमत्ता व सर्जनशीलता या दोन वेगवेगळ्या गोष्टी असून बुद्धिमत्ते प्रमाणेच आपण सर्जनशीलतेच्या आधारे भविष्यात खूप काही करू शकतो. याविषयी विश्वास निर्माण होईल. त्यावेळी आजच्या विद्यार्थ्यांमध्ये गुणांसाठी जी स्पर्धा निर्माण झालेली आहे. ती कमी होण्यास निश्चित मदत होईल. व या गुणांच्या स्पर्धेतून विद्यार्थ्यांमध्ये कळत न कळत निर्माण होणार्या समस्यांवर सुद्धा काही प्रमाणात आळा बसेल.

म्हणून शालेय विद्यार्थ्यांच्या सर्जनशीलतेवर प्राणायामाद्वारे होणार्या परिणामांच्या अभ्यासाची आजच्या काळात खूप आवश्यकता आहे

गृहीतक: शालेय विद्यार्थ्यांच्या सर्जनशीलतेवर (Creative Thinking) प्राणायामाचा सकारात्मक परिणाम दिसून येईल.

निवडलेले पद्धती, साधने व उपयोजना:

नमुना निवड- जळगाव येथील ओरीयन स्कूल ऑफ सी.बी.एस.ई. या शाळेतील १२ ते १५ वर्ष वयोगटात बसणार्या आठवीच्या ४५ विद्यार्थ्यांची निवड केली.

कालावधी:

दररोज २० मिनिटे ९० दिवसांसाठी प्राणायाम प्रक्रियेचा अभ्यास केला गेला.

प्रयोगात्मक संशोधन पद्धतीतील पूर्वपश्चात चाचणी पद्धतीचा अवलंब केला.

Non-verbal Test of Creative Thinking by Prof.Baqer Mehdi

प्रक्रिया:

प्राणायाम- संश्रवसन, दीर्घश्रवसन, अनुलोम-विलोम प्राणायाम व भ्रमरी प्राणायाम

संख्याशास्त्रीय फलिते व विश्लेषण

पूर्व-पाश्चात चाचणीच्या माध्यमातून सांख्यिकीय विश्लेषण केले.

निष्कर्ष:

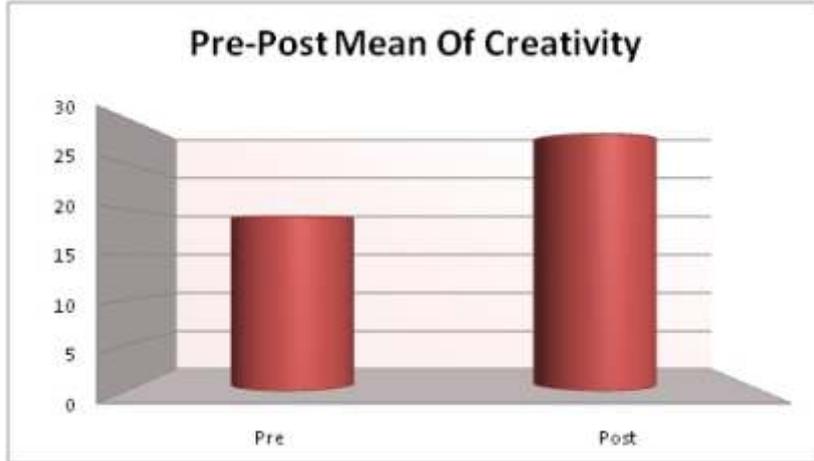
संख्याशास्त्रीय विश्लेषणाच्या आधारे प्राणायामामुळे १२ ते १५ वर्षीय वयोगटातील शालेय विद्यार्थ्यांच्या सर्जनशील विचारांमध्ये (Creative Thinking) सकारात्मक परिणाम आढळून आला .

प्राणायामाच्या साधनेचे फायदे सांगताना महर्षी पतंजली म्हणतात कि,

ततः क्षीयते प्रकाशावरणम् । -- प.यो.सूत्र २६५२

म्हणजेच प्राणायामाच्या अभ्यासाने बुद्धीवर पडलेले आवरण दूर होते. इथे असे म्हणता येईल कि, प्राणायामाच्या अभ्यासामुळे मेंदूचे कार्य सुधारून शालेय विद्यार्थ्यांमधील बहिर्मुखता कमी झाली. चित्त स्थिर होऊन एकाग्र व्हायला लागले. विद्यार्थ्यांमध्ये अंतर्मुखता वाढीस लागली आणि त्यामुळे त्यांच्यात असलेल्या सर्जनशीलतेवर सकारात्मक परिणाम दिसून आला.

| Test | Mean | S.D. | Max | Min | P.Value |
|------|------|------|-----|-----|---------|
| Pre | 19.2 | 10.8 | 46 | 05 | 0.001 |
| Post | 28.2 | 11.3 | 65 | 06 | |



उपसंहार:

प्राणायामामुळे १२ ते १५ वर्षीय वयोगटातील शालेय विद्यार्थ्यांच्या सर्जनशील विचारांमध्ये (Creative Thinking) सकारात्मक बदल आढळून आला.

संदर्भ सूची-

- १.) श्री.भागवत भारंभे- पातंजल योग दर्शन
- २.) डॉ.विश्वास मंडलिक- हठयोगातील शुद्धीक्रिया- योगचौतन्य प्रकाशन नाशिक २००२
- ३.) डॉ.विश्वास मंडलिक- योग व मनःस्वास्थ्य- योग चौतन्य प्रकाशन नाशिक
- ४.) डॉ.सौ.किरण जैन- प्राथमिक योगसाधना- योगक्रीडा प्रबोधिनी नाशिक २०१०
- ५.) डॉ.विश्वास मंडलिक- प्राणायाम साधनाआरंभ
- ६.) डॉ.निशा डी. मुंदडा आणि डॉ.शशिकांत खलाणे- प्रगत सामान्य मानसशास्त्र
- ७.) डॉ.अच्युत गोडबोले- मनात (मानसशास्त्राची उत्कंठा वर्धक रम्य सफर)
- ८.) डॉ.विश्वास मंडलिक- विद्यार्थ्यांच्या सर्वांगीण विकासाची साधना.
- ९.) स.आ.केळकर-बाल मनोविकास(शैक्षणिक दृष्टीकोनातून आढळणारे स्वरूप)

२० ते ३५ वायोगतील महिला व पुरुषांमध्ये खालीत्य(केस गळणे) व दारूणक(कोंडा) यावर योगाभ्यासाचा होणारा परिणाम अभ्यासणे.

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ABSTRACT:

प्रस्तावना: आजच्या घडीला केसांच्या समस्या फार वाढल्या आहेत. केसांचे गळणे पांढरे होणे, केस विरळ होणे ह्या समस्या वाढल्या आहेत. सौंदर्याच्या दृष्टीने केसांचे फार महत्त्व आहे. केसांचे सौंदर्य कमी झाल्याने मानसिक ताण, नैराश्य वाढून मानसिक आरोग्यवर विपरीत परिणाम बघायला मिळतो.

केसांचे विकार होण्यामागे काही कारण आहेत. बदललेल्या जीवनपद्धती मुळे समतोल आहार घेतला जात नाही. नौकरी आणि कौटुंबिक जबाबदारी ह्या दोन्ही मध्ये समतोल साधतांना ताण-तणाव, नैराश्य निर्माण होते. ह्या ताण-तणाव व नैराश्याचा अतःस्त्रावी ग्रंथीवर परिणाम होऊन हार्मोन्सचा समतोल बिघडतो आणि ह्याचा परिणाम केसांवर लगेचच दिसून येतो. रासायनिक सौंदर्यप्रसाधने वापरण्याचे प्रमाण सुद्धा प्रचंड प्रमाणात वाढले आहे. वेगवेगळे शाम्पू, तेल, कॅंडीशनर, हेयरकलर ह्यामुळे केसांचे आरोग्य धोक्यात येते. ह्या सोबतच अजून एक कारण म्हणजे वाढलेलं प्रदूषणाचा स्तर होय. केसांच्या आरोग्यवर आंतरीक व बाह्य दोन्ही घटकांचा परिणाम होताना दिसतो.

केसांच्या विकारांवर अनेक चिकित्सा उपलब्ध आहेत. हेयर ट्रान्सप्लॉंट, कृत्रिम केश रोपण, हेयर स्पा, आयुर्वेदिक, होमियोपॅथी, अशा अनेक चिकित्सा शास्त्रात केसांच्या चिकित्सा केल्या जातात. योग शास्त्रात केसांच्या समस्या कमी करण्याची क्षमता नक्कीच आहे. या विश्वासानेच आम्ही केसांच्या विकारांवर जसे केस गळणे, कोंडा होणे यावर योगातील प्रक्रिया, योगासने, प्राणायाम व ओंकार साधनेचा तसेच दिनचर्येतील सामान्य बदलांचा काय परिणाम होतो? याचा अभ्यास करित आहोत.

उद्देश्य: २० ते ३५ वयोगटातील महिला व पुरुषांमध्ये केसांच्या वाढलेल्या समस्यांवर नियंत्रण आणण्यासाठी योगाभ्यासाचा होणारा परिणाम अभ्यासणे.

गृहीतक: २० ते ३५ वायोगतील महिला व पुरुषांमध्ये खालीत्य(केस गळणे) व दारूणक(कोंडा) यावर योगाभ्यासाचा सकारात्मक परिणाम आढळून येईल.

विवरण(योगिक प्रक्रिया, साहित्य, पद्धती, इत्यादी)-

हे प्रयोगात्मक संशोधन आहे. २० ते ३५ वयोगटातील ३० महिला व पुरुषांना ९० दिवस रोज ६० मिनिटे योगाभ्यास करविण्यात आला.

साधने:

- १) यु.एस.बी. मायक्रोस्कोप व हेयर अॅनालायझरच्या माध्यमाने पूर्व आणि उत्तर दारूणक(कंदकतर्नी)प्रमाण काढण्यात आले.
 - २) वैयक्तिक प्रश्नावली चाचणीचा उपयोग करून पूर्व आणि उत्तरकेस गळण्याचे प्रमाण काढण्यात आले.
- ह्या चाचण्या करून योगाभ्यासाचा केसांच्या आरोग्यावर काय परिणाम झाला हे अभ्यासले.

सांख्यिकी विश्लेषण-

योगिक प्रक्रिया पूर्व(प्री) आणि पश्च्यात (पोस्ट) डाटा(माहिती) गोळा करून सांख्यिकीय विश्लेषण करण्यात आले.

निष्कर्ष-२० ते ३५ वयोगटातील महिला व पुरुषांच्या खालित्या(केस गळती) व दारूणक(कोंडा) यावर योगाभ्यासाचा सकारात्मक परिणाम आढळून आला.

पार्श्वभूमी-

आपले व्यक्तिमत्व सुंदर असावे हे प्रत्येकच स्त्री आणि पुरुषाला वाटते. त्या व्यक्तीचा रंग, रूप, उंची, देहयष्टी आणि केस हे त्या व्यक्तीचे सौंदर्य खुलवत असतात. काळे घनदाट लांबसडक केस असण हि प्रत्येक स्त्रीची इच्छा असते तर कधीही टक्कल पडू नये आणि केस कधीही पांढरे होऊ नये अस प्रत्येक पुरुषाला वाटत असत.

आज प्रत्येक वयोगटातील व्यक्तींमध्ये केसांच्या समस्या फार प्रमाणात वाढल्या आहेत. बदलती जीवनशैली व आहार शैली यामुळे या समस्या वाढत असल्याचे लक्षात येते आहे. या सोबतच सर्वात महत्वाचे कारण म्हणजे वाढता मानसिक ताण-तणाव, नैराश्य व भीती हे आहे.

मानसिक ताण-तणावामुळे ग्रंथी विकार होऊन हार्मोन्सचे विकारसुद्धा होताना दिसतात. या सर्व समस्या योगशास्त्राच्या मदतीने नियंत्रणात आणून केसांचे आरोग्य नक्कीच जपता असा विश्वास आहे.

आवश्यकता:

संशोधन हि आजच्या काळाची गरज आहेच. संशोधन झाल्यावरच त्या गोष्टीला, सिद्धांताला, वाक्यांना मान्यता प्राप्त होते. आरोग्य क्षेत्रात संशोधन अनेक वर्षांपासून फार मोठ्याप्रमाणात होत आहे. आयुर्वेद, योग, या शास्त्रात संशोधन होत नाही असे वारंवार म्हंटले जाते. काही अर्थी ते बरोबर सुद्धा आहे. योगशास्त्रातील आसन, प्राणायाम, शुद्धीक्रिया, यांचा मानवी शारीरिक व मानसिक आरोग्यावर काय परिणाम होतो हे संशोधनाद्वारे सिध्द कारणे गरजेचे आहे. आम्ही हाच प्रयत्न करण्यासाठी केसांवरील आरोग्यावर प्राणायाम व ओंकार साधनेचा काय परिणाम होतो हे संशोधन करण्याचे ठरविले आहे. यामुळे केसांच्या विकारांच्या चिकित्सेत योगशास्त्राचा काय भूमिका आहे हे स्पष्ट होईल.

गृहीतक

२० ते ३५ वायोगतील महिला व पुरुषांमध्ये खालीलत्या(केस गळणे) व दारूणक(कोंडा) यावर योगाभ्यासाचा सकारात्मक परिणाम दिसून येईल.

निवडलेले पध्दती, साधने व उपयोजना:

संशोधनासाठी निवडलेले क्षेत्र:

स्थळ- प्रस्तुत संशोधनासाठी संशोधकाने एम.जे. कॉलेज सोहम डिपार्टमेंट ऑफ योग - नॅचरोपॅथीच्या योगहॉलची निवड केली. तसेच ज्योती आयुर्वेद चिकित्सालय जळगाव येथे रुग्णांचे केश परीक्षण करण्यात आले.

स्वतंत्र परिवर्तन:

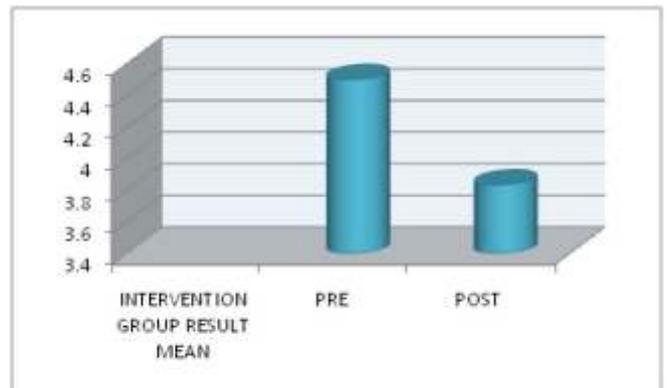
नमुना निवड दृसहेतुक -सारख्या भौगोलिक व सामाजिक स्थितीतील आणि २० ते ३५ वयोगटातील महिला व पुरुष परतंत्र परिवर्तन दृयोगासने, प्राणायाम व ओंकारसाधना , रोज १ तास, ९० दिवसांचा कालावधी ज्योती आयुर्वेद चिकित्सालय (अधिकृत उपकेंद्र केशायुर्वेद) रचित प्रश्नोत्तर चाचणी वापरली आहे.

संख्याशास्त्रीय फलिते व विश्लेषण

गट अ प्रयोगात्मक गटाचे संख्याशास्त्रीय विश्लेषण

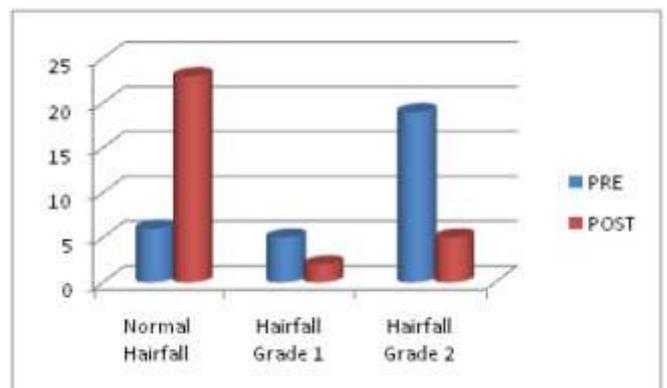
१) केसांच्या विकारांचे एकूण प्रमाण

| Intervention Group Result Mean | |
|--------------------------------|-------------|
| Pre | 4.5 |
| Post | 3.833333333 |



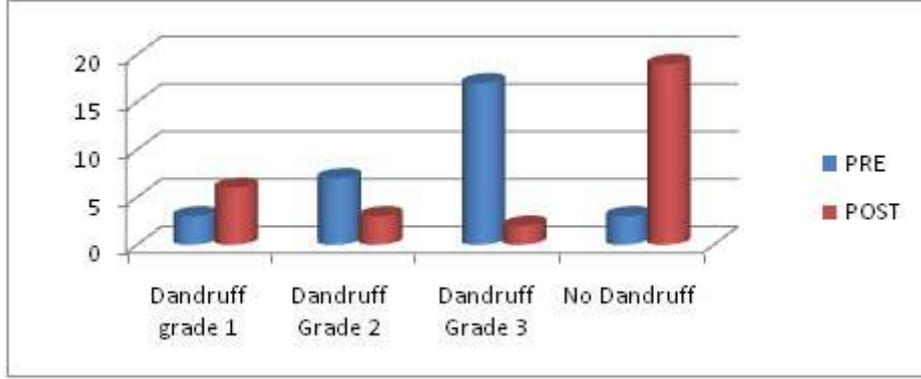
२) खलित्या (केस गळण्याचे) प्रमाण

| Intervention Group | | | |
|--------------------|-----------------|------------------|------------------|
| | Normal Hairfall | Hairfall Grade 1 | Hairfall Grade 2 |
| PRE | 6 | 5 | 19 |
| POST | 23 | 2 | 5 |



३. दारूणक (कोंड्याचे) प्रमाण:

| Intervention Group | | | | |
|--------------------|------------------|------------------|------------------|-------------|
| | Dandruff grade 1 | Dandruff Grade 2 | Dandruff Grade 3 | No Dandruff |
| PRE | 3 | 7 | 17 | 3 |
| POST | 6 | 3 | 2 | 19 |



गट “ब” नियंत्रक चे संख्याशास्त्रीय विश्लेषण

निष्कर्ष:

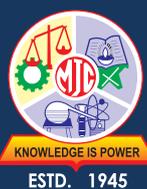
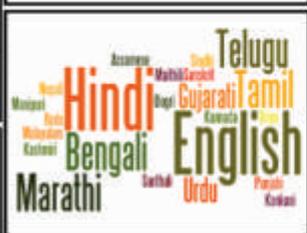
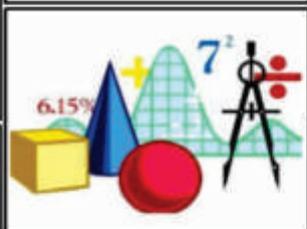
२० ते ३५ वयोगटातील महिला व पुरुषांच्या खलित्या(केस गळती) व दारूणक(कोंडा) यावर योगाभ्यासाचा सकारात्मक परिणाम आढळून आला .

सारांश:

अनुलोम विलोम, भ्रमरी, दीर्घश्वसन व ओंकार साधना व आहार विहाराचे सामान्य बदल यांच्या अभ्यासाने शरीरातील रक्ताभिसरण क्रिया, चयापचय क्रिया, मलउत्सर्जन क्रिया सामान्य होतात. यामुळे केसांना योग्य ते पोषण मिळण्यास मदत होते. तसेच घामाचे नियंत्रण होऊन, त्वचेचा कोरडेपणा व स्निग्धता यांचे नियंत्रण होते. यामुळे कोंड्याचे प्रमाण कमी होण्यास मदत होते. तसे या अभ्यासात आढळून आले आहे. नियंत्रक गटावर पूर्व व पश्चात चाचणीत सारखाच परिणाम आढळून आला. या वरून लक्षात येते कि योगाभ्यासाचा सकारात्मक परिणाम प्रयोगात्मक गटावर दिसून झाला.

संदर्भ सूची:

- १) डॉ. साधना कुंटे दृओंकारातून व्यक्तिमत्व विकास- साकेत प्रकाशन प्रा.लि. औरंगाबाद २००८
- २) डॉ.विश्वास मांडलिक- हठयोगातील शुद्धीक्रिया- योगचौतन्य प्रकाशन नाशिक २००२
- ३) डॉ.विश्वास मांडलिक- योग व मन:स्वास्थ्य- योग चौतन्य प्रकाशन नाशिक
- ४) डॉ.सौ.किरण जैन- प्राथमिक योगसाधना- योगक्रीडा प्रबोधिनी नाशिक २०१०
- ५) वैद्य. हरीश पाटणकर दृकेशायुर्वेद



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