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CONTENTS

A GREEN APPROACH TO CORROSION INHIBITION OF CARBON STEEL USING ECLIPTA PROSTRATA EXTRACT IN ACID MEDIA

S.Vinitha[1] and C.Mary Anbarasi[2*]

[1&2]PG and Research Center of Chemistry, JayarajAnnapackiam College for Women (Autonomous), Periyakulam, Theni Dist. Tamil Nadu, India.

Corresponding Author: anbarasi.mary@gmail.com

ABSTRACT

Corrosion inhibition effect of anethanolic extract of EcliptaProstratastem (Plant Extract (PE)) was investigated for carbon steel corrosion in HCl solution with different concentrations. The influence of PE in reducing the corrosion of carbon steel was discussed considering the weight loss study. It was observed from the results that in both the acid environment (0.5N and 0.3N), theinhibition efficiency (IE) increases with increasing the concentration of PE up to 250 ppm and then it decreases. The maximum IE of 99.8% wasnoticed at the inhibitor concentration of 250ppm.The effect of temperature on the corrosion rate in the absence and presence of the PE was probed and the thermodynamic parameters were evaluated. The adsorption process was found to be spontaneous, physisorptionand it follows Temkin, Langmuir and Flory-Huggins adsorption isotherms. Atomic Force Microscopy characterization (AFM) wasdone to ascertain the nature of the protective film. These results indicate that the PE was efficient in preventing the corrosion of carbon steel in the acid media.

Keywords: Carbon steel, Plant extract, Acid environment, Isotherm, AFM

1. INTRODUCTION

Corrosion is referred to as metallic deterioration by chemical attack or reaction of a metal with its environment [1].It is difficult to eliminate corrosion completely. Prevention would be more practical and achievable than elimination of corrosion

[2].Corrosion process, beinga surface reaction, can be controlled by inhibitors (i.e) PE, which get adsorbed on the reacting metal surface.One of the most important and practical methods of protecting carbon steel from corrosion is the use of inhibitors. Extract of plants having organic compounds containing hetero atoms like O,N,S and P have been widely used as a potential corrosion inhibitor in acid solutions.

Carbon steel is generally used in industries.PEassists in corrosion inhibition to reduce corrosion of carbon steel [2,3]. Carbon steel is commonly used for mechanical and structural engineering purpose,boiler,plates,steam engine parts and automobile etc.,[4]. Hydrochloric acid is largely used in acid cleaning,pickling of steel structures and descaling processes, as well as for drilling operations and oil well acidizing. These processes are normally accompanied by considerable loss of the metals due to corrosion reaction [5]. Thus the present study is an effort to use an ethanolic extract of *EcliptaProstrata* stem as a green corrosion inhibitor for the carbon steel in acid solutions in different concentrations.

2. EXPERIMENTAL

2. 1.Preparation of *Ecliptaprostrata* stem extract:

EcliptaProstrata plant was collected from the field, washed with water and the stem alone is taken. It was dried under shade and powdered well. The powder was used for the study. The Ethanolic extract was prepared by refluxing 10g of the stem powder with 100 ml of ethanol for 3hours. The refluxed solution was filtered, and the liquor was evaporated. The stock solution was prepared by dissolving 1g of the stem powder from the ethanolic extractin 1000 ml of double distilled water in a 1000 ml standard flask, the concentration of which is1000 ppm. This extract was used as corrosion inhibitor in the present study.

2.2. Preparation of carbon steel specimens:

Carbon steel specimens of size 1.0 cm $\times$ 4.0 cm $\times$ 0.2 cm, (area 10 cm^2) and chemical composition 0.026 % Sulphur, 0.06 % Phosphorous, 0.4 % Manganese, 0.1

% Carbon and the rest iron (density 7.87 gm/cm^3), used were polished to a mirror finish and degreased with acetone and used to carry out the weight loss and surface examination studies.

2.3. Weight loss Method:

For the weight loss studies, for a period of 3 hoursthe entire carbon steel couponswere immersed in 100 ml of the solution of acid media of normality (0.5N and 0.3N HCl) having various concentrations of the inhibitor (PE). After 3 hours of immersion the specimens were taken out, washed in running water, dried and weighed. The given equation is used to calculate the corrosion IE.

$$IE = 100 \left[1 - \left(\frac{W_2}{W_1} \right) \right] \%$$

where,

W_1 denotes the corrosion rate in the absence of the inhibitor

W_2representsthe corrosion rate in the presence of the inhibitor

Corrosion rate is calculated assuming uniform corrosion over the entire surface of the coupon. Corrosion rates(CR) are calculated from weight loss results using the given formula

$$CR = \frac{534\ W}{DAT}\ \text{Mils per year (mpy)}$$

where,

W = weight loss in milligrams

D denotes the density of specimen g/c   = 2.70 gm/cm^3

A representsarea of specimen in square inches = 1.395

T   = exposure in hours   = 3 hours

The following formula is used to calculate the degree of surface coverage (θ) using the weight loss measurement results

$$\text{Surface coverage } \theta = \frac{W_0 \text{-} W_1}{W_0}$$

where , W_0 denotes the weight loss in the absence of inhibitor

W_1 represents the weight loss in the presence of inhibitor

2.4. Effect of temperature

The effect of temperaturewas studied by suspending the polished and pre–weighed specimens in 100 ml of the test solution without and with the addition of various concentration of the PE for 3 hours in the temperatures range of 303 – 323 K using water thermostat. After 3 hours, the specimens were taken out from the test solution, washed using distilled water dried and weighed. The IE was calculated from the weight loss results.

2.5. Atomic Force Microscopy characterization (AFM)

The AFM (VeecodiInnova model) is one of the foremost tools for surface analysis studies.For a period of 3 hours, the carbon steel specimens were dipped in blank and in the inhibitor solution. The specimens, after washing and drying wereused for the surface examination analysis in tapping mode, using cantilever with linear tips. The scanning area in the images was 5µm $\times$ 5µm and the scan rate was 0.6 Hz/ second.

3. RESULTS AND DISCUSSION

3.1. Weight Loss Study:

Corrosion inhibition efficiencies (IE%) and the corrosion rates (CR) in mills per year (mpy) of carbon steel in Ethanol Extract of *EcliptaProstrata* stem in different acid solutions (0.5N and 0.3N) HCl are discussed below;

Table 1 shows the IE of the PE and CR of carbon steel in 0.5N and 0.3N HClsolutions having various concentrations of PE ranging from50-300 ppm. It was observed that in both the solutions IE increased up to 250 ppm and then it decreases. On the other hand CR decreases upto 250 ppm and then it increases. The maximum IE of

about 99.8 % was achieved at 250 ppm of PE. This result indicated that PE could act as

a potent corrosion inhibitor[6-8]. Since the PE showed maximum IE at 250 ppm concentration in 0.5N HCl medium, that was selected as the best system with which further studies were carried out. Above 250 ppm, the concentration of the inhibitor may be high and destroy the protective film formed on the metal surface.

Table 1: Corrosion inhibition efficiency (IE) and the corresponding corrosion rates (CR) in mills per year (mpy) of carbon steel in different acid solutions in the absence and presence of PE

PE in ppm	0.5N HCl		0.3N HCl	
	IE (%)	CR (mpy)	IE (%)	CR (mpy)
0	0	7088	0	6899
50	51	3497	48	3591
100	67	2315	59	2835
150	82	1228	66	2362
200	91	614	89	708
250	**99.8**	**14**	**91**	**614**
300	84	1134	83	1181

3.2. Effect of Temperature

Temperature has adefiniteinfluence on the rate of corrosion of metals. Thisparameter is studied at different temperatures like 303 K, 313 K, and 323 K for 3 hours of immersion period. The values of IE, CR and (Θ) are tabulated in Table 2. As observed from the table, a remarkable decrease in IE takes place with raise in temperature [9]. This is mainly because of the fact that the adsorbed film is unstable and easily damaged at high temperature. It is also because of desorption of inhibitor

molecules from carbon steel surface at elevated temperatures and showed that adsorption of PE on the metal surface may be due to physical adsorption[10,11].

Table 2: Effect of temperature on the IE of PE

| PE in ppm | 303 K | | | 313 K | | | 323 K | | |
	IE (%)	Θ	CR (mpy)	IE (%)	Θ	CR (mpy)	IE (%)	Θ	CR (mpy)
0	0	0	7684	0	0	8629	0	0	8960
50	45	0.45	4361	38	0.38	5349	35	0.35	5831
100	50	0.50	3804	45	0.45	4749	40	0.40	5359
150	67	0.67	2410	61	0.61	3407	54	0.54	4092
200	73	0.73	2036	65	0.65	3005	59	0.59	3681
250	91	0.91	723	83	0.83	1483	78	0.78	1975

3.3. Thermodynamic Parameters

Activation Energy

The activation energy (E_a) for the corrosion of carbon steel is calculated using the following Arrhenius Equation (1) and (2).

$$CR = A \exp\left[\frac{-E_a}{RT}\right] \qquad (1)$$

$$\log\left[\frac{CR_2}{CR_1}\right] = \frac{E_a}{2.303R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right] \qquad (2)$$

(Where CR_1 and CR_2 are the corrosion rate at the temperature T_1 and T_2 respectively, E_a is the activation energy and R is the universal gas constant). The value of activation energy (E_a) for the blank (9.64 kJ/mol) is lower than in the presence of PE (Table 3).

This observation clearly indicates that the adsorption process is physisorption.

Heat of adsorption

The heat of adsorption is obtained using the equation (3).

$$Q_{ads} = 2.303 \, R \, \log \left[\left(\frac{\theta_2}{1-\theta_2} \right) - \log \left(\frac{\theta_1}{1-\theta_2} \right) \right] \, x \, \left[\frac{T_2 \, x \, T_1}{T_2 - T_1} \right] \qquad (3)$$

(Where R is the gas constant, θ_1 and θ_2 are the degree of surface coverage at temperatures T_1 and T_2 respectively).

The calculated Q_{ads} values from (Table 3) vary from -36.11 to -19.64 kJ/mol for PE. The negative Q_{ads} values indicate adsorption, supporting the earlier proposed physisorptionphenomenone.

Free energy of adsorption

The equilibrium constant of adsorption for PE on the carbon steel is related to the free energy of adsorption ΔG_{ads} by equation (4).

ΔG_{ads}=- 2.303 RT log (55.5 K) ----------- (4)

(Where R is the gas constant, T is the temperature, K is the equilibrium constant of adsorption)

The free energy of adsorption ΔG_{ads} gave negativevalues in (Table 3) for the temperatures under study. They indicated the spontaneity of adsorption of the PE on the carbon steel surface. This adsorption process may be physical adsorption (ΔG_{ads}< 40 kJ/mol). Generally, the values of ΔG_{ads} around -20 KJ/mol or less negative depict physisorption and that around -40 kJ/mol or more negative values indicate chemisorption [12,13].

Table 3: Thermodynamic parameters for the corrosion of carbon steel in 0.5 N HCl containing various concentrations of PE at different temperature

PE in ppm	Activation energy, E_a(KJ/mol)	Heat of adsorption Q_{ads} (KJ/mol)	Free energy change ΔG_{ads}(KJ/mol) of adsorption at 303 K	Free energy change ΔG_{ads} (KJ/mol) of adsorption at 313 K
0	9.64	0	0	0
50	16.96	-36.11	-5.55	-4.83
100	18.44	-52.16	-4.31	-3.81
150	28.77	-54.27	-5.08	-4.42
200	32.33	-18.38	-5.07	-4.13
250	59.76	-19.64	-7.83	-6.0

3.4. ADSORPTION STUDIES

Adsorption isotherms are frequently used to predict the inhibition mechanism of the inhibitor molecules at the metal surface [14]. The mechanism of adsorption is evaluated by fitting the values of 'θ" at different concentrations 'C' of PE in acid medium in the temperature range (303 K – 323 K)

Temkin adsorption isotherm

The degree of surface coverage (θ) was related to the inhibitor concentration (C) according to the equation:

$$\theta = \frac{2.303 \log K}{2a} - \frac{2.303 \log C}{2a}$$

where

K is the adsorption equilibrium constant, a is the attractive parameter

The plot of θ versus log C of PE was shown in Figure 1reveals, there exists a linear relationship with $R^2 > 0.90$ in 0.5N HCl, fitting to Temkin adsorption isotherm [15,16].

Figure 1: Temkin adsorption isotherm plotted as "θ" versus "log C" for carbon steel corrosion in 0.5N HCl containing various concentrations of PE at 303 K to 323 K

Langmuir adsorption isotherm

In Langmuir adsorption isotherm, the following equation is used

$$\frac{C_{inh}}{\theta} = \frac{1}{K_{ads}} + C_{inh}$$

where

K_{ads} is the adsorption constant, C is the concentration of the inhibitor

θ is the degree of surface coverage of the inhibitor

The plot of C_{inh} versus C/θ of gives the Langmuir adsorption isotherm, which is shown in Figure 2. R^2 value is found to be closer to 1 in 0.5N HCl. This confirms the adsorption of PE on the carbon steel surface and obeys Langmuir adsorption [17].

Langmuir isotherm

y = 0.8564x + 15.898
R² = 0.993

y = 0.81x + 12.99
R² = 0.9883
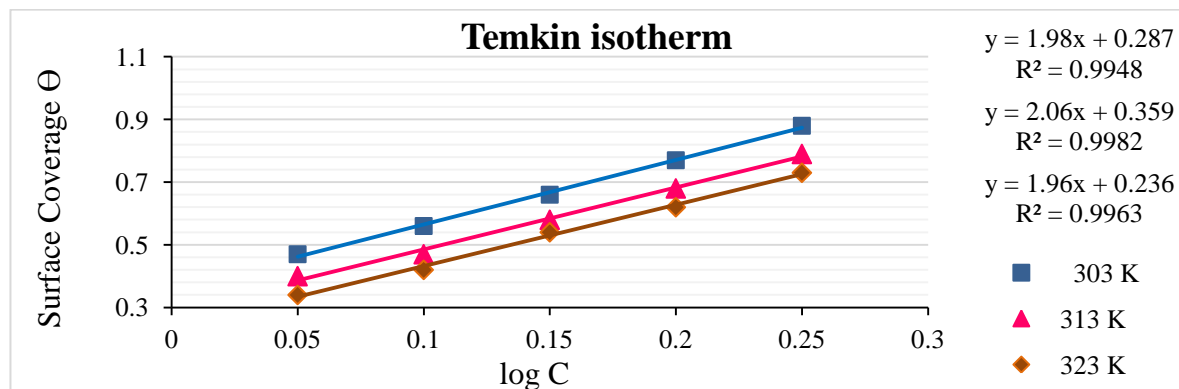
y = 0.8064x + 9.098
R² = 0.9865

◆ 303 K
● 313 K
▲ 323 K

Figure 2: Langmuir adsorption isotherm plotted as "C/θ" versus "C" for carbon steel corrosion in 0.5N HCl containing various concentrations of PE at 303 K & 323 K

Flory-Huggins isotherm

The Flory-Huggins isotherm is given by

$$\frac{\log \theta}{c} = \log k + x \log (1\text{-}\theta)$$

where C is the inhibitor concentration, θ denotes the degree of surface covered by the inhibitor, K is the adsorption equilibrium constant and x is the size parameter.

A plot of log (θ /C) versus log $(1- \theta)$ was shown in figure 3. From the figure it was noted that there exists a linear relationship with $R^2 > 0.90$ in 0.5N HCl, reveals that the adsorption data fitted to Flory-Huggins adsorption isotherm.
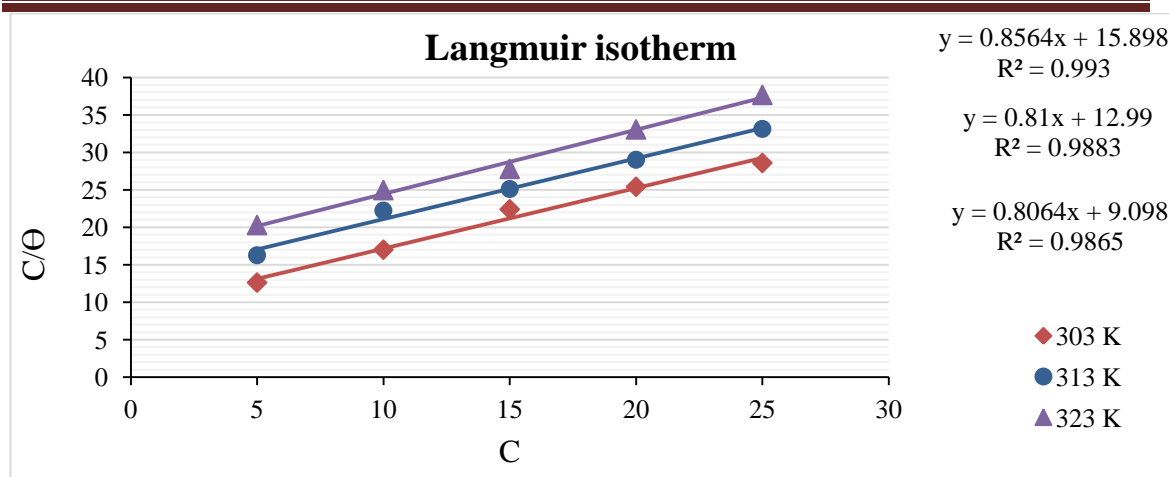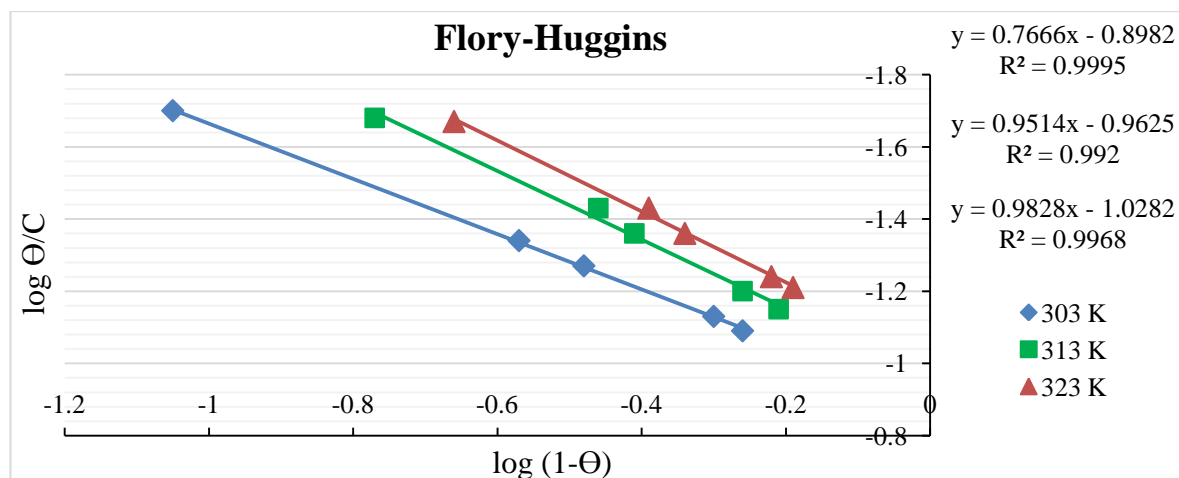
Figure 3: Flory-Huggins adsorption isotherm plotted as "log θ/C" versus "log (1- θ)" for carbon steel corrosion in 0.5N HCl containing various concentrations of PE at 303 K to 323 K

3.5. ATOMIC FORCE MICROSCOPY CHARACTERIZATION

The three-dimensional AFM technique is one of the ideal approaches for exploring the surface topography at the nano and micro levels. Atomic force microscopy is a powerful tool to investigate the surface morphology studies which have been useful to study the influence of inhibitors on the metal/solution interface [18].

Figures 4 (a, b, c) and 5 (a,b,c) represent the two dimensional (2D) and three dimensional (3D) AFM morphologies of polished carbon steel surface (reference sample), carbon steel immersed in 0.5N HCl (blank sample) and that immersed in 0.5N HCl containing 250 ppm of PE.

Root-mean-square roughness and average roughness

AFM analysis was carried out to obtain the average roughness, R_a, (the average deviation of all points roughness data from a mean line above the evaluation length), root-mean-square roughness, R_q, (the average of the measured height deviations consider within the evaluation length and measured from mean line).The R_q and R_a

values are summarized in Table 4.

Figures4 (a) and 5 (a) reveal the surface topography of uncorroded metal surface. The values of R_q and R_a for the reference sample are 4.88 nm and 3.73 nm respectively. The valuesprove a homogeneous surface. The slight roughness is may be due to atmospheric corrosion.

Figures 4 (b) and 5 (b) show the pitted, corroded carbon steel surface in the absence of the inhibitor dipped in 0.5N HCl. The R_q and R_a values for the carbon steel surface are 43.7 nm and 34.7 nm respectively. These data imply that carbon steel surface has high surface roughness, when immersed in 0.5N HCl, due to the corrosion of the carbon steel in acid environment.

Figures 4 (c) and 5 (c) denote the images of the carbon steel in 0.5N HCl containing 250 ppm of PE. The R_q and R_a values are 10.22 nm and 7.81 nm respectively. The R_q and R_a values are lower in the inhibited environment compared to the uninhibited environment. The above values confirm that the surface is smoother. It is due to the formation of a compact protective film of Fe^{2+}- inhibitor complex on the carbon steel surface, thereby preventing the corrosion of carbon steel [19,20].

Table 4: AFM data for Carbon steel surface immersed in inhibited and uninhibited environment

Samples	RMS (R_q) Roughness (nm)	Average (R_a) Roughness (nm)
Polished carbon steel (control)	4.88	3.73
Carbon steel immersed in Acid (blank)	43.7	34.7
Carbon steel immersed in Acid + Inhibitor	10.22	7.81

Figure 4: Two dimensional AFM images of the surface of

    a) Polished carbon steel (control)

    b) Carbon steel immersed in 0.5N HCl (blank)

    c) Carbon steel immersed in 0.5N HCl containing 250 ppm of PE
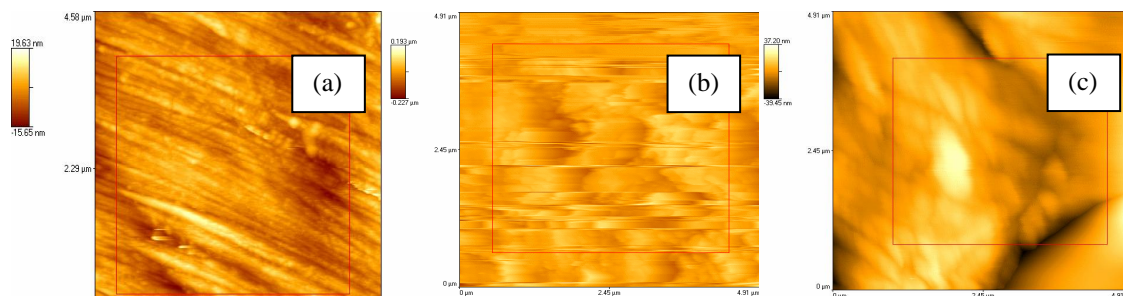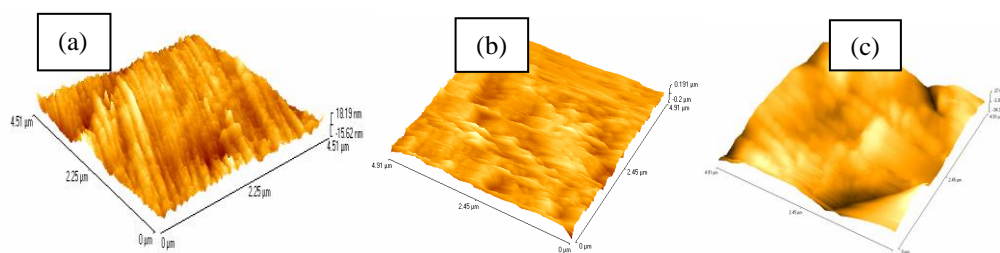

Figure 5: Three dimensional AFM images of the surface of

    a) Polished carbon steel (control)

    b) Carbon steel immersed in 0.5N HCl (blank)

    c) Carbon steel immersed in 0.5N HCl containing 250 ppm of PE

4. CONCLUSION

EcliptaProstrata stem (PE) was found to be an effective inhibitor to prevent the corrosion of carbon steel in 0.5N HCl solution with 99.8 % IE. IE and degree of surface coverage decreases with the increase in temperature. Inhibition efficiency increases with the increase in the concentration of PE, but decreases with rise in temperature. As temperature increases corrosion rates increases and it decreases with increase in inhibitor concentration. It obeys Temkin, Langmuir and Flory-Huggins adsorption isotherms. E_a increases with the

increase in concentration of the inhibitor suggests physisorption. The negative value of Q_{ads} indicates physisorption. The negative value of ΔG_{ads} shows the adsorption of inhibitor is a spontaneous process. AFM studies confirm the presence of the protective film on the surface of the carbon steel

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CATEGORIZING SUPERVISED DATA USING DIFFERENT METRICS

Mrs. D. Abinaya,

Assistant Professor,

Department of Mathematics, JayarajAnnapackiam College for women Autonomous

Corresponding Author: abimat@annejac.ac.im

ABSTRACT

This paper aims an approach of categorizing supervised data using different metrics to find which is easy and accurate. A brief introduction about data mining,machine learning and Naive bayes and k-nearest were given and Comparison of Naïve Bayes method, k-nearest neighbor and different metrics were carried out to find the accuracy of each metrices.

Keywords: Data mining, Machine learning, K-NN method, Manhattan distance, Chebyshev's distance,Euclideandistance.

INTRODUCTION

Data mining is the Process of discovering interesting knowedge such as pattern, association, changes, anomalies and significant structure from large amount of data stored in databases, data warehouse or other information repositories. Data Mining refers to extracting or "mining" knowledge from large amount of data.

Metrics is a distance between the two points. Distance metrics are a key part of several Machine learning algorithms. These distance metrics are used in both supervised and unsupervised learning, generally to calculate the similarly between data points. An effective distance metric improve quality of this paper provides the detailed analysis study for a better metrics machine learning model, whether that's for classification tasks or clustering.
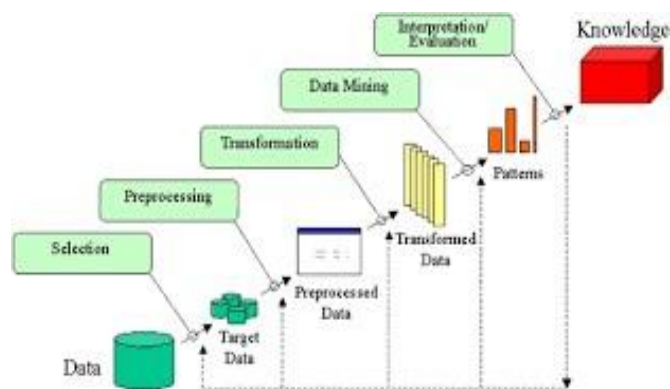
DATA MINING

Definition:

Data mining is the process of discovering interesting knowledge such as patterns, associations, changes, anomalies and significant structure from large amount of data stored in database, data warehouse or other information repositories.

Machine Learning

Machine Learning is related to the development and designing of a machine that can learn itself from a specified set of data to obtain a desirable result without it being explicity coded. Hence Machine Learning implies 'a machine which learns on its own'.

Machine learning is a technique that creates complex algorithm for large data processing and provides outcomes to its users. It utilizes complex programs that can learn through experience and make predictions.

Machine Learning algorithms are divided into two types.

1. Supervised
2. Unsupervised Learning.

Naïve Bayes classification

Naïve Bayes is a probabilistic machine learning algorithms based on Bayes theorem, that can be used in wide variety of classification tasks. Typical application include filtering spam, classification documents, sentiment prediction etc. it is based on the works of Rev. Thomas Bayes (1702 – 1761) and hence the name.

The name Naïve is used because it assumes the features that go the model is independent of each other. That is, changing the value of one feature does not directly influence or change the value of any other features used in the algorithm.

K-Nearest-NeighborMethod

K-Nearest-Neighbor is a supervised Machine Learning algorithm where the result of new instance query is classified based on majority of K-Nearest-Neighbor category. The purpose of this algorithm is to clarify a new object base on attributes and training samples.

K-Nearest-Neighbor used neighborhood classification as the prediction value of the new query instance. K-NN can be used for both classification and regression predictive problems. K-NN classification can be effectively used as an outlier detection method.

K-NN is simple algorithm that stores all available cases and classifies new cases base on a similarity measure (eg., Distance function) or characteristics.

K-Nearest Neighbor Algorithm:

1. Determine parameter K=number of nearest neighbors.
2. Calculate the distance between the query-instance and all the training samples.
3. Sort the distance and determine nearest neighbors based on the K-th minimum distance.

4. Gather the category Y of the nearest neighbors.

5. Use simple majority of the category of nearest neighbors as the prediction value of the query instance

Distance Function:

EuclideanDistance:

Euclidean Distance is a distance between two Points.

$$\text{Euclidean Distance: } \sqrt{\sum_{i=1}^{k}(x_i - y_i)}\ {}_2$$

Comparisonof NaïveBayesand K-Nearest Neighbor of chebyshev's distance and mahanttan distancesIris Flower data set:

Comparison of Naïve Bayes and K-Nearest Neighbor(1) shows that it contains a set of 50 records under five attributes Sepal length, Sepal width, Petal length, Petal width and Species. Classify whether a given species is a Iris Setosa, or Iris Versicolor, Iris Virginica.

NaïveBayesClassifierMethod:

We attained at a result that **11 Iris Versicolor**and **9 Iris Virginica.** Iris Versicolor has most majority. So, we predict the species sample is **Iris Versicolor.**

 K-Nearest Neighbor:

 Using K-Nearest Neighbor we predict the species sample is **Iris Versicolor.**

CHEBYSHEV DISTANCE;

1. Determine parameter k = number of nearest neighbors; Suppose use k = 20

2. Calculate the distance between the query-instance and all the training samples;

Coordinate of query instance is (6.3, 3.1, 5.0, 1.5) instead of calculating the distance we compute absolute distance between two points as the maximum difference over any of their axis values. Using,

$$Max = \{ \, |X_1 - X_2|, |Y_1 - Y_2| \, \}$$

Dataset Order	Sepal length	Sepal width	Petal length	Petal width	Distance
1	5.1	3.5	1.4	0.2	3.6
2	4.9	3.0	1.4	0.2	3.6
3	4.7	3.2	1.3	0.2	3.7
4	4.6	3.1	1.5	0.2	3.7
5	5.0	3.6	1.4	0.3	3.6
6	5.4	3.9	1.7	0.4	3.6

Similarly proceeding this calculation for 50 data set, we use

Use simple majority of the category of nearest neighbors as the prediction value of the query instance;

We have 15 Iris setosa, 18 Iris versicolor, 17 Iris virginica. Iris versicolor has most majority. So, we predict the species sample is Iris versicolor.

MANHATTAN DISTANCE ;

1. Determine parameter k = number of nearest neighbors;
   Suppose use k = 25

2. Calculate the distance between the query-instance and all the training samples;

Coordinate of query instance is (6.3, 3.1, 5.0, 1.5) instead of calculating the distance we compute as the sum of absolute distance between two points.. Using,

$$D = |X_1 - X_2| + |Y_1 - Y_2|$$

Dataset Order	Sepal length	Sepal width	Petal length	Petal width	Distance
1	5.1	3.5	1.4	0.2	6.5
2	4.9	3.0	1.4	0.2	6.4
3	4.7	3.2	1.3	0.2	6.7
4	4.6	3.1	1.5	0.2	8.9
5	5.0	3.6	1.4	0.3	6.6
6	5.4	3.9	1.7	0.4	6.4
7	4.6	3.4	1.4	0.3	6.8
8	5.0	3.4	1.5	0.2	6.4
9	4.4	2.9	1.4	0.2	7
10	4.9	3.1	1.5	0.1	6.3
11	5.4	3.7	1.5	0.2	6.3
12	4.8	3.4	1.6	0.2	6.5
13	4.8	3.0	1.4	0.1	6.6
14	4.3	3.0	1.1	0.1	7.4
15	5.8	4.0	1.2	0.2	6.5
16	7.0	3.2	4.7	1.4	1.2

17	6.4	3.2	4.5	1.5	0.7
18	6.9	3.1	4.9	1.5	1
19	5.5	2.3	4.0	1.3	2.8
20	6.5	2.8	4.6	1.5	0.9
21	5.7	2.8	4.5	1.3	1.6
22	6.3	3.3	4.7	1.6	0.6
23	4.9	2.4	3.3	1.0	4.3
24	6.6	2.9	4.6	1.3	1.1
25	5.2	2.7	3.9	1.4	2.7
26	5.0	2.0	3.5	1.0	3.4
27	5.9	3.0	4.2	1.5	1.3
28	6.0	2.2	4.0	1.0	2.7
29	6.1	2.9	4.7	1.4	0.8
30	5.6	2.9	3.6	1.3	2.5
31	6.7	3.1	4.4	1.4	1.1
32	5.6	3.0	4.5	1.5	1.3
33	5.8	2.7	4.1	1.0	1.4
34	6.3	3.3	6.0	2.5	2.2
35	5.8	2.7	5.1	1.9	1.4
36	7.1	3.0	5.9	2.1	2.4
37	6.3	2.9	5.6	1.8	1.1
38	6.5	3.0	5.8	2.2	1.3
39	7.6	3.0	6.6	2.1	3
40	4.9	2.5	4.5	1.7	2.7

41	7.3	2.9	6.3	1.8	2.8
42	6.7	2.5	5.8	1.8	1.6
43	7.2	3.6	6.1	2.5	3.3
44	6.5	3.2	5.1	2.0	0.9
45	6.4	2.7	5.3	1.9	1.2
46	6.8	3.0	5.5	2.1	1.7
47	5.7	2.5	5.0	2.0	1.7
48	5.8	2.8	5.1	2.4	1.8
49	6.4	3.2	5.3	2.3	1.3
50	6.5	3.0	5.5	1.8	1.1

3.Sort the distance and determine nearest neighbors based on the kth minimum distance

Dataset Order	Sepal length	Sepal width	Petal length	Petal width	Distance	Rank of minimum distance
1	5.1	3.5	1.4	0.2	6.5	24
2	4.9	3.0	1.4	0.2	6.4	23
3	4.7	3.2	1.3	0.2	6.7	26
4	4.6	3.1	1.5	0.2	8.9	30
5	5.0	3.6	1.4	0.3	6.6	25
6	5.4	3.9	1.7	0.4	6.4	23
7	4.6	3.4	1.4	0.3	6.8	27
8	5.0	3.4	1.5	0.2	6.4	23
9	4.4	2.9	1.4	0.2	7	28

10	4.9	3.1	1.5	0.1	6.3	22
11	5.4	3.7	1.5	0.2	6.3	22
12	4.8	3.4	1.6	0.2	6.5	24
13	4.8	3.0	1.4	0.1	6.6	25
14	4.3	3.0	1.1	0.1	7.4	29
15	5.8	4.0	1.2	0.2	6.5	24
16	7.0	3.2	4.7	1.4	1.2	7
17	6.4	3.2	4.5	1.5	0.7	2
18	6.9	3.1	4.9	1.5	1	5
19	5.5	2.3	4.0	1.3	2.8	17
20	6.5	2.8	4.6	1.5	0.9	4
21	5.7	2.8	4.5	1.3	1.6	10
22	6.3	3.3	4.7	1.6	0.6	1
23	4.9	2.4	3.3	1.0	4.3	21
24	6.6	2.9	4.6	1.3	1.1	6
25	5.2	2.7	3.9	1.4	2.7	16
26	5.0	2.0	3.5	1.0	3.4	20
27	5.9	3.0	4.2	1.5	1.3	8
28	6.0	2.2	4.0	1.0	2.7	16
29	6.1	2.9	4.7	1.4	0.8	3
30	5.6	2.9	3.6	1.3	2.5	15
31	6.7	3.1	4.4	1.4	1.1	6
32	5.6	3.0	4.5	1.5	1.3	8
33	5.8	2.7	4.1	1.0	1.4	9
34	6.3	3.3	6.0	2.5	2.2	13

35	5.8	2.7	5.1	1.9	1.4	9
36	7.1	3.0	5.9	2.1	2.4	14
37	6.3	2.9	5.6	1.8	1.1	6
38	6.5	3.0	5.8	2.2	1.3	8
39	7.6	3.0	6.6	2.1	3	18
40	4.9	2.5	4.5	1.7	2.7	16
41	7.3	2.9	6.3	1.8	2.8	17
42	6.7	2.5	5.8	1.8	1.6	10
43	7.2	3.6	6.1	2.5	3.3	19
44	6.5	3.2	5.1	2.0	0.9	4
45	6.4	2.7	5.3	1.9	1.2	7
46	6.8	3.0	5.5	2.1	1.7	11
47	5.7	2.5	5.0	2.0	1.7	11
48	5.8	2.8	5.1	2.4	1.8	12
49	6.4	3.2	5.3	2.3	1.3	8
50	6.5	3.0	5.5	1.8	1.1	6

4.Gather the category Y of the nearest neighbors;

Dataset Order	Sepal length	Sepal width	Petal length	Petal width	Distance	Rank of minimum distance	Y- category of nearest neighbor
1	5.1	3.5	1.4	0.2	6.5	24	-
2	4.9	3.0	1.4	0.2	6.4	23	-
3	4.7	3.2	1.3	0.2	6.7	26	-

4	4.6	3.1	1.5	0.2	8.9	30	-
5	5.0	3.6	1.4	0.3	6.6	25	-
6	5.4	3.9	1.7	0.4	6.4	23	-
7	4.6	3.4	1.4	0.3	6.8	27	-
8	5.0	3.4	1.5	0.2	6.4	23	-
9	4.4	2.9	1.4	0.2	7	28	-
10	4.9	3.1	1.5	0.1	6.3	22	-
11	5.4	3.7	1.5	0.2	6.3	22	-
12	4.8	3.4	1.6	0.2	6.5	24	-
13	4.8	3.0	1.4	0.1	6.6	25	-
14	4.3	3.0	1.1	0.1	7.4	29	-
15	5.8	4.0	1.2	0.2	6.5	24	-
16	7.0	3.2	4.7	1.4	1.2	7	Iris versicolor
17	6.4	3.2	4.5	1.5	0.7	2	Iris versicolor
18	6.9	3.1	4.9	1.5	1	5	Iris versicolor
19	5.5	2.3	4.0	1.3	2.8	17	Iris versicolor
20	6.5	2.8	4.6	1.5	0.9	4	Iris versicolor
21	5.7	2.8	4.5	1.3	1.6	10	Iris versiolor
22	6.3	3.3	4.7	1.6	0.6	1	Iris versicolor
23	4.9	2.4	3.3	1.0	4.3	21	-
24	6.6	2.9	4.6	1.3	1.1	6	Iris versicolor
25	5.2	2.7	3.9	1.4	2.7	16	Iris versicolor
26	5.0	2.0	3.5	1.0	3.4	20	Iris versicolor
27	5.9	3.0	4.2	1.5	1.3	8	Iris versicolor
28	6.0	2.2	4.0	1.0	2.7	16	Iris versicolor

29	6.1	2.9	4.7	1.4	0.8	3	Iris versicolor
30	5.6	2.9	3.6	1.3	2.5	15	Iris versicolor
31	6.7	3.1	4.4	1.4	1.1	6	Iris versicolor
32	5.6	3.0	4.5	1.5	1.3	8	Iris versicolor
33	5.8	2.7	4.1	1.0	1.4	9	Iris versicolor
34	6.3	3.3	6.0	2.5	2.2	13	Iris virginica
35	5.8	2.7	5.1	1.9	1.4	9	Iris virginica
36	7.1	3.0	5.9	2.1	2.4	14	Iris virginica
37	6.3	2.9	5.6	1.8	1.1	6	Iris virginica
38	6.5	3.0	5.8	2.2	1.3	8	Iris virginica
39	7.6	3.0	6.6	2.1	3	18	Iris virginica
40	4.9	2.5	4.5	1.7	2.7	16	Iris virginica
41	7.3	2.9	6.3	1.8	2.8	17	Iris virginica
42	6.7	2.5	5.8	1.8	1.6	10	Iris virginica
43	7.2	3.6	6.1	2.5	3.3	19	Iris virginica
44	6.5	3.2	5.1	2.0	0.9	4	Iris virginica
45	6.4	2.7	5.3	1.9	1.2	7	Iris virginica
46	6.8	3.0	5.5	2.1	1.7	11	Iris virginica
47	5.7	2.5	5.0	2.0	1.7	11	Iris virginica
48	5.8	2.8	5.1	2.4	1.8	12	Iris virginica
49	6.4	3.2	5.3	2.3	1.3	8	Iris virginica
50	6.5	3.0	5.5	1.8	1.1	6	Iris virginica

5.use simple majority of the category of nearest neighbors as the prediction value of the query instance;   We have 17 Iris Versicolor, 17 Iris Virginica.

CONCLUSION:

In this paper we had a detailed study about K-nearest neighbor problems and Naïve Bayes problem. On considering the data set to determine whether a given sample is Male or Female, they have used Naïve Bayes Method to identify the sample which was done purely using Probability method. In order compare the results between K-nearest neighbor and Naïve Bayes, using the same data set, I have triedit for K-nearest neighbor method, which was done using Distance concept and as a result. The result of both the method is same, precisely the result from K-nearest neighbor is more accurate and this concluded by considering the more data set of iris flower to determine its species.

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SYNTHESIS OF TRANSPARENT CONDUCTIVE OXIDE THIN FILMS BY SPRAY PYROLYSIS TECHNIQUE

A.Jacquiline Regina Mary[1 *], S.Arumugam[2]

[1*] Department of Physics, Jayaraj Annapackiam College for Women (Autonomous), Periyakulam, Theni Dist, Tamilnadu, India.

[2] Solar Energy Division, Department of Physics, The Gandhigram Rural Institute-Deemed University, Gandhigram, Dindigul Dist, Tamilnadu, India."

Corresponding Author : jreginaphy@annejac.ac.in

ABSTRACT

Transparent conducting oxide (TCO) is an essential material for electronic devices. Aluminum doped Zinc oxide (AZO) thin films with different Al content were deposited by spray pyrolysis and its structural, electrical and optical properties were studied. XRD pattern illustrate the films grow in the Wurtzite phase. The FTIR spectrum for the AZO sample revealed the vibrational property through Zn-O stretching mode at $458cm^{-1}$ .The absorption edges are found to be blue shifted and the energy band gap values were estimated by Tauc relation increases from 3.21eV to 3.30eV. The widening of band gap is due to Burstein-Moss effect. A transmittance of 72% at 550nm was found for AZO film with doping ratio of 5%. The obtained results show that AZO film with 5% doping is appropriate as a transparent electrode in solar cell.

Keywords: Blue shift; Optical Band gap; Burstein-Moss effect.

1. INTRODUCTION

Zinc oxide based transparent conducting oxide (TCO) films are being studied extensively because of its numerous technical applications. They have good optoelectronic properties which are much needed for the use as transparent electrodes in flat panel displays such as plasma display panels and electronic paper displays. Thin films of Zinc oxide are suitable candidates as antireflection coating in solar cells [1],

heat mirrors and multi layer photo thermal conversion systems [2], gas sensors and spintronics [3], transparent thin film transistors, photo detectors, light emitting diodes and laser diodes that operate in the UV and blue region of the spectrum [4], catalyzers [5] etc. In addition ZnO thin film possesses high electro-chemical stability and absence of toxicity. ZnO is a n-type semiconductor with large band gap 3.37 eV and binding energy of 60 mev, high transparency and low resistivity in the visible region and posses high light trapping properties [6-8].Compared to indium tin oxide (ITO) , ZnO is abundance in nature and its non-toxicity, allows it to be a attractive TCO material.

Without doping, zinc oxide can satisfy the optical property requirements of TCO material. At room temperature the carrier concentration of ZnO is approximately 10^6 cm$^-3$, however, introduction of dopants affords an increase in carrier concentration [9]. Often Ga, Al and In from group III elements and Fluorine from group VII elements are used dopants in order to improve electrical conductivity [10]. Among those materials Aluminum have good optical transmission, can improve the electrical properties and ZnO doped with Al (AZO) thin films are a promising alternative for ITO. A. Djelloul et.al obtained green emission for their AZO films made on α-alumina substrates [11]. Tamiko Ohshmia et.al observed the lowest resistivity of 0.548Ω cm and transmittance of 82% was obtained by sputtering from their mixed powder target of ZnO and Al_2O_3 [12]. Minimum resistivity of $1.5x\ 10^{-4}\ \Omega$ cm obtained for 0.8% Al doped ZnO and a maximum transmission of about 91% is reported by M.J Alam et.al. by Sol-gel process [13] . Sputtered Al doped ZnO films have been tested for a photovoltaic effect and showed an efficiency of 5% [14]. Multilayer transparent conducting oxides GZO/AZO thin films were fabricated by pulsed laser deposition where the band gap decreases linearly with increase in concentration [15].

Different methods have been employed to prepare ZnO thin films such as sol-gel processes [16], metal organic chemical vapor deposition (MOCVD) [17], pulsed

laser deposition (PLD) [18], molecular beam epitaxy (MBE) [19], spray pyrolysis [20] and sputtering [21]. Because of its simplicity and large-area film production spray pyrolysis method is found suitable for thin films.

Out of all the ZnO: Al film studies only a few reports on conduction mechanism in heavily Al-doped ZnO thin films have been reported [22]. This research study, is focused on influence of high Al content ranging from 0 to 10 at wt %, on the structure, surface morphology, electrical and optical properties of ZnO thin films. The future work is focused to develop the solar cell (AZO/Cu_2O) device and testing their power conversion efficiency as well as fill factor by using solar simulator.

2. EXPERIMENTAL PROCEDURE

2.1. Material Synthesis

Zinc acetate [Zn (CH_3 COO) $_2$. $2H_2O$] and aluminum nitrate (Al $(NO_3)_3.9H_2O$) were used as starting materials for AZO thin films, which are dissolved in Iso-propyl alcohol and de-ionized water in the ration 3:1. The films are deposited on to a glass substrate 1mm thick, at an optimized substrate temperature (400˚C), precursor concentration (0.2M), the substrate to nozzle distance (SND) 25cm and volume of the solvent taken was 25ml. The Al/Zn ratio in the solvent was varied from 0 to 10% (atomic). The aluminum dopant were taken in the atomic weight percentage 0, 2.5%, 5%, 7.5% and 10% which are represented as ZnO, AZO(2.5), AZO(5), AZO(7.5) and AZO(10) respectively. Few drops of acetic acid was added to improve the solubility of Zinc acetate and aluminum nitrate mixture in the solvent. The solution was stirred at 60˚C for 1h to give a homogenous solution, which is used for coating.

2.2. Experimental Setup

The spray unit used was an indigenous set up comprising a burette, a glass nozzle and a temperature controller made from University Scientific Instrumentation Centre (USIC) meant for spraying good film. A PID temperature controller was used to

heat the glass substrate upto $400\pm5^\circ$C. Compressed air was used as a carrier gas and the solution flow rate was kept at 4ml/ min. After coating, the films were allowed to cool to room temperature. The films were annealed at 500°C after deposition.

2.3. Characterization Technique

The structural analysis was made by pan analytical XPERT-PRO X-ray diffractometer system with a scan angle from 20° to 80° and the anode material as copper. The surface morphology was seen by TESCAN VEGA3 Scanning Electron microscope. The optical studies were carried out by UV-Vis spectrophotometer (Shimadzu, model UV-1800, Japan) in the wavelength range 190-1100nm. FTIR Spectra are recorded by Perkin Elmer BX II spectrometer between the wave number region 4000cm^{-1} to 400cm^{-1}. The Keithley source meter model 4600 was used to record the I-V characteristics of the samples. Hall measurement and sheet resistance of the AZO films are measured by van der Pauw method.

3. RESULTS AND DISCUSSION

3.1. Structural analysis

3.1.1 XRD pattern
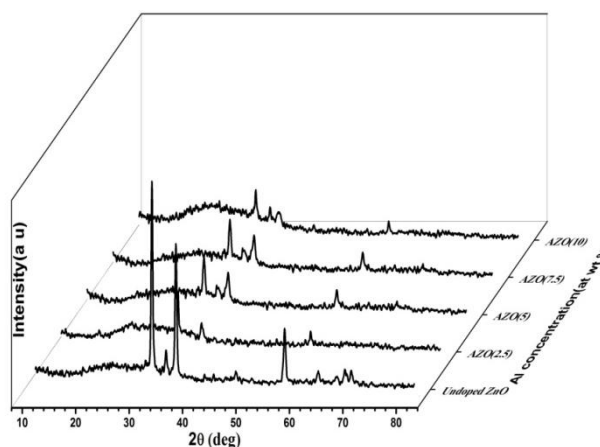
Figure 1: XRD pattern of undoped and Al doped ZnO thin films.

The XRD Spectra of pure ZnO and AZO films, for different doping percentages are shown in Figure 1. The observed XRD pattern depicts the polycrystalline nature with hexagonal Wurtzite structure. The diffraction peaks (Miller indices) are found to match with the JCPDS card no: 36-1451.The prominent peaks are along (100), (002), (101) and (110) planes corresponding to the 2θ values 31.81˚, 34.41˚, 36.36˚ and 56.53˚ respectively. There are small peaks noted along (102), (110), (112) diffraction planes for both pure ZnO and doped ZnO (AZO). As the Al doping concentration increases the intensity of the prominent as well as weaker diffraction peaks decrease indicating the degradation of crystalline nature of the films after doping. But there is no change in the preferred growth plane and the same trend is observed by F.Paraguay et.al in their research [23-25].

When the Al concentration is raised, the intensity of the (100) plane, which is dominant in the undoped and AZO 2.5 film continues to decrease, and the (002) peak start to appear for the doped AZO (5) and AZO (7.5) thin films. This implies that as the Al concentration increases, the growth of the films tend to align parallel to the c-axis. However for all the as deposited and doped films the (100) plane is the prominent growth plane. For AZO(10) film the intensity of all the peaks become smaller and the films is amorphous, indicating that increase in aluminum concentration leads to random orientation. K.L Chopra et.al in their study discussed that the ZnO crystals with lower surface energy prefer to grow along (002) diffraction plane [27]. Hence (100) orientation may be attributed to a little higher surface energy of the films grown perpendicular to the glass substrate.

The grain size is calculated through the Debye-Scherrer formula [29].

$$D = \frac{0.94\lambda}{\beta Cos\theta} \qquad \text{------------ (1)}$$

Where β is the width measured at half maximum intensity (FWHM) of the diffraction

peak. λ is the wavelength of the Cu Kα ,X-ray radiation and its value is $1.5406\mathring{A}$ and θ is the Bragg's angle. The estimated lattice constants and the grain size are listed in Table 1. The crystalline particle size decreases for Al doped films compared to the undoped ZnO, except AZO (5). This is attributed to the disorder developed in the lattice for higher Al concentration, owing to the difference in the ionic radii of Zn^{2+} (r_{Zn}^{2+} = 0.074nm) and Al^{3+} (r_{Al}^{3+}=0.057nm) [5] .

Table 1: Variation of grain size and lattice constants with Al dopant concentration.

Al Concentration (at .wt %)	Grain size (nm)	[TC]$_{hkl}$ (100)	Lattice constants	
			a	c
0%	28.88	1.38	3.19	5.21
2.5%	21.87	2.14	3.20	5.19
5%	55.61	1.92	3.24	5.18
7.5%	16.12	1.39	3.21	5.18
10%	27.94	1.64	3.16	5.23

3.1.2 FTIR studies
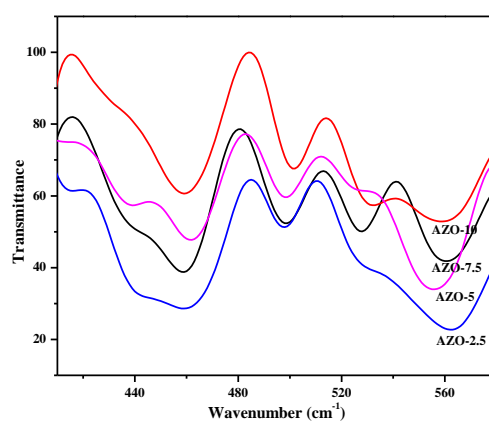
Figure 2: The Fourier Transform Infra Red transmission spectra of AZO thin films deposited at different Al concentrations

FTIR spectroscopy supplies the information about the occurrence of elements in the sample. Figure 2 shows the FTIR spectrum of AZO thin films recorded from 4000 to 400 cm^{-1}. The Fourier transform Infrared spectra recorded for AZO sample revealed the vibrational property through Zn-O stretching mode at 458cm^{-1} which is characteristic vibration of ZnO. Inclusion of Al in the ZnO lattice is confirmed by the emergence of common band exists in all cases such as 568 cm^{-1}, 528 cm^{-1} and 498cm^{-1} which are identified to be the characteristic bond of Al_2O_3 [11]. There is a shift observed in the IR transmittance spectrum of AZO, which may be ascribed to the crystal perturbation introduced by the dopant atoms into the lattice sites.

3.1.3. Morphological studies

The surface morphological studies were carried out by scanning electron microscope (SEM) which shows the existence of nanostructure for the doped and as deposited thin films (Figure 3). The spray deposited undoped thin film exhibits spindle like nano structure, which are dense and closely packed spreading through the entire substrate surface. The doping causes significant changes in the morphology of films with different Al concentration. The AZO (2.5) film depicts the random growth of tiny nano rods on the substrate. On further increasing the Al concentration to 5% AZO (5), more prononuced nano rods could be seen.
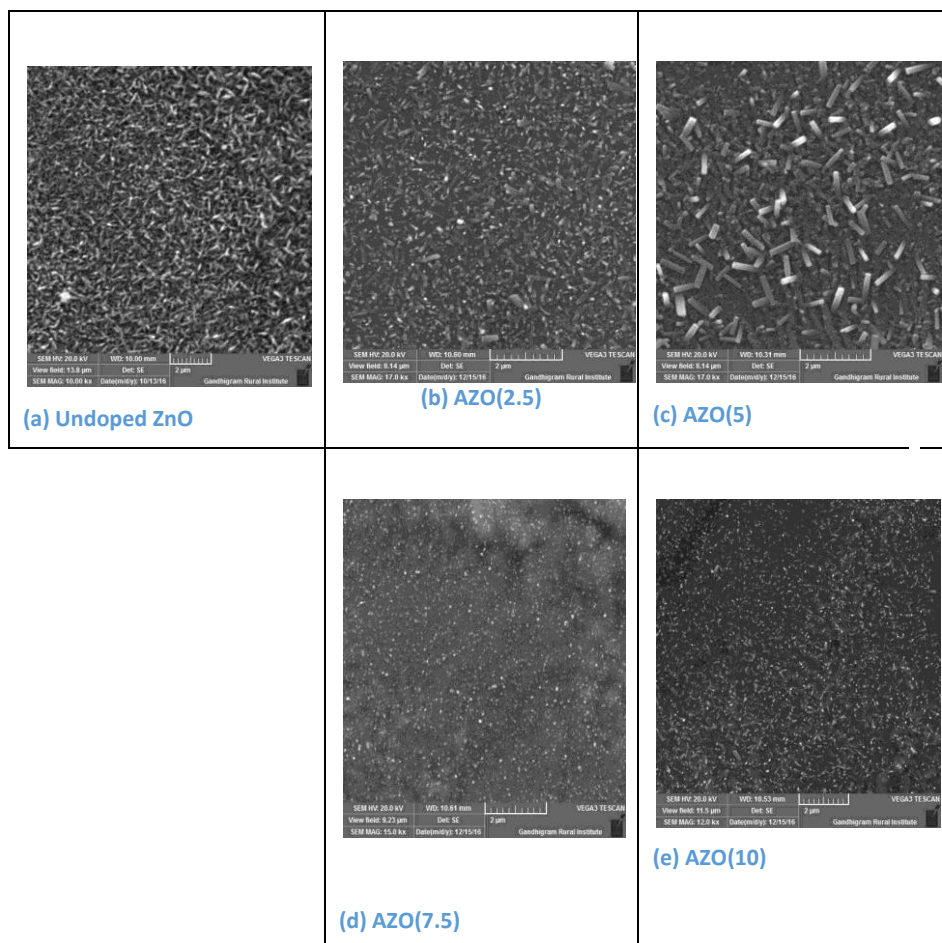
Figure 3: SEM images of ZnO thin films at different Al concentration.

T.Dedova et.al in their study discussed about a novel deposition method to grow ZnO nano rods by spray pyrolysis onto a ITO substrate prepared from aqueous Zinc chloride solution from the seed layer [30]. These nano rods are formed in our indigenous experimental set up, without any surfactants and seed layer for higher Al concentration the films are smooth with very small spots which can be distinguished as polycrystals.

3.2. OPTICAL INVESTIGATIONS

3.2.1. UV Absorption

. The band gap (E_g) which is an important optical parameter, calculated from the absorption coefficient α which is calculated from the absorbance data. The variations of the squared absorption coefficient α, with photon energy (hν), obey the Tauc's relation [1]

$$\alpha h\nu = A\,(h\nu - E_g)^{1/2} \quad \text{--------------} \quad (2)$$

for direct allowed transition.
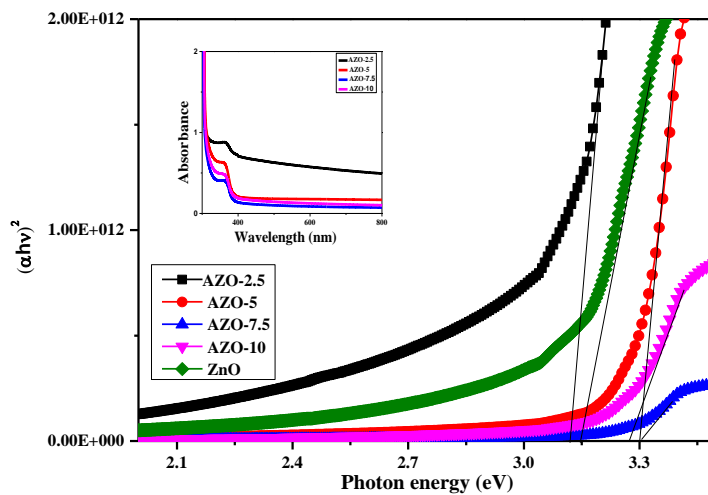
Figure 4: Optical band gap along with absorption spectra (inset) for as deposited and Al doped ZnO thin films.

This variation of $(\alpha h\nu)^2$ with energy of photon (hν) was plotted and it is shown in Figure 4. The extrapolation of the linear portion of the curves to α = 0, renders the optical band gap energies. Table 3 lists the optical band gap energies (E_g) were found to vary between 3.21eV to 3.30eV. The value of band gap is 3.21eV for pure ZnO and it

decreases to 3.15eV for Al doped ZnO (2.5). C. Rameshkumar et.al, found a shrinkage in optical band gap when Al at wt % is 2 [5]. The band gap value increases beyond 5 at% of AZO.

The absorption spectra (inset) shown in Figure 4 are blue shifted from 381nm to 378nm. Yalnli Lu et.al reviewed that the blue shift in heavily doped semiconductors observed because lower energy states in the conduction band are blocked [9]. The band gap of AZO (2.5) decreases initially with the increase of doping after that band gap becomes wider. The shift in optical band gap happens due to two contending effects: band filling effect called Burstein-Moss (B-M) shift and band gap narrowing (BGN) effect. Largely BGN effect is counteracted by B-M effect because of which it is difficult to separate the two effects. So it may be attributed that due to BGN effect the band gap narrows down for AZO (2.5) sample and thereafter B-M effect dominates, causing widening of band gap for AZO(5), AZO(7.5) and AZO(10). According to Burstein-Moss effect the band gap would increase with growing carrier concentration ($\Delta E_g^{BM} \propto (3\pi^2 n_e)^{2/3}$ where n_e is the carrier concentration). Doping of ZnO with Al will expand the carrier concentration as a result, the bottom most state in the conduction band is blocked. The widening of band gap is due to the increase of Fermi level in the conduction band of the degenerate semiconductors [7].

3.2.3. UV- Transmittance

Figure 5 shows the optical transmission spectra of AZO thin films coated for different Al concentrations. The transparency of the undoped films is observed to be more prominent than that of the doped films. A blue shift in the optical band edge was detected in the absorption spectra. This may be because of the presence of Al_2O_3 and Zn-O-Al phases in the synthesized films. Degradation of crystallinity causes the decrease in the transmittance of the AZO films [5].The pure ZnO and Al doped films are observed to be transparent in the visible region (400-900nm) and also in the near IR

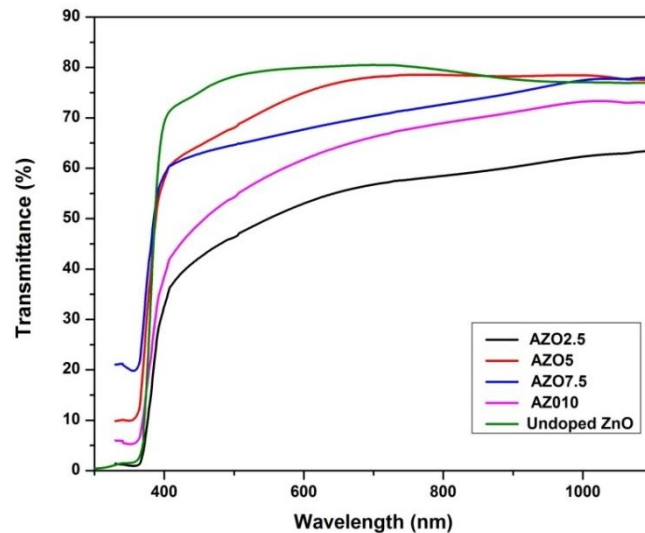region which is a suitable factor for optical device design.

Figure 5: The optical transmission spectra of AZO thin films deposited for different Al concentrations.

According to Burstein-Moss theory, inclusion of Al atoms shifts the Fermi level into the conduction band of semiconductors leading to the widening of band gap. Hence larger band gap would increase the optical transmission in the visible region. AZO(5) sample was recorded to have the highest transmittance of 82% and all the other films have transmittance above 70%. For doping percentages beyond 5% the transmittance decreases, this might be because of the increased phonon scattering which results in band gap widening. [1]

3.2.4. Photoluminescence Analysis.

Photoluminescence (PL) spectra for all the four AZO thin films are shown in

Figure (6). The films are excited by Hg arc lamp at 313nm and show strong visible emission band centered around 420 nm and a hump around 494nm for all the AZO samples. The near band edge (NBE) emission centered around 380nm for pure ZnO

shifts to 420nm due to Al doping. The NBE emission is due to free-exciton annihilation [31]. The maximum PL intensity was obtained for the AZO (5) sample. This may originate from the recombination of photoelectrical holes with electrons located at the ionized oxygen vacancies [11]. The blue emission in the emission spectra at 420nm (2.95eV) is inversely proportional to FTIR intensity of vibrational band at 458cm^{-1}, which is consistent with the result of PL characterization. The characteristic blue-green emission at 503nm is present at 495nm for the Al doped samples. This emission might be due to phonon-assisted transition [31,32].
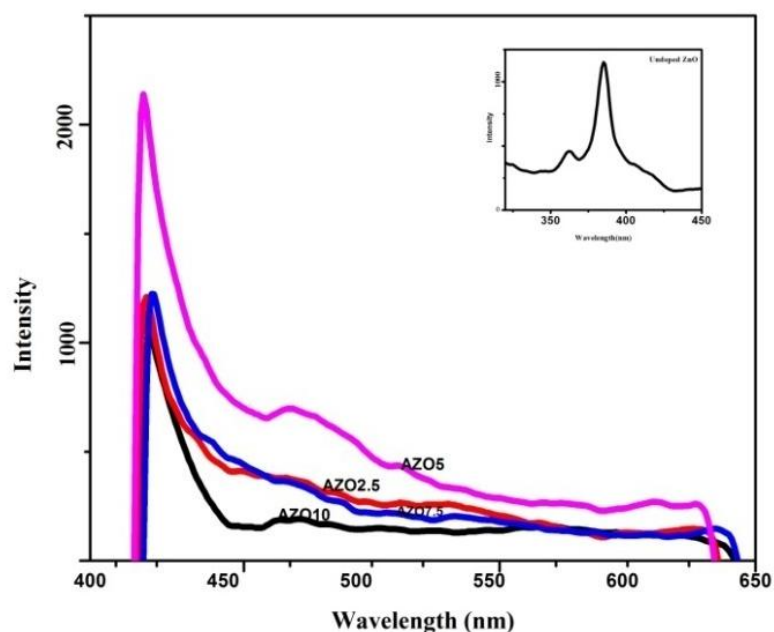
Figure 6 : Photoluminescence (PL) spectra for all the four AZO thin films

E.G. Bylander et.al gave a model that the blue-green emission is a result of electronic transition from an interstitial Zn to Zn vacancy [33]. The intensity of blue-green emission for the Al doped samples is decreased due to the drop in oxygen antisites and naturally the resistivity (ρ) of these films are found to be less due to this.

4. CONCLUSION

Transparent, conductive Al doped Zinc oxide thin films are synthesized by a indigenously developed spray unit. The effect of electrical and optical properties on Al content was studied. The XRD results exhibit that all the thin films are polycrystalline with a hexagonal wurtzite structure. The films surface shows change in morphology from a spindle like nano structure to nano rods with doping. The UV-absorption studies reveal that the absorption edges are blue shifted and the energy band gap increases from 3.21 to 3.30eV from undoped to doped samples. The pure ZnO and Al doped films are found to be transparent in the visible region (400-900nm) and also in the near IR region with an average transmittance of 82%. Optical parameters refractive index and extinction coefficient (k) are found to decrease with Al doping .Among the doped films, the AZO(5) thin film possess the best optoelectronic properties, with lowest resistivity 0.45Ω cm. The experimental results show the suitability of Al doped ZnO films as transparent electrode in solar cell fabrication.

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GREEN SYNTHESIS OF SILVER NANOPARTICLES USING CALOTROPIS GIGANTEA AND THEIR ANTI FUNGAL ACTIVITY

A. AnithaMary [1*], M.R. Delphine Rose [2], D. Kasthuri Santira Kumari [3]

[1]Assistant Professor, [2]AssociateProfessor, [3]Research Scholar

PG and Research Centre of Zoology,

Jayaraj Annapackiam College for Women (Autonomous)

Corresponding Author : amaryzoo@annejac.ac.in

ABSTRACT

The most trending nanotechnology is a vital technology in this modern era. Even though there are various methods of synthesizing nanoparticles, the biological method is less expensive. Silver nanoparticles are mostly used in medical field. In this study we have focused on green synthesis of silver nanoparticles using Calotropis gigantea flower extract it is characterization and its activities against the pathogenic fungus. The silver nanoparticles formed were seen by the change of colour and by UV-Vis spectrometry, functional groups are noted using FTIR, crystalline nature of the particles are seen with the help of XRD. The green synthesized silver nanoparticles using Calotropis gigantea flower extract showed the antifungal activity.

Key Words: UV-Vis spectrometry, antifungal activity, Calotropis gigantea, FTIR

1. INTRODUCTION

Nanotechnology refers to an emerging field of science that includes synthesis and development of various nano materials. Nanoparticles can be defined as objects ranging in size from 1-100 nm that due to their size may differ from the bulk material (Dubchak S*et al*., 2010). Nano biotechnology is the most active area of research in modern material science. Based on specific characteristics such as size,

distribution, morphology and nanoparticles exhibit completely new or improved properties (A. Singh *et al*., 2012). Irfanljaz *et al. ,*2020 says that biologically developed chemicals are used in biological methods which are not harmful and it's most preferable process.

Calotropis gigantea is a large growing plant upto 4 m (13ft) tall. It has clusters of waxy flowers that are withwhite or lavender in colour. Each flower consists of five pointed petals and a small "crown" rising from the center which holds the stamens. The aestivation found in *Calotropis* is valvate sepals or petals in whorls just touch one another at the margin, without overlapping. The plant has oval, light green leaves and milky stem. The latex of *Calotropis gigantea* contains cardiac glycosides, fatty acids, and calcium oxalate. The roots also contain Calotropone (Wang. Zhu-Nian *et al.,* 2008). *Calotropis* species possess anti-inflammatory components (GururajaK. and David M. (2016).

2. METHODS AND MATERIALS

Fresh flowers of *Calotropis gigantea*, were collected from Periyakulam and were washed with tap water followed by double distilled water in order to remove the impurities. The samples were chopped into small pieces, about 20 gram of plant sample was taken in a sterilized beaker and 50 ml of distilled water was added and boiled for 10 mins. After 10 mins, the extracts were transferred into conical flask and filtered with Whatsman No.1 filter paper to remove particle matter for getting clear solution and stored 4ºC refrigerated for further experiments. The filtrate acts as a reducing and stabilizing agent for the synthesis of silver nanoparticles.

2.1 Biosynthesis of Silver Nanoparticles

For green synthesis ofthe silver nanoparticles, about 100 ml of 0.02mmol aqueous solution of silver nitrate was taken and it was added with the 40 ml of the plant sample in a conical flasks and sealed using cotton plugs and observed the colour

change. The plant mediated synthesis is a rapid, flexible and suitable process for large-scale production of nanoparticles. Nowadays, plant parts like seed, leaf, bark, stem and fruit extracts have been effectively used for synthesis of nanoparticles. Among nanoparticles, silver nanoparticles have been used enormously due to their potent anti-bacterial (Struwig*et al*., 2010) and anti-fungal activity (Gupta *et al*., 2009).

2.2 Characterization of Silver Nanoparticles

Synthesized silver nanoparticles was confirmed by sampling the aqueous component of different time intervals and the absorption maxima was scanned by UV-Vis spectrometer at wavelength of 250-600nm on CHEMILINE CL-1320 Spectrophotometer are generally used for characterizing various metal nanoparticles in the size range of 2 to 100nm (Jitendra Mittal*et al.,* 2017).

2.3 FTIR spectroscopy

FTIR analysis was carried out in order to determine the role of functional groups involved in stabilization, capping and synthesis of silver nanoparticles in flower extract.

2.4 XRD analysis
XRD analysis was carried out to confirm the crystalline nature of the particles.

2.5 Antifungal activity
2.5.1 Potato Dextrose Agar Medium
The potato dextrose agar medium was prepared by dissolving 20 gm of potato influsion, 2 gm of dextrose and 1.5 gm of agar in 100ml of distilled water. The dissolved medium was autoclaved at 15 lbs pressure at 121°C for 15 minutes. The autoclaved medium was mixed well and poured onto 100mm petri plates (25-30 ml/plate) while still molten.

2.5.2 Procedure
Petri plates containing 20ml potato dextrose agar medium was seeded with 72 hours culture of fungal strain *(Candida albicans, Aspergillus niger* and *Aspergillus flavus)* wells were cut and different concentration of sample (500, 250, 100 and 50 µg/ml) was added. The plates were then incubated at 28°C for 72 hours. The anti-fungal activity was assayed by measuring the diameter of the inhibition zone formed around

the wells. Amphotericin B was used as a positive control. The values were calculated using Graph Pad Prism 6.0 software (USA) (M. Abbas Ali *et al.,* 2007).

3. RESULTS AND DISCUSSION

Synthesis of silver nanoparticles from silver nitrate is one of the most widely used methods for the synthesis of silver colloids. During the biosynthesis using the extract, the colour of the reaction medium changed rapidly from pink to reddish brown due to surface Plasmon Resonance.

3.1 UV-Visspectroscopy

Formation of silver nanoparticles was confirmed using UV-Vis spectrophotometer in a range of wavelength from 200nm to 800nm.The surface Plasmon Resonance of silver occur at416nm. This confirms the formation of silver nanoparticles (Figure-1).
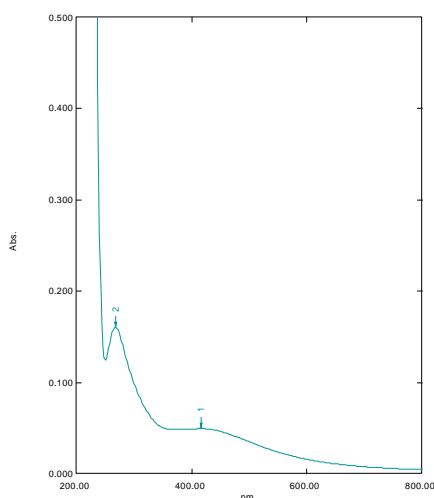
Figure 1.UV-Vis spectrum of silver nanoparticle synthesized from the flower of *Calotropis gigantea*

3.2 FTIR

FTIR study was carried out and the spectra showed absorption peaks. The peaks were 2154.16, 1660.74, 1535.36, 1362.98, 1020.36, 868.321. The prominent bands1535, 1660 are attributed to N-H stretching possibly due to presence of amide group, which is

responsible for reduction of silver nitrate to silver nanoparticles. The peak at 2154.16 results due to the alkene and ketene c-c. The peak at 1660.74 is for c=o stretching conjugated ketone. The peak at 1535.36 is for strong stretching nitro compound. The absorption peak at 1362.98 shows c-o alcohol, ether, ester, carboxylic acid, anhydride. The peak at 102.36 – c –f fluoro compound (Figure-2).
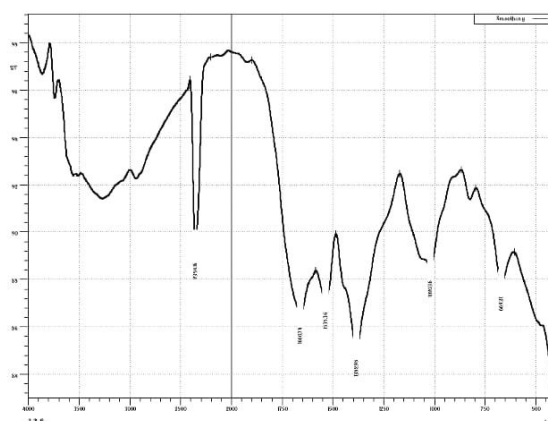

Figure2. FTIR spectral analysis for the silver nanoparticle synthesized from flower of *Calotropis gigantea*

3.3 X-Ray Diffraction (XRD) Studies

This was done to find out the crystalline nature of the formed particles. The XRD Spectrum when it is compared with standard confirmed the formation of silver nanoparticles. The peaks values at 20º shows values of 38.2, 40.1, 44.1 and 60.1 corresponding to (111), (200), (220) and (311) respectively bragg reflection of silver. The XRD clearly shows the crystalline nature of silver nanoparticles formed by reduction of silver ions by the *Calotropis gigantea* flower extract (Figure-3).
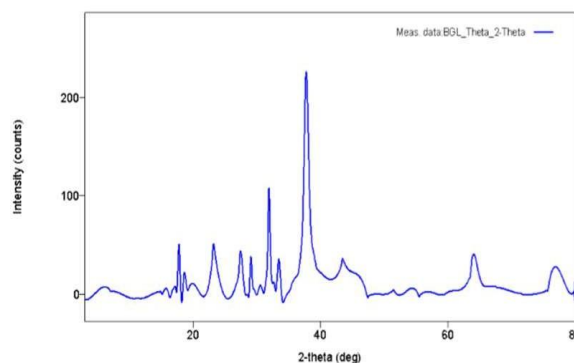
Figure 3: XRD spectra of synthesis silver nanoparticle synthesized from flower of *Calotropis gigantea*

3.4 Antifungal Activity

Biosynthesized silver nanoparticles were studied for antifungal activity against Sp.(*Candida albicans, Aspergillus niger* and *Aspergillus flavus*). It was observed that silver nanoparticles have antifungal activities at various concentrations.

Silver nanoparticles synthesized using *Calotropis gigantea* flower extract was observed by colour change UV-Vis Spectrophometry analysis shows formation of silver nanoparticles. FTIR showed the presence of functional groups, XRD showed the crystalline nature of the synthesized silver nanoparticles. It showed inhibition some against Sps *Candida albicans, Aspergillus niger* and *Aspergillus flavus*. The inhibitory activity is increasing with the high concentration of the flower extract of *Calotropis gigantea*. The inhibitory action is more with high concentration against *Aspergillus flavus*. The inhibition is concentration dependent and the inhibitory impact is also different with other one.

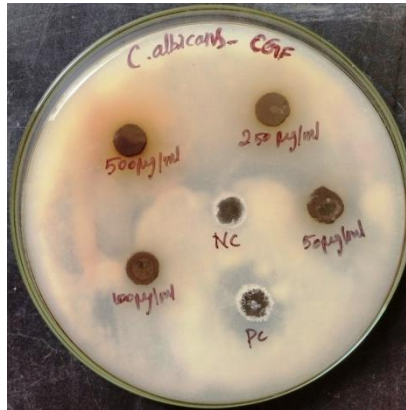**Figure 4**: Effect of *Calotropis gigantea* flower extract against *Candida albicans*

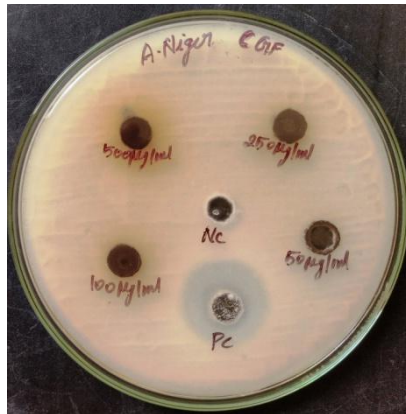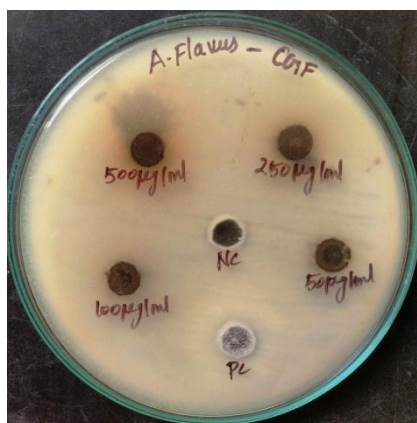**Figure 5**: Effect of *Calotropis gigantean* flower extract against *Aspergillus niger*

Figure 6: Effect of *Calotropis gigantea* flower extract against *Aspergillus flavus*

4. CONCLUSION

The current investigation reveals that the aqueous flower extract of *Calotropis gigantea* is capable of serving as a reducing and stabilizing agent in the synthesizing silver nanoparticles and antifungal activity showed inhibition against *Candida albicans*, *Aspergillus niger* and *Aspergillus flavus* which reveals that *Calotropis gigantea* has the ability of inhibiting fungus activity.

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AN OVERVIEWOF ELECTRONIC COMMERCE(E-COMMERCE)

Mrs.S.Paul Rani

Assistant Professor of Commerce

Jayaraj Annapackiam College for women (Autonomous)Periyakulam-625601

Theni District –Tamil Nadu, India.

Corresponding author: paulrani1517@gmail.com

ABSTRACT

The world economy is witnessing a transition. All companies are transformed intoinformation-based operations through online technologies. The pace of technical transition is soexponential that modern electronic commerce is now making tremendous changes in the economicenvironment, impacting all areas of industry. Bytheglobalnetworkthatfacilitatesthegathering of information between firms, a corporation, its clients and the various divisions of abusiness is increasing exponentially. The information-based virtual value chains for any companycannot be overlooked operationally or strategically. This article presented the aspects ofelectronic commerce its importance, facilitators, benefits, challenges and scope in theIndian market.

Keywords*: Business,Consumer, Electroniccommerce, Internet, Marketstrategy, Growth, Profit.*

INTRODUCTION

Globalizationwellas information Technology (IT) changethemethod of the business doing by the organizations. In almost all companies that have invested largely in the IT infrastructure for the ultimate growthof their company, the IT system is implemented and integrated. The utilization of e-commerce (EC) as a way toexecute

transactions related to business is increasing concern. It has been a priority for many companies With EC, businesses will link "Just in Time production" and "Just in Time" o their trading partners, who boosttheir strategic abilities worldwide. EC's description is not widely agreedupon. From the communications pointof view, EC may represent information, services as well products or online payments through telephone lines,computer networking, or other means from a communication point of view. EC implements technology for automating corporate transactions and work flows from a business process perspective. From aserviceviewpoint, EC is a way of lowering services costs while enhancing product efficiency and speeding up thedelivery of services, which addresses industry, customers and management's desire. EC offers online shopping and distributing goods and information for the Internet and other online resources from an online point of view.Because of Internet and network technology's popularity and accelerated expansion, the electronic industry has become a significant field for contemporary enterprises. Nowadays online marketing is a big opportunity for any companies. This paper porlrugs the of e-commerce in business advantages and impacts.

E-COMMERCEAND ITS IMPORTANCE

E-commerce is referred to as electronic commerce. It means the electronic media and the internet for dealing with goods and services. E-Commerce entails a company accessing the internet as well as IT, such as theelectronic data interchange (EDI). E-commerce concerns an internet vendor's website, trading goods or servicesto the user directly from the platform. The gateway uses a wireless purchase cart or a purchase basket to pay by credit card, debit card or Electronic fundtransfer. (EFT). A further descriptionis as follows: Electronic communications and digital information processes in business transactions are used to create, modify and redefine value generation relations between, and between, organizations and individuals.

With the increasing spread of ICTs, specifically the Internet, the global corporate world pushes rapidly into e-commerce (Business-to-Business). As the Internet enables consumers to enter the global economy, they can compare prices across areas, find out how they vary by request, and become aware of substitution. The buyersobtain a distinct advantage. Thanks to market openness, consumers can conveniently compare e-commerceofferings from different websites. The rivals would immediately be one click away from the customer if the company is electronic.If consumers aren't comfortable with certain goods, content's pricing or services, they can adjust even more quickly than in traditional terms.

E-COMMERCE FACILITATORS

Internet:

E-commerce provides variety of services to the users and its Usage has also increased manifold.E-commerce has grown through huge penetration of the internet. The Internet and intelligent mobile telephoneshave literally been part of every life. Internet no longer constitutes an intelligence source, however, it is anefficient means in which horsemen, and carpenters, physiciansetc. can buy, read, communicate and even receive service. The supply chain is slender and intelligent, as digital networks can quickly link to customers,which greatly minimizes pollution and benefits green businesses. In the last 15 years, the ICT revolution haspowered the economy unprecedentedly. The Internet and its services have helped grow new markets with huge technological advancements. In the 1980s the population of internet users was small, and there was a gradual butsteady increase until 1994 when the number of test users was growing. The number of network users exploded with the advent of the World Wide Web and later the expansion of multimedia content. The internet has in turnevolved even quicker than any other previous medium. The United Nations International Telecommunication Union (ITU) recently fore cast 3.2 billion users online in 2015.

There were 7.2 billion habit and sin May 2015. In 2000, world wide Internet subscribers were just400 million.

1.PaymentGateway:

The payment transfer, which allows e-commerce, online shops, bricks, and clicks and traditional brick andmortar payments via credit card, is an ecommerce application service provider.The main variables ininternet transactions are payment routes that include credit cards, debit cards, online banking purchases, andtransfers of electronic funds. There is a need for payment gates for sustainable future e-Commerce, and the environment tshifts from cashing to digital currency.

2.Analytics:

Analytics is another facilitator transform in to decision making intelligence and assists the organizations in collecting, arranging, reviewing and commenting on their client. The vast rise in data volumehas caused organizations to rely on research to know the customer's behavior. Retailers must have real-timeaccess to knowledge to compute returns on internet investments and a channel blend. Basic analytics are available fore-commerce players; for customer in sight, average order volume, basket size measuring, conversion ratios are required and a deeper analytical approach is needed.

3.SocialMedia:

Business organizations use social media the media source to advertise their goods and services. Business people focuses concentrates the growing population, their demand and attitude towards. The input on the product or the service is also useful. It provides a brand-building tool for creatinga trust worthy group of consumers, publications,word of mouth and soon.

4.AutonomousVehicles:

Autonomous cars are belongs to the motor vehicles category that can work without direct intervention from ahuman operator using artificial intelligence, sensors

and the global system of positioning. The age of the privatecar is quickly approaching. Autonomous consumers will have much time to browse the internet, read emails,purchase new items and view commercials nearby. Very vast digital media expertise is obtained for autonomous vehicles. These shopping and search trends can be traced to assist businesses in tailoring their marketing strategy to avoid this new industry. Big data are now much wider in nature but in the coming years will be soadapted and predictive that nothing can be manually modified again.

5. 3DPrinting:

3D printer belongs to an electronic device category that can build a digital 3-dimensional model. The "additive manufacturing" technique is an overlay that resembles the successful laying of the colors of an ink-jet printer ona flat sheet of paper. 3D printing might one day blow out the method of output people use, as the Industrial Revolution in starting of 19th century shook agricultural life. 3D printing produces business of prototypes thatthe consumer is expected to print — or that the designer is connected to a third-party maker. The finished product is not marketed – the concept is sold and a printable license. In the corners of the internet, promising artists show the irprinting planseither at home or atwork.

FEATURES OF E-COMMERCE:
1.Ubiquity :

E-commerce is widespread, that is, it is available everywhere always. It sets free market from being restricted to a physical space and makes it possible to shop from computer (such as desktop, laptop). The result is called a market space.For consumers, ubiquity cuts transaction costs for exploring products in a market. Consumers can acquire any information whenever and wherever they want, regardless of their location. It is no longer necessary that buyer spend time and money for traveling to a market. In all, it saves the cognitive energy needed to transect in a market space.

2. Global Reach :

E-commerce technologies enable a business to easily reach across geographic boundaries around the earth far more conveniently and effectively as compared to traditional commerce. Globally, companies are acquiring greater profits and business results by expanding their business with e-commerce solutions. As a result, the potential market size for e-commerce merchants is approximately equal to size of online population.

3. Universal Standards :

Universal Standards are standards shared by all the nations around world. These are technical standards of Internet for conducting e-commerce. It gives all the ability to connect at the same "level" and it provides network externalities that will benefit everyone. Universal technical standards lower entry costs and minimal search costs.

4. Interactivity :

E-commerce technologies permits two-way communication between customer and sellers which makes it interactive. It proves as significant feature of e-commerce technology over the commercial traditional technologies of the 20th century.

5. Information Density :

Information density means total amount and quality of information available over Internet to all market buyers and sellers. Internet vastly increases information density. Information density offers better quality information to consumer and merchants. E-commerce technologies increase accuracy and timeliness of information. For example, flipkart.com store has variety of products with prices.

6.Richness:

Richness refers to the complexity and content of a message. Richness means all commercial activity and experience, conducted through a variety of messages. For example, text, pictures, videos, sound, links, SMS (Short Message Services) etc.

7.Personalisation :

E-commerce technology offers personalisation. Personalisation means designing marketing messages according to particular individuals by customising it as per customer personal details like name, interests, and past purchases record. Products or services can be modified or altered according to the user's choice or past buying record.

E-COMMERCE BENEFITS

The biggest advantage from the consumer viewpoint is that it improves dramatically and saves lots of time and convenient to access from everywhere in the world. At any time, the customer is free to place the order. For consumers, the key advantages of e-commerce are:

- Lower trade rates for stock exchange members.
- Enhancedflexibility-purchases can be carried out 24 hours a day without physical contact with the firm.
- Save time-Consumers will at any time purchase or sell any product online.
- The customer has betteraccess by clicking on the buttontos earch details on numerous pages, Easily and continuously accessing information.
- Comfortin both purchases and transactions be made from the comfort that a buyer needs from a home or office.
- Moving to other companies - customer sisstill easy if the company's operation is unsatisfactory.
- Aproduct was not available at the localornation almarket that provides consumer's access to a larger product than before could be available to customers.
- A consumer will make feed back on aproduct to see what others buy or see other clients' review comments be fore making a final purchase. Increased sales and decreased running and sustaining costs through the Internet

are the key advantage of e-commerce from the point of view of sellers. Include the following:

- Reduces significantly costs related to operation as well as maintenance
- Reduces costs that is spend on purchase as well as procurement
- Significantly reduction in budget spend transportation of the products
- Improve and develop relationship of customer and the supplier
- Make internal as well as external communication better

CHALLENGES ASSOCIATED WITH E-COMMERCE

Like other technologies, electronic commerce (E-commerce) also facing many challenges.These challengesmainly faced by the buyer as well as sellers who use internet as a medium for the business.Some of the thesechallengesare discussed as follows:

- The electronic commerce market is not rising along with private and public enterprises.Privat ean dpublic collaboration is need edtoincrease the electronic commerce industry. Joint efforts offer people the credibility they need to succeed on electronic commerce.

- There is no system protection, reliability, special requirements and some communication protocols. Thecustomer loses his money, if the e-commerce website is hacked. For e-commerce Web sites, cyber security is the most common problem.

- Financial institutions and intermediates: So far, financial institutions and banks are reluctant to play anactive role in supporting the e-commerce market in developed countries. But retailers need the participationof banks in expanding e-scope commerce and popularity and in mitigating theft and possible losses relatedto credit card fraud. However, banks and other financial service intermediaries are threatened outside theirpayment card strategy, in

areas with no ordinary credit card creation alternative approaches to safe and efficient online purchases.

- There is a culture of purchasing goods in developed countries by bargaining deals with suppliers,which is challenging fore-commerce in developing nations due to the absence off acilities in the networks.

- One of the biggest challenges is the reduction of internet prices. The regulators are trying to be modest in band width costs. However, the internet does not remain low due to high network delivery and servicing costs.

- The most critical factor is trust in electronic settlements. A standard paper on Baseline Laws and Rules may provide for the accuracy and legitimacy of e-commerce transactions. The trust in the developed world isbased on modern legislation and impartiality in electronic transactions. Although the legislation and the judicial system which does not establish e-commerce-based transactions are not covered, whether real orperceived, they are adverse. In many developed nations, cash delivery is still today the most well-known process,with checks and credit cards not being readily accepted.

- Formodern transaction procedures,new instruments and new service providers the legal description,consent and authorization are needed. For example, it is important to define an electronic signature and thestatus of a handwritten signature. The new legislative definitions and permits as the legal term of a bank and the notion of a domestic border can also be reviewed.

E-COMMERCE BUSINESS TYPES

There are mainly six basic types of electronic commerce as shown:
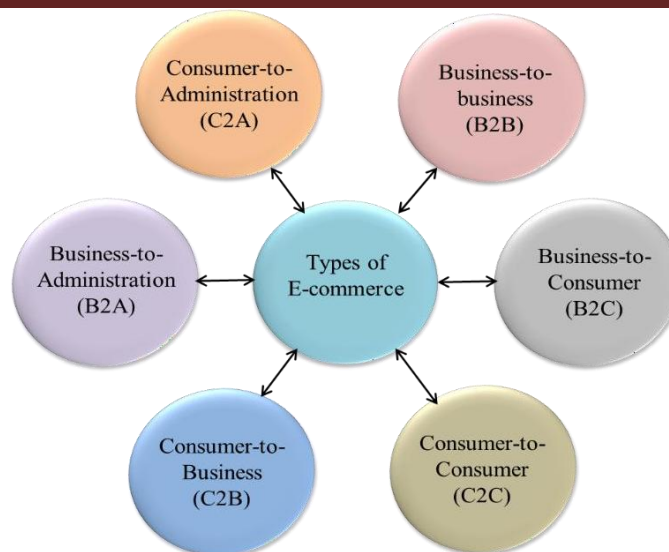
Schematic illustration of theTypes of the E-commerce based on their Characteristics

1. **Business-to-Business(B2B):**

Electronic commerce B2B includes all electronic products or services transfers between firms.In general producers and traditional industrial wholesale companies use this approach for electronic trading.

2. **Business-to-Consumer(B2C):**

Company and final client electronic company partnerships E-commerce business to consumer. It is the e-commerce shopping section, where conventional retail business typically takes place. These partnership stylescan be simpler, more complex and intermittent and can be discontinued. This business type has expanded considerably because of theadvent of the Internetwitha number of online shops and centers that offer customers 'product so fany kind such as computers, electronics, books, accessories, cars, food, financial materials and digital publications. In contrast to retail sales in conventional trade, the buyer typically has more knowledge about insightful content available and it is generally accepted that you can buy cheaper, without jeopardizing a similarly individual customer experience as well as promising easy processing and distribution.

3. Consumer-to-consumer(C2C):

Type C2C electronic e-commerce encompasses all trade in goods or services electronically between customers.Typically this exchange is done bya third party that offers an online transaction forum.

4. Consumer-to-business(C2B):

In C2B is reversed the usual context of exchange in goods. This method of e-commerce is widely used in crowd sourcing based companies. For companies that aim precisely at some types of services or items,individuals also sell their services or products. These events include locations at which artists ask for several suggestions for a logo and only one is successfully selected and purchased. Another popular medium in this business segment is the markets which sell photos, photos, media and design elements free ofroyalty.

5. Business-to-administration(B2A):

This portion comprises all internet transactions between companies and the government. This covers a widevariety of diverse programs, notably in areas such as taxation, social care, healthcare, legal documentation andrecords, etc. These modes of services have been significantly extended inrecent years by spending in e-government.

6. Consumer-to-administration(C2A):

The C2A model includes all electronic purchases between governments and individuals. Application highlightsinclude:

- Education–disseminating information,distance learning, etc.
- Social Security–via information distribution,making payments, etc.
- Taxes–filing tax returns,payments, etc.
- Health–appointments,information about illnesses,payment of health services,etc

E-COMMERCE TRENDS IN INDIA

The purchasing of products and services through e-commerce enables shoppers to select when and where to buyand to study the commodity, the vendor and other choices available. The availability of online information has revolutionized the buying process. Almost anything that can be purchased in a shop, including perishable items such as food, can be purchased through e-commerce. And customers around the world have taken up theseopportunities. In all spheres of industry, from services provides to the customer to the design of the new product,the influence of e-commerce already exists. It offers new forms of company knowledge tomeet and communicate with consumers, such as internet advertisement and commercialization, order fulfillment online and customer support online. At least a phase in the purchase life of the WWW is still being used for ecommerce. It may also minimize cost so for derprocessing and communicate with a large number of vendor trade partners, which generally bring substantial overheads to product and service costs. E-commerce provides tremendous opportunities for emerging countries such as India.It is still in its infancy in India, buteven the most negative forecasts suggest a boom. In recent years, it has been noticed growth in the multiple ofelectronic commerce organizations. Instead of advertisement sales, big Indian websites have pushed into e-commerce.

There are number of services and products such from flowers, greeting cards, multiplex tickets to grocery shopsmobile devices, machines etc. are now available in several locations. Electronic commerce has expanded it'sreached the stage to even sell the dung patties of cow like hotcakes. In 2016, the Indian market in electronic commerce is supposed to hit a $38 billion level, a huge leap over the Industry's $23 billion in sales in 2015, a study by Assoc ham said. Increased internet and smartphone usage, increased adoption of online purchasesand optimistic demographics have given businesses with a rare ability to contact their clients. On the other hand,as a healthy and secure companion to electronic commerce, mobile commerce (m-commerce) has

evolved rapidly. Online shopping via smartphones is a game-changer. M-commerce is expected to add up to 70% of itsoverallsales.

CONCLUSION

In summary, in the years to come, the industry of electronic commerce will be a one of the leading sector in thefield of electronic business. The revolution in electronic commerce has huge positive impact on the transactionindustry by fast offering new markets and crossing edges. It greatly affected the conventional market system inthe world and made it possible to improve the lives of people. Although it provides customers and sellers rewards, ecommerce poses conventional businesses with obstacles to a sustainable place. Developing countries Pose a range of challenges to the effective conduct of e-commerce when contrastin digit with developing countries. When Internet prices are minimal, e-commerce flourishes quickly and many companies are typically drained. Convenience is one of the major advantages of electronic commerce for consumers and thus increasing customer loyalty. This is because consumers can put orders via internet access fromany wher they are.Company e-commerce offering a seamless operation and multiple payment choices should be essential to any customer and provide more functions accessible online. Other advantages include expanded products and enhanced regional coverage. However, e-commerce companies face many challenges in their expansion.

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TRANSMUTED WORLD OF *SHIVA TRILOGY*

G. Petricia Alphine Nirmala

Assistant Professor of English

Jayaraj Annapackiam College for Women(Autonomous), Periyakulam

Corresponding author: petriciaeng@gmail.com

ABSTRACT

Indian myths are never static; it is constantly in the process of reinterpreting and revalidating itself and the society that it defines. The demythified story provides an apt ground for interpretations from a contemporary perspective. With events and characters that can be easily related to everyday life, the myth is no longer a story of supernatural beings and supernatural actions. Shiva Trilogy has been creatively transported from the mythological time to the modern time. The readers are left to muse over the modifications made to the customary myths. Herohood is not predestined but achieved. Humanizing the supernatural figure Shiva, Tripathi has put away the transcendental divinity of Gods. Myths speak of Gods who represent the power beyond the visible, comprehensible world. Demythification in Shiva Trilogy speaks of Gods as if they are men whose actions make them godlike. This paper analyses the intricate details when creative writers transplant myths into modern settings.

Key Words: Transmutation, anthropomorphism, mythological space, demythification scientific system

INTRODUCTION

"Literature is the art of discovering something extraordinary about ordinary people, and saying with ordinary words something extraordinary", says Boris Pasternak (Paz 4). Literature is an expressing mode of artistic works. It has imaginative works of poetry, prose and novel. Literature is a sensible body, which has different genres as its parts and expresses its various characters as numerous themes. It can be classified

according to its variety of systems. There are numbers of literature in this universe such as British Literature, American Literature, African Literature, Indian Writing in English, New Literature and so on. Every literature has its own nature and scope.

MYTH AND LITERATURE

Myth is a traditional story especially one concerning the early history of the people or explaining a natural or social phenomenon and typically involving supernatural being or phenomenon. The gifted novelists have employed them creatively. Realism is not a new concept for novels but using myths have added to a new taste. Myths, legends, folktales, all the three modes of knowledge, each different yet closely connected with one another, are often confused. Myth is a sacred narrative in which gods and other supernatural (non-human) characters hold the centre stage. The time and space of a myth do not belong to human world. Highlighting timeless and historical character of myths, Martin Day remarks, "For the great majority of myths everywhere the time is the remote and misty of past" and adds: "For prophetic and eschatological myth, the setting is sometime in the future"(Rajasree 223). Myths are anthropological in the sense that they are addressed to human being. Legends are either sacred or secular with the stories of human characters with a time frame of the recent past. Folktale is the secular narration of human or non-human characters of any time and place. The search for the roots of the origin of religion is directly linked with the formation of myths. Mythology has embodied for mankind its highest ideals in forms to be worshipped.

Religion was created by man during the course of the evolution of his ideas and struggles against adverse forces of life. He formed laws to provide him consolation, safety and prosperity. His logical and more emotional pursuit about his own being and the reason of existence often transgressed the boundaries of stark reality. Ancient Hindu seers regarded myth as '*mithya*'— delusion –and therefore open to correction. Myths cannot be rationalized. Keeping pace with evolution, religious

concepts kept changing. Yet the illogical irrational myths were passed on to generations without any change.

Myth is a term, which eludes exact definitions and neat categorization. The term itself is quite elastic and flexible and contains within itself shades of meaning. It is interesting to note how the ancient concept has been worked out by the modern man. Everybody lives in myth. This idea disturbs most people. For conventionally myth means falsehood. Nobody likes to live in falsehood. Everybody believes that they live in truth. Even perfection is a myth. There is no perfect world, a perfect man or a perfect deed anywhere on earth. Perfection exists only in mythology. Yet everyone craves for it. This craving inspires art, establishes empire, sparks revolutions and motivates leader.

Even with the varied definitions of myth, the essential characteristics include its narrative aspect, its sacred origin, its etiological character, its relation to ritual, its communication and normative dimensions, its pre-historical and pre-logical nature and its fabulous character. As proposed by Wellek and Warren, the communitarian and the anonymous nature of myths need to be underlined "myth is social, anonymous, and communal''(Ibid. 224).

Myths bind the society in which it occurs. Ruthven opens his monograph titled *Myth* by conceding that it is difficult to define myth because it is "obscure in origin, protean in form and ambiguous in meaning"(Ibid. 224). William Righter in his *Myth and Literature* says that myth is "one of the great cant words of our time and that 'myth' has become a kind of intellectual shorthand which has gained acceptance as standing for an elusive almost unanalyzable amalgam of beliefs, attitudes and feelings"(Ibid. 225).

Hindu myth is another human understanding of life. The mythological literature is intertwined with the ethos of ancient Vedic religion and Vedic civilization and fundamentally constructed with Indian systems of philosophy. The earliest record of

Indian mythology is contained in the Rig Veda, a series of ten books of hymns celebrating the chief Vedic God. The exact motives of the collection are uncertain but it is clear that they formed a most important part of the worship of the gods in the ritual of the subsequent period. The date of the Rig Veda is much disputed.

Mythology in India is not just an academic or a historical subject; it is a vital living topic of contemporary relevance. The complex, social, political and religious attitudes of modern India cannot be understood without an understanding of our myths and their impact on the collective faith of the people.

Indian myths are never static; it is constantly in the process of reinterpreting and revalidating itself and the society that it defines. Myths are endowed with flexibility, adaptability and resilience, which help creative artists to transpose and transplant them in diverse cultures and media. It is the semiological structure of myth, which throws light on the different levels of signification that provides its multivalent character. It is precisely this quality, which accounts for the resilience and recurrence of myths in various cultures. This paper investigates the intricate details when creative writers transplant myths into modern settings.

More recently, in several mythological tales are getting a modern make over into historical fictional themes. The trend signify good times for bestselling Indian mythology writers such as Amish Tripathi, Ashwin Sanghi, Dr. Devdutt Pattanaikand, Ashok Banker who are wooing readers with characters cast in a human would amid a masterful weaving of mythology and suspense. The trend was initiated in 2003, with the publication of the first volume of an eight-part series by Ashok Banker on the classical epic Ramayana, which expresses the successor of the noble King Rama over Ravana, a learned king gone astray.

Amish Tripathi gives convincing reasons as to how important myths are for Indians even in this modern world:

For Greeks or Egyptians myths are just stories. But in India, these are more than myths... Why are our myths alive today? I think it's because the myths tell us something for today's life. Why do they tell us that? It's beause India has displayed this genius over centuries, modernizing and localizing our myths again and again. Why do Indians keep modernizing and localizing our myths? That's because we are making our myths relevant to our present day lives. And that attitude keeps our myths relevant and alive. (qtd. in Rajasree 229)

The different creativity makes *Shiva Trilogy— The Immortals Of Meluha*, *The Secret of the Nagas,* and *The Oath of the Vayuputras—* popular. Amish Tripathi says: "Today, He is a God, Four thousand years ago, He was just a man". Shiva seems to be an ordinary man. He is an exceptional warrior but does not seem to have been endowed with supernatural powers at birth. "The whole hero-life is shown to have been a pageant of marvels with the great central adventure as its culmination" (Ibid 230).

The divinity of Shiva, the God figure, and the whole supernatural aura that surrounds him have been modified into an ordinary human experience. Tripathi has modernized the mythological version of Shiva's story in Amish Tripathi's *Shiva Trilogy*.

It is not an easy task to deal with myths on one hand and legends, folklore and facts of a remote past on the other. Myths have demonstrated to be an irresistible mine of knowledge for historians, anthropologists, sociologists and psychologists. It is a cause of stimulation for writers, and the subject of mysticism that determines in it a message that frequently surpasses history or any intellectual interpretation and reveals the least hints at a greater truth. Reciting the stories from mythologies and history is not at all a new happening in Indian Writing in English. Amish Tripathi's *Shiva Trilogy* is also retelling the mythological story of Shiva. It is a re-imagination and a fantasy that transmit readers to the transmuted world, which is created by Amish Tripathi.

MYTHOLOGICAL TRANSMUTATION

In the series, Amish Tripathi has transmuted mythological space to modern space. His way of expressing Shiva as an ordinary human being is itself a process of transmutation. Tripathi uses anthropomorphism in all his novels. In an ancient myth, Lord Shiva is an ascetic and God of Dissolution. He has been compared to the fire and He is one of the supreme Gods. Govinda Krishna Pillai says, "He is not tangible, he is not created, but born of his own, hence he is not created, but born of his own, hence is called Svayambu,' Svayam-bhuva', or 'Sambhu' in short, all meaning self born (*Hindu Gods and Hidden Mysteries* 12)".

Amish Tripathi portrays Shiva who has parents and relatives, as a chief of gunas tribe, fierce warrior and Sati's ardent lover who has more respect for his wife. Tripathi portrays Shiva as an ordinary human being with a greater destiny. Shiva recollects of his destiny articulated by his uncle, "Your destiny is much larger than these massive mountains. But to make it come true, you will have to cross these very same massive mountains" (*The Immortals of Meluha* 4). Later he becomes Lord Neelkanth because of his deeds and karma in this transmuted story.

Sati is the female protagonist of these novels. Tripathi changes the entire life of the mythological character Sati. Chitralekha Singh and Prem Nath depict the marriage of Sati:

> But as Sati (A Devi's incarnation) had long been a devotee of Siva and wished to marry no one else, She was disconsolate to discover Siva's absence. After looking through the assembled, she prayed to Siva to appear and then threw the garland into the air, where Siva appeared and received it. Dakshya was thus forced to marry Sati to Siva. (*Hindu Goddesses* 181,182)

Thus, Sati marries to Shiva and She is the ideal Hindu wife. They stick to

monogamy. But Tripathi transmutes the marriage life of Sati. In *Shiva Trilogy*, Tripathi makes a new character named Chandandhwaj who is the first husband of Sati. Chandandhwaj dies when Sati has gone to give birth to his child. Unfortunately, the child also dies. At last, She marries Shiva. According to *Shiva Trilogy*, Shiva is the second husband of Sati.

Sati burns herself to death in the sacrificial yageya conducted by Daksha in the ancient myth but in *Shiva Trilogy*, she was killed by Swuth (the Egyptian warrior) in the duel between Sati and Swuth. This is an incredible imagination of Amish Tripathi. The description of the life of Sati in *Shiva Trilogy* has totally transmuted by Amish Tripathi in an unexpected way.

Amish Tripathi has depicted mythological characters as human characters with different occupations, which suit for the modern age. The mythological character Brahaspati (Dhaksanamurthi) has transmuted as the chief scientist called Brahaspati in this story. In *Shiva Trilogy*, Kanakhala introduces Brahaspati to Shiva:

> My Lord, we would be meeting Brahaspati. He is the chief scientist of the empire. He leads the team of scientists who manufacture the somras for the entire country (*The Immortals of Meluha* 128).

Brahaspati is one among devas but Tripathi transmuted him as the chief scientist and major character to reveal the secret of Nagas. He is the only one who finds evil scientifically and becomes an aid for Shiva to find the prevailing evil.

The next character in *Shiva Trilogy* is Nandi. Nandi (bull) is a vehicle or carrier of Lord Shiva in the ancient myth and he has been transmuted as a companion for Shiva in Amish Tripathi's *Shiva Trilogy*. Nandi has accompanied Shiva from the beginning and his allegiance towards Shiva is note worthy. Tripathi portrays him as the captain of Meluha and has become the follower of Shiva throughout his life.

Tripathi transmutes the character of Daksha who is the emperor of Suryavanshis

and father of Sati. Daksha is the brave and pride emperor in the ancient myth but his character is portrayed as a weak soul mentally and physically in *Shiva Trilogy*. Even Daksha's father Brahmanayak disrespects and humiliates him often. Tripathi mentions in the second novel:

> He was not just respected, but also feared in all of Meluha. Obsessive about the character was a source of anger and dismay for him. (*The Secret of the Nagas* 316)

In an ancient mythology, Lord Nataraj is considered as the God of Dance and he is the incarnation of Lord Shiva. But in *Shiva Trilogy*, Tripathi describes Lord Nataraj as a separate deity of dance. Tripathi introduces Lord Nataraj through Shiva, "Yes. It's called the *Nataraj* pose. The pose of the *Lord of dance* (*The Immortals of Meluha* 80)". Shiva himself explains about Nataraj's pose while he is dancing in front of Sati, Krittika and Guruji.

Tripathi introduces Veerbhadra as the childhood friend of Shiva and he gets married to Krittika who is the friend of Sati. Veerbhadra is the deity who born from the hair of Lord Shiva and Krittika is the step mother of Lord Karthik in the ancient mythology. Tripathi changes their characters and relationship according to the modern age.

Amish Tripathi transmutes even the appearance of the mythological characters and alters the circumstance of the mythological space and incidents. He depicts the people who lived in 1900 BC. The people in *Shiva Trilogy* live a stylish life in a hygienic circumstance. Tripathi picturises the image of the modern society throughout the series.

According to the ancient myth, Vayuputhra is Hanuman, the son of Vayu. Tripathi states Vayuputhras as the followers of Lord Rudra. Mithra (the chief of Vayuputhras) plays an essential role in *Shiva Trilogy*. The author interprets the mythological heritage of ancient India into modern concepts producing some mysterious surroundings.

Tripathi creates many new characters such as Brangas, Suryavanshis, Chandravanshis and so on. The female characters like Kanakhala, Ayurvati and Anandhamayi are the unique characters in *Shiva Trilogy*. Tripathi newly creates these characters with different aspects of revolution in *Shiva Trilogy*, the blending fiction with historical fact.

Tripathi explains the prophecy of legends about the arrival of Lord Neelkanth at the time of the entry of evil. In the first book of *Shiva Trilogy*, Nandi cries in front of Shiva, "You have come! My Lord! You have come! The Lord Neelkanth has come! (*The Immortals of Meluha* 23)". The role of prophecy is the inventive method of Tripathi in his novels. There is no identity for prophecy in the ancient mythology. Tripathi transmutes the mythological story of Lord Shiva through his own perspectives.

In an ancient myth, Lord Shiva and Lord Rudra are the different names of same deity. Tripathi transmutes these mythological characters into two different deities. He describes Shiva as the follower of Lord Rudra and recreates the entire theme of Lord Rudra as well as Vayuputhras. Each and every character and atmosphere that are mentioned in *Shiva Trilogy* have established the mythological transmutation effectively.

SCIENTIFIC TRANSMUTATION

In mythology, when the ocean of milk has churned with Mandara Mountain as the churning rod and the snake Vasuki as the rope, the force exerts in pulling and brings out deadly poison from the mouth of Vasuki. Lord Shiva swallows the poison to save the Universe. The obstructed poison is a permanent mark on his neck and then he calls as 'Nila-kantha'. The remaining liquid is considered as the drink of God. In *Shiva Trilogy*, Tripathi describes the scientific preparation of drink of Gods. Brahaspati, the chief scientist explains the invention of Somras (the drink of Gods):

> After a lot of research, Lord Brahma invented the Somras, which when
> consumed, reacts with the oxidants, absorbs them and then expels them

from the body as sweat or urine. Because of the Somras, there are no oxidants left in the body. (*The Immortals of Meluha* 137)

To manufacture the Somras, Scientists need some ingredients those branches of Sanjeevani tree, water of Saraswati River and some herbs. So here, Scientists prepare the drink of Gods scientifically. Amish depicts the drink of Gods in a scientific way and makes it comprehendable to the modern world.

Amish Tripathi introduces the various characters who are suffered by the concept of Vikarma. Here, he transmutes the concept of karma from Bhagavatgita. In *Shiva Trilogy*, Nandi explains about Vikarma people to Shiva:

> Vikarma people, my Lord, are people who have been punished in this birth for the sins of their previous birth. Hence they have to live this life out with dignity and tolerate their present sufferings with grace. This is the only way they can wipe their karma clean of the sins of their previous births. Vikarma men have their own order of penance and women have a different order. (*The Immortals of Meluha* 94, 95)

Vikarma people are considered as sinners and deformities. Their sufferings have happened because of their sins in the previous birth. Shiva doesn't agree with Nandi's words and he says to Nandi:

> That sounds pretty ridiculous to me. A woman could have given birth to a still born child simply because she did not take proper care while she was pregnant. Or it could just be a disease. How can anyone say that she is being punished for the sins of her previous birth? (Ibid. 96)

Shiva fights against this concept and he scientifically proves that the cause for their deformities is their physical weakness not of their previous birth's sins. Nagas are the main characters to reveal the truth of evil. They are deformities but more skillful people though being ignored by their family members. Once Kali introduces herself to

Sati, "Then listen, oh exalted Princess. I am your twin sister, Kali. The one whom your two-faced father abandoned! And this sad soul is the son you abandoned, Ganesh (*The Secret of the Nagas* 224)". Ganesh, the son of Sati and Kali, the twin sister of Sati are also the Nagas. They are affected by the polluted Somras. Brahaspati and Shiva establish the causes of Somras and get freedom for those deformities. Amish Tripathi transmutes every mythological character scientifically. The holy river Saraswati is mentioned by many ancient writers but Tripathi gives the explanation for the loss of Saraswati river. He says that the river has dried because of the over usage of Saraswati water for the preparation of Somras. Finally, Saraswati river has been lost and Somras is identified as the embodiment of evil.

Tripathi creates the Maika system in *Shiva Trilogy* whereas ancient writers have catagorised people into four groups such as Brahmins, Kshathriyas, Vaisyas and Sudhras. People practice the same profession of their ancestors for generations. But Tripathi breaks those systems and produces the Maika system which helps them to be categorized based on individual skills and they are chosen through the conduct of examination. Pandit from Mohen Jo Daro says:

> If we believe that flexibility is key to successful society, then the Maika system is designed to achieve it in practice. No child knows what the professions of his birth-parents are. He is independent to pursue what his natural talent inspires him to do. (*The Immortals of Meluha* 212)

Tripathi expresses Shiva as an ordinary human and at last becomes Lord Neelkanth because of his deeds and karma. Tripathi beautifully evokes the scientific system of human minds. If a man concentrates on particular object and be a willful person, he can hear the words of other human minds. This method has been proved by Amish Tripathi through the characters of Shiva and Vasudev pandits.

Mythological stories are being mysterious in most of the times. Many writers

attempt to write those mysteries through histories and scriptures. In the case of Amish Tripathi, he recreates and transmutes the story of Lord Shiva by establishing the fact that there exists a potential god in every single human being.

Shiva Trilogy has been thus creatively transported from the mythological time to the modern time. The readers are left to muse over the modifications made to the customary myths. The demythified story provides an apt ground for interpretations from a contemporary perspective. With events and characters that can be easily related to everyday life, the myth is no longer a story of supernatural beings and supernatural actions. Herohood is not predestined but achieved. Shiva becomes a present day superhero.

Amish Tripathi has successfully reconstructed the ancient myth without compartmentalizing it into a specific genre. His novels are retold myths blended in fanciful imagination with historical facts and socially relevant issues. He deftly brings out the transformation of Shiva, the God, from Shiva, the man. *Shiva Trilogy* portrays a new rendering of the myth of Shiva by demythification.

Humanizing the supernatural figure Shiva, Tripathi has put away the transcendental divinity of Gods. Myths speak of Gods who represent the power beyond the visible, comprehensible world. Demythification in *Shiva Trilogy* speaks of Gods as if they are men whose actions make them godlike. As Darwin's theory of evolution always defies the myths of creation, rational science and irrational myths confront at every level. It is Rudolf Bultmann, a German theologian who introduced the concept of demythology which called for theologians to interpret the mythological elements in the New Testament existentially. Demythologization aims to demystify and look into the underlying meaning of myths. It is a hermeneutical approach to myths.

By modernizing the ancient myth, Tripathi has deconstructed the image of a God-figure proving that there are only hero figures that men turn into Gods. The myth

has been recontextualized from the mythical lines to the modern. Events of a myth take place in a timeless world. It is the unique feature that differentiates a myth from a legend or a folktale. The timeless myths are transplanted to the horizon of the present. Narrating the archaic in a contemporary perspective, the divine is made human, the static is made dynamic and the religious is made secular or universal.

The conventional belief that anything can happen in a myth has been replaced with concrete logical events on scientific grounds. The sacredness attached to myths in the process of demythification has made the narrative, universal and objective. Recontexualization has recreated the familiar myths reducing the cultural chasm dividing the moderns from the ancients in their respective approaches to myths.

Through Amish Tripathi's *Shiva Trilogy*, the readers may learn and find some lessons from different aspects. Tripathi exposes philosophical thoughts through his literal characters. From the traits of the protagonist, the readers can learn many positive and philosophical thoughts. In this fantasy novel, first Shiva does not believe himself to destroy the evil. But later he decides to be a helpful person to all the people and finally, he destroys the evil. So, these incidents prove us that if there is a will there is a way. It gives the positive vibration that anyone can lead a success in life if one has faith in oneself and do the best.

Evil may seem to exist in the world but can't remain so forever. Good thing wins at last by God's grace. This is proved by Amish Tripathi in *Shiva Trilogy*. Evil may establish its power in society but its power has the limitation and is destroyed by God's grace. As coin has two sides, the philosophical teachings of Shiva's uncle has proved the truth that everything has both good as well as evil in itself.

Human beings are unique based on the environmental impacts for they are not basically evil. If human beings rationalise this concept then there is no room for jealousy, quarrel, misconception and so on. Transmuting all the mythological forms

Amish Tripathi establishes the transformation needed for the modern society. Therefore, it becomes the teachings of life through his characters by helping the readers to modify their life world with moral values.

The omnipotent God makes use of human beings to reveal this unavoidable truth. Though people, who turn to be atheists, never believe in the guidance of God. Nevertheless, they are unconsciously leading the lives of Godly thoughts. Since human beings are handworks of God are created by God, every single movement of each human being is tuned by God's will. *Shiva Trilogy* is the best illustration of the benevolent truth of the Supreme Power.

Amish Tripathi's *Shiva Trilogy* is concluded with a lot of teachings and learning and findings for readers in order to help them to enhance their life with meanings and happiness. Though the mythological realm of imagination is the same, each generation receives and interprets differently. Even though human beings are different in themselves, *Shiva Trilogy* has been universally accepted by a large number of people because the fantasy world created by Tripathi is apprehendable.

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CHRISTIAN MISSION: MARY IMMACULATE AND St. PATRICK CHURCH IN PERIYAKULAM- A STUDY

A. Jesintha Vilveena,

Associate Professor of History,

Jayaraj Annapackiam College for Women (Autonomous),Periyakulam.

Corresponding author: ajascintha@gmail.com

ABSTRACT

Christianity teaches that humanity can achieve salvation through Jesus. The advent of Christianity in India is believed around 52. A.D by an apostle named, St. Thomas. Society of Jesus was restored by Pope Pius VII in 1814 and in 1838 French Jesuits, sent at the request of the French apostolic of Pondicherry, began to reoccupy the territory of the river Cauvery. Robert De Nobili founded the Madura Mission in 1606. In 1938, Madurai Diocese was born. Periyakulam is a chiefly agricultural belt and known for its choice mangoes, which are famous only next to Salem's that is fondly called the Mango city. Fr. Maria Louis had the credit of the foundation of three new parishes namely Ayampatti, Periyakulam and Palani . Fr. David,S.J, became the Parish Priest of Periyakulam in 1920 and build the chapel in 1924. Some of the Parish Priests like Fr. Maria Louis, Fr. Susai Regis, Fr. Arulsamy served as Chairman, Vice-Chairman and Municipal Councillor respectively.

Keywords: Christianity, Missionary, Salvation, Diocese, Propaganda, Foundation

INTRODUCTION

Christianity is the religion based on the life and teachings of Jesus Christ. Most Christians believe that God sent Jesus into the world as 'Saviour'. Christianity teaches that humanity can achieve salvation through Jesus. Today, Christians make up the largest religious group in the world. Christianity has about ½ billion followers- about a

fourth of the world's population. It is major religion in Europe, the Western Hemisphere and Australia. Many Christians also live in Africa and Asia. Christianity originated in the ministry of Jesus.[1]

Christianity was first propagated by Portugese in India who tried their level best to proselytize the secular king "Akbar" who totally denied that proposal despite of having an intense desire to explore the religion. The British later on took over the Indian scenario and threw the Portuguese out of the land.

THE ROMAN CATHOLIC CHURCH IN INDIA

The advent of Christianity in India is believed around 52 A.D. by an apostle named, St. Thomas. He landed on the Southern coast of India and laid the foundations of proselytization. He and his other successors during ages sought for the loop holes in the social system where they could easily serve a blow to delink the indigenous system for inducing their religion. They took each and every hardship whether being of slaving by the reigning rulers, horrors of travelling woods filled of beasts or sailing the high tides for spreading the gospel of their messiah. It is due to their effort and efficacy that Christianity is considered as the most influential and dominant religion in the present world.[2] However, others believe that the first missionary to arrive in the country was St. Bartholomew. Historically, Christian Missionary Movement started with the initiation of St. Francis Xavier in 1544.[3]

In the Roman Church there is a modern missionary dating from the nineteenth century. In the first place the power of Portugal had dwindled. In the heyday of Portuguese influence in India missions had been under the patronage of the king, and had been carried on with the active help of the government. The man who set the missionary movement going in India was Pope Gregory XVI, who before he became Pope in 1831 had been perfect of Propaganda. His policy was to set up vicariates apostolic in non- Portuguese territories as a framework. The Pope had begun to set new

vicariates. The vicariate of Madras, covering a great area from Madras to Hyderabad, Nagpur and the border of Orissa was erected in 1832. Another one at Calcutta was erected in 1834. In 1836, the mission vicariate of Pondicherry was made into a full-fledged vicariate of the Coromandel Coast, covering most of Tamil Nadu and Mysore. Society of Jesus was restored by Pope Pius VII in 1814. In 1838, French Jesuits sent at the request of the French apostolic of Pondicherry, began to reoccupy the territory of the river Cauvery.[4]

ARCHDIOCESE OF MADURAI

The Archdiocese of Madurai extends over the civil district of Madurai minus the northern part of Dindigul taluk. The historical roots of Christianity in this Archdiocese seems to go back to the times of St.Thomas and St. Francis Xavier. Already Pliny and Ptolemy have made a reference to the "Mediterranean Emporium of Madura", the Roman colony here. The Pandiya kingdom was the "Malabar" between the east and west coasts. In the early centuries, there has been constant contact between Kottayam and Santhome; the ancient road between the two churches passed through Pandiyanadu. Hence, it is possible and probable that the Apostle passed through the Madurai country.[5] Fr. Robert de Nobili founded the Madura Mission in 1606.[6] The year 1838 is to be regarded as the year of the resurrection for the Madura Mission. Four Jesuits, Fr. Joseph Bertrand, Alexander Martin, Louis Garnier and Louis de Ranquet reached the Madura Mission in March 1838.[7] In 1846, the Madura Mission was made a Vicariate Apostolic.[8]

A feature of Roman Catholic history in modern India, especially since 1886 has been the increasing number of Indian clergy and of seminaries for their training and the increasing number of Indian bishops. The Jesuits in their missions in Tamilnadu made abundant use of lay catechists but never attempted to train an Indian priesthood. The importance attached to this work by Rome was conspicuously shown by Pope Leo XIII's decision in 1890 to found a papal seminary worthy to rank with the best

seminaries in Europe, to train secular priests for India and Ceylon. This institution was located at Kandy in Ceylon in 1893 and in 1954, it was moved to Poona. At the same time as the Papal seminary was founded the Jesuits established central colleges for the training of members of their society, one at Kurseong in the north of Bengal, the other at Shembaganur in the Palani Hills of South India. Indians have been trained for the priesthood at the Propaganda College at Rome. The result has been an impressive increase in the number and competence of the Indian clergy. The first Indian diocesan bishop of the Latin rite, F.T.Roche, Bishop of Tuticorin was consecrated in 1923 since then the number of Indian bishops and latterly archbishops has steadily risen. By 1958, when Archbishop Pothacamury's book, *The Church in Independent India* was published, 12 out of 15 archbishops and 26 out of 47 diocesan bishops were Indians. Some dioceses are now entirely staffed by Indians. In 1953, the Indian Archbishop of Bombay was created as a Cardinal. The church has flourished in the twentieth century. It now numbers over a million members**.[9]**

CREATION OF THENI DISTRICT

Theni District has been formed after bifurcation from erstwhile Madurai District as per G.O.Ms. No.679 Revenue Department Dated: 25-07-96. Consequent on the bifurcation, one new Revenue Division with headquarters at Uthamapalayam and two new Taluks at Theni and Bodinayakanur were also created with effect from 01-01-1997**.[10]**

PERIYAKULAM TALUK

Periyakulam is a taluk headquarters[11] and the Periyakulam taluk covers eight towns and fifty two villages. Cosily nestled in the foothills of Kodaikanal along the Palani range and far from the hustle and bustle of cities lies Periyakulam. A valley surrounded by the Western Ghats, it is lush with mango orchards, coconut groves, paddy fields, rolling hills, babbling brooks and streams. Just crossing the Ghat Road and

entering into Theni district, one would be amazed at the green grandeur of the place as it is richly blessed by Mother Nature in every way.

Situated in Theni District, Periyakulam is about 282 meters (925ft) above the sea level. Periyakulam is a chiefly agricultural belt and known for its choice mangoes, which are famous only next to Salem's that is fondly called the Mango city. Periyakulam has picnic spots like Sothuparai Dam, Vaigai Dam, Kumbakarai waterfalls and Theerthathotti.

ORIGIN OF THE NAME 'PERIYAKULAM'

The town hadnot always been called Periyakulam. Early inscriptions in various temples reveal that in the 12th Century A.D it was called Perungulam, meaning "Big Pond". [12]The Pandyan country comprised of many nadus; one among them was Nedungulanadu. Under this came the Ur Alankulam.[13] In the later centuries, when the trader-guild of Nana Desis was using Periyakulam as its trade capital of these areas, the town came to be called as Nana Desi Yeri Veera Pattinam. As the deity of the prominent Murugan temple in the town is portrayed and celebrated in his infant form, the town had also been known as Kulanthai Managar and Kulanthaiyur meaning "The City of the Holy Child".[14]

FOUNDATION OF PERIYAKULAM PARISH

Society of Jesus started Sacred Heart College at Shembaganur in Kodaikanal. To preach the Gospel, they started their works in Periyakulam. With the assistance of Parish Priest, Silukkuvarpatti established a Shed which can shelter for the purpose of worshipping God Jesus. They worked for the upliftment of poor people who live in and around Periyakulam. In 1909, they constructed a church in the name of St. Xavier and they also constructed a house for priests in the outskirt of Periyakulam. [15]

Till 1913, Periyakulam belonged to Hanumanthampatti Parish. It was regularly visited by a Father from Shembaganur until 1911.[16] Fr. Maria Louis was the first Parish

Priest who preached good message to all Christians and non- Christians alike. He exercised great influence at the centre to such an extent that the Panchayat Board elected him as the Municipal Chairman.[17] Fr. David,S.J, became the Parish Priest in 1920 and build the chapel in 1924. Fr. Munch succeeded him in 1926. The little chapel in the Parish quarters, providing altogether inadequate, he started gathering funds with the aid of the Shembaganur Scholastics.[18] Due to the services rendered by Jesuits the number of Catholics began to increase. So, they wanted to construct a church. As a result, they selected a place in Eastern side of Highways and started to construct the church in 1930. Due to First World War, they were not able to complete their construction. A lady from Ireland met Jesuits and gave RS. 80,000/- as donation to complete the construction of the church in the name of St. Patrick. The people also agreed her desire and decided to call the church in the name of Mary Immaculate and St.Patrick Church. Mary Immaculate statue was installed in the centre of alter and St. Patrick statue was installed in the front kopuram. From 1935 onwards, the church came into existence. Due to the ignorance of the history of St. Patrick, they are celebrating the birthday of Mary Immaculate (December 8th) as Church Day.[19] In 2009, centenary celebration was celebrated in the church.[20] On March 17th 2012,Fr. James Paulraj take efforts for the celebration of St. Patrick by installing a St. Patrick's statuein the right side of the alter of the church.In 2022, Fr.Pappuraj took efforts to install the new statue of St. Patrick in the right side of alter of the church. Dr. C.Gnanathikkam, Rtd. Professor of Kamaraj College, Tuticorin take full responsibility and spend Rs. 1,50,000 to install St.Patrick's statue. On 17th, March 2022, with his effective efforts, St. Patrick's statue was installed.[21]

FOUNDER OF MARY IMMACULATE AND ST. PATRICK CHURCH

Fr. Maria Louis had the credit of the foundation of three new parishes namely

Ayampatti, Periyakulam and Palani. At Periyakulam, he was who first negotiated the gradual purchase of the site on which stand to-day the stately church of St. Patrick. In Periyakulam, he occupied the post of Vice- Chairman of the Municipality for several years and made the best account of his position for the good of his Parish. He enlisted the sympathies of men in high station, Hindus as well as Catholics. He possessed in a remarkable degree the gift of gaining the friendship of such as could assist him in whatever way in his apostolate.

Fr. Maria Louis confined himself to India in his endeavours to obtain financial help. He had friends and correspondents all over the world and drew liberally on their resources. All the readers of Caritas have read his richly illustrated booklet on Christian. In short, he was a strong believer in advertising. As a preacher, Fr. Maria Louis was decidedly outstanding. His clear and powerful voice, together with a certain quaintness of pronunciation and the slight Telugu sing of his language, greatly pleased his audience and arrested their attention. No wonder, then, that he was in great demand in all the dioceses of the Tamilnadu and that those who had had heard him once wished to hear him again. Moreover, he developed his natural oratorical powers by constant study and practice. Due to kidney troubles, he died in 1939.[22]

DEVELOPMENT OF PERIYAKULAM PARISH

Fr. S. Regis too served as Municipal Vice- Chairman and left the place in 1938. Fr. Soufflet was here for one year and was replaced by Fr.Pujo in 1939 who started the Parish of Theni. He left his assistant Fr. Jeganather in charge of Periyakulam.[23] The next incumbents were Fr. Selvam and Fr. Immel from 1948 to 1955. He was followed by Fr. Arulsamy who remained till 1968. He was also a Municipal Counsellor. Fr. Gonsalvas replaced him for one year and he was succeeded by Fr. Francis Xavier who held the post till September 1972. Fr. Mathai was the Parish Priest from 1972 to 1978. Fr. Antony Nair served as the Parish Priest from 1978 to 1981.[24] During his period,

Fr. D.Gnanapragasam became the first Priest from Periyakulam Parish. Later on, Fr. Irudhayam, Fr. Savarimuthu, Fr.M.Gnanapragasam's period. Fr. Lourdhuraj became the second priest from Periyakulam Parish. In 1989, Fr. Aruldass became the Parish Priest. During his tenure, the church festival was celebrated after a gap of sixty years. Further, a Grotto was also constructed. [25]

ADMINISTRATION OF PERIYAKULAM PARISH

In Periyakulam Parish, administration is carried out through certain associations like Fund Committee, Choir Class and Vincent de Paul Sabhai. The Fund Committee collects money from the Catholics to celebrate church festivals and other important celebrations. The Choir class is mainly responsible for singing songs during the mass in the church. Volunteers carry out some social services and also decorates the church, campus, statues whenever the festivals are celebrated. In Periyakulam Parish, there are parochial registers that is for Baptism, Marriages and Deaths. The entries are accurately made by the Parish Priest and the registers are preserved by him. Periyakulam Parish has its own seal which provides the address of Periyakulam Parish Priest. The letter is considered authentic only if it bears the Parish seal.

PERIYAKULAM PARISH PRIEST'S RELIGIOUS FUNCTIONS

In Periyakulam, most of the Catholics are regular for Sunday mass and an appreciable number go for daily mass also Many Catholics evince keen interest in the activities of church. The Periyakulam Parish Priest has to discharge many functions. He proclaims the gospel of God to all. He administrates Baptism, the sacrament of confirmation to those in danger of death. He gives assistance in the celebration of marriages. The Priests conduct funerals, celebrates Eucharist on all days. On Saturday and Sunday, he hears confession of the people which is a sacrament of giving forgiveness of God. Catechism classes are conducted regularly after the end of the second mass of Sunday. Apart from these functions mentioned above he supervises

different organisations like Matha Sabhai, Choir Class, Ileigner Manram and Vincent de Paul Sabhai. He meets the representatives of those above organisations, members of the Fund Committees and important Catholics of the town now and then to discuss religious and other matters**.²⁶**

PERIYAKULAM PARISH PRIEST'S SOCIAL SERVICES

Periyakulam Parish Priest with some of the volunteers who pray for others, makes periodical   visit to the families, the people share their sorrows, happiness in a special way. He also helps the sick and especially the dying in great charity, solicitously restoring them with the sacraments and commending their souls to God. He treats all with outstanding humanity especially, the poor, the suffering the lonely those who are exiled from their homeland and those burdened with special difficulties. He cares social equally with different kinds of people.**²⁷**

RELATIONS BETWEEN THE DIOCESAN BISHOP AND PERIYAKULAM PARISH PRIEST

Periyakulam Parish Priest stands as the representative of the Diocesan Bishop. So, his disposition is in accordance with the disposition of Bishop. To grow pastoral care more and more, the Bishop gives enthusiasm to Periyakulam Parish Priest in the means of calling him for the conference, conversation, seminar and senate meetings. Thus, the Bishop can come to know the mind of Periyakulam Parish Priest and the Parish people**.²⁸**

Conclusion

The Periyakulam Parish is unique in many respects. It symbolises love and devotion. The Periyakulam Parish Priests are known for their meritorious services not only for the development of the church alone but also work with zest for the development of socio-economic upliftment of the people. Apart from discharging religious duties which is their main concern, some of the Parish Priests like Fr. Maria

Louis, Fr. Susai Regis, Fr. Arulsamy served as Chairman, Vice-Chairman and Municipal Councillors respectively**.** After the Sunday Mass, the people used to meet the Parish Priest in order to discuss their problems and settle their disputes amicably. This clearly shows that the Parish Priests have rendered social obligations to fulfil. They patiently listen to the problems of the public and suggest ways and means to get over them They also guide the people who are socially and economically backward to get concessions from the Government. Further, the Parish is continuously working for the emancipation of the downtrodden. It has done commendable job in this direction.

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25.Fr.A.Aruldass, Parish Priest's Diary entry, dated 8th December 1989 and 11th February 1990

26.Interview with Santiago, Sacristan of Periyakulam Church, on 23.3.1991.

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கிறித்தவஅந்தாதி இலக்கியங்கள்

இ. அல்போன்சாள்

உதவிப் பேராசிரியை

ஜெயராஜ் அன்னபாக்கியம் மகளிர் தன்னாட்சிக் .கல்லூரி, தேனி.

Corresponding author: sister.alphonse2020@gmail.com

ஆய்வுச் சுருக்கம்

'அறிவுறுத்தல், இன்புறுத்தல்' ஆகிய இருபெரும் பணிகளை இலக்கியங்கள் ஆற்றுகின்றன. இப்பணிகளைச் செய்யும் இலக்கியங்கள் மட்டுமே காலத்தை வென்று நிற்கின்றன.சிற்றிலக்கியங்களுக்கும் இத்தகைய பெருமையுண்டு சிற்றிலக்கிய வகைகள் இன்றைக்கு 417 என்று கணக்கிடப்படுகின்றன. இவ்வகைகளுள் ஒன்றுதான் அந்தாதி. கிறித்தவ சமயஞ் சார்ந்த அந்தாதி இலக்கியங்கள் பல தோன்றியுள்ளன. முனைவர் இ.எலியாஸ் அவர்கள் கிறித்தவ அந்தாதி இலக்கியங்களைத் தொகுத்து,அந்நூலின் வாயிலாக புலப்படும் கருத்துக்களை விளக்குவது சிறப்பிற்குரியதாகும். அந்நூல்கள் புகட்டும் அரியகருத்துக்களை நாட்டுமக்களுக்கு அளித்துள்ளார். கிறித்தவ அந்தாதிகள் பற்றி ஆராய்வதே இவ்வாய்வு ஆகும்.

Abstact

Instructing and rejoicing are the two vital duties of Literature. This type of work can Surviye beyond ages. 'Sitrilakiyam' also has the same characteristics. Nowadays this type of works are 417 in numbers.A unique kind of Tamil poetry is called 'Andhadhi'.Today we can found 'Andhadhis' which reflect Christianity. Dr.Eliyas collected christian 'Andhadhis' and explained the rare concepts in a better way to the country.Here we are going to research christian 'Andhadhis'.

முன்னுரை

உலகில் தோன்றிய சமயங்கள் பலவும் தத்தமக்குரிய சமயக் கடவுளரைப் போற்றும் வண்ணமும் இறைக் கோட்பாடுகளை எடுத்துக் கூறும் வண்ணமும் புனித நூல்களைக் கொண்டுள்ளது. இன்றையஉலகில் வழக்கில் உள்ள சமயங்களுள்

குறிப்பிடத்தக்கது கிறித்தவ சமயம். கிறித்தவப் புலவர்கள் தாங்கள் படைத்த இலக்கியங்கள் பலவற்றிலும் கிறித்தவமதக் கோட்பாடுகளையும் இறையருள் நிலைகளையும் மக்களுக்கு எடுத்துக் கூறுவதாக உள்ளது. அவற்றுள் குறிப்பிடத் தக்கது அந்தாதி இலக்கியவகை.கிறித்தவ புலவர்களால் படைக்கப்பட்ட அன்னையழுங்கல் அந்தாதி, ஞான அந்தாதி,தேவமாதா அந்தாதி, நற்கருணைநாதர் அந்தாதி, கோட்டூராந்தாதி, வேளைஅந்தாதி, அருள்திரை அந்தாதி, திருவீற்று முதல் அந்தாதி, ஆகியன இயேசுகிறித்து, தேவமாதா ஆகியோர் குறித்த இறை இயல்புகளை எடுத்துக் கூறுவதாக இவ்வாய்வுரை அமைந்துள்ளது.

திறவுச் சொற்பொருள்

1.தெரிசனை-தரிசனை   2.திருவினரே-அருள்பெற்றவரே   3.வல்வினை-தீவினை 4.மிடி-மடி 5.பரிபாலனம்- பாதுபாத்தல் 6.ஏலவில்லை-இயலவில்லை 7.ஆரணங்கே-தேவதையே 8.செழுங்கண்-துயர்நிறைந்தகண்கள் 9.தயாபரியே -கருணையுள்ளவளே

முதல் அந்தாதி

கிறித்தவ இலக்கியத்திற்குத் தோற்றுவாய் தந்தவீரமாமுனிவர் படைத்த 'அன்னைஅழுங்கல் அந்தாதி' முதல் அந்தாதியாகப் படைக்கப்பெற்றுள்ளது. இறைமகன் இயேசுபடும் சிலுவைத் துன்பங்களைக் கண்ட அன்னைமரி படும் துன்பங்களை எடுத்துரைப்பதே இவ்வந்தாதியின் கருப்பொருளாகிறது.

பத்தொன்பதாம் நூற்றாண்டு

"ஞானஅந்தாதி" சுவிசேடக் கவிராயர் என அழைக்கப் பெற்ற தஞ்சை வேதநாயக சாஸ்திரியாரால் இயற்றப் பெற்றது. விவிலியத்தின் பழைய ஏற்பாட்டில் ஒருபகுதியாக இடம் பெறும் சாலமோன் பாடிய இறைக்காதல் பாக்களையொற்றி எழுதப் பெற்றது. இயேசுவைத் தலைவனாகவும்,திருச்சபையைத் தலைவியாகவும் உருவகித்துப் பாடப்பெற்றது. 101 கலித்துறைப்பாக்களால் இயற்றப்பெற்றது. 1873 இல் மாயூரம் வேதநாயகம் பிள்ளையால் 'திருவருள் அந்தாதி' இயற்றப்பெற்றது. இறைவனின் திருவருளைப் போற்றிஎவ்வெற்றிற்குஉளவையவைஅழகுதரும் எனக் கூறி என் உள்ளத்திற்கு'நின் குடியிருப்பேஅழகு'எனச் சுட்டிவேதநாயகம் பிள்ளைபாடுகிறார்.

> "சொல்லுக் கழகுமெய் சோலைக்கழகு சுகநிழலாம்
> செல்லுக் கழகுமழை கொடைசெல்வர்க்குச் சீரழகாம்
> இல்லுக் கழகுனையே குடியேற்ற லிறையவனே"[1]

என்றபாடல் மூலம் அறியப்படுகிறது. பத்தொன்பதாம் நூற்றாண்டில் வெளிவந்த 'தேவமாதா அந்தாதி'யைப் பாடியவரும் வேதநாயகம் பிள்ளையே ஆவார். இந்நூல் 100 வெண்பாக்களைக் கொண்டது. இந்நூலின் தொடக்கத்தில் வரும் 37 பாடல்கள் உத்தரீயமாதா, உபகாரமாதா, செந்மராக்கினிமாதா, அடைக்கலமாதா, செபமாலைமாதா, வியாகுலமாதா, காணிக்கைமாதா, பெரியநாயகிமாதா, எனச் சிறப்பிக்கப் பெறும் தேவமாதாவின் பொதுவியல்புகளைக் கூறுவனவாகவும் அமைந்துள்ளது.

இருபதாம் நூற்றாண்டு

நற்கருணைநாதர் அந்தாதி 1982-இல் இயற்றப்பெற்றது. இதனை இயற்றியவர் அருள் திரு.பி.கே. ஜார்ஜ் அடிகளார் ஆவார். நற்கருணைநாதரைப் போற்றிப் பரவுவது 'நற்கருணைஅந்தாதி ஆகும் காப்புச் செய்யுள் நீங்கலாக நூறு பாக்களைக் கொண்டது.

> "இலதென் றுணர்ந்தமே பாடாதிருக்கவும் ஏலவில்லை
> பலவேபிழைகள் மலிந்திடும் கேவலம் பார்த்திடாமல்
> சில்சொல்லக் காழறும் என்சொல்லை ஏற்றருள் சேசுநீயே"[2]

நற்கருணைநாதரைப் பாடும் திறன் தனக்கு இல்லையெனினும் ஏற்றருளுமாறுபி.கே. ஜார்ஜ் இப்பாடலைப் பாடியுள்ளார். இயேசுவின் மலைப்பொழிவைக் கருப்பொருளாகக் கொண்டுவேதநாயகசந்திரசேகரன் இயற்றிய நூல் 'ஆண்டவர் அந்தாதி ஆகும். 1978 இல் வெளிவந்துள்ளது. பரன்குன்றாபுரத்தைச் சேர்ந்த மு.நல்லசுவாமியின் 'அருள் திரைஅந்தாதி'என்னும் நூலை இயற்றியுள்ளார். அருள் நாதர் அந்தாதியைப் பாடியவர் முனைவர் ஜே.மனுவேல் ஆவார். இவ்வந்தாதி இருபதாம் நூற்றாண்டில் வெளியானவைஆகும். 'மறைத்திரு. மாசிலாமணி திருச்சிலுவைப் பாடுகளை நினைத்து திருச்சிலுவை அந்தாதி 'இயற்றியுள்ளார். முனைவர் ஜே. மனுவேல் அவர்கள் அருள்நாதர் அந்தாதியைப் பாடியுள்ளார். 'திருக்குமரன் அந்தாதி'என்னும் பெயரிலும் ஒரு நூல் சென்னையில் வெளியாகியுள்ளது. 'எருசலைஅந்தாதி'என்னும் நூலைஆபிரகாம் பாடியுள்ளார்.

திருத்தலஅந்தாதி

திருத்தலப் பெயர் கொண்டஅந்தாதிகள் நான்குகிடைக்கப் பெற்றுள்ளன.

வேதபுரியில் வீற்றிருக்கும் அன்னைமரிபற்றிப் பாடப்பெறுவதால் 'வேதபுரிஅந்தாதி'என பெயர் பெறுகிறது. வேதபுரிஎன்பதுதிருக்குடந்தையைக் குறிக்கும். அவ்வூரைச் சேர்ந்ததுரைசாமிமுதலியார் இதனை இயற்றியுள்ளார். நூறு கலித்துறைச் செய்யுட்களால் ஆனது. 1868 இல்புதுவையில் வெளிவந்தது. வெல்லைநகர் வாழும் கிறித்துவைப் பற்றிப் பள்ளிக் குழந்தைகளுக்காகஎழுதப் பெற்றஅந்தாதி'வெல்லைஅந்தாதி'ஆகும். 1890 இல் வெளிவந்தது. அருணாசலம் சதாசிவம் என்ற ஜே.ஆர். அருனால்டு இதனைப் படைத்துள்ளார். கோட்டூரில் குடி கொண்டுள்ளஅன்னைமரியைப் புகழ்ந்துபாடப்பெற்றது'கோட்டூர் அந்தாதி'புலவர் சூ.தாமஸ் இதனை இயற்றியுள்ளார். இந்நூல் 1978இல்வெளிவந்தது.

> "நாயாய் அலைந்துநரியாய் யுழன்றுசெய் நன்றிகெட்ட
> பேயாய்த் திரிந்துபிணமாய்க் கிடந்துபிழைபுரிந்துன்
> சேயாய் இருந்தும் மதியிழந் தேன்செழுங் கோட்டுநகர்த்
> தாயாய் இருந்து பரிபாலனம் செயும் தாய்மரியே"[3]

தாம் வாழும் அவலவாழ்வைத் தாய்மரியிடம் எடுத்துச் சொல்லும் வண்ணம் புலவர் தாமஸ் பாடியுள்ளார். வேளைமாநகர் எனஅழைக்கப் பெறும் வேளாங்கண்ணிஅன்னையைப் போற்றி'வேளைஅந்தாதி'என்னும் நூலை இயற்றபட்டுள்ளது. சென்னைபெசன்ட் நகரில் உள்ள அன்னைபேரில் 1991- இல் ஞான ஜோசப் ஜவஹர் ஓர் அந்தாதி இயற்றியுள்ளார். அதற்கு'அன்னை வேளாங்கண்ணி அந்தாதி'என்னும் தலைப்பிட்டுள்ளார். கடற்கரை ஒரத்தில் உள்ளமையால்

> "அலையும் கடலின் கரையோரம்
> அணையாவிளக்காய் நின்றெமக்குத்
> ----------------
> அலையும் மனப்பேய் எனையகல
> அடக்கிவைத்த ஆரணங்கே"[4]

எனஅன்னையைப் போற்றுகிறார்.

வீரமாமுனிவர்

அன்னை அழுங்கல் அந்தாதியின் ஆசிரியர் வீரமாமுனிவர் ஆவார். நவம்பர் 8, 1680 –பிப்ரவரி 4,1742 இத்தாலிநாட்டில் உள்ள கேசுதிகிலியோன் என்னும் இடத்தில்

பிறந்தார். இவரின் இயற்பெயர் கான்ஸ்டன்டைன் ஜோஸப் பெஸ்கி. இவர் இயேசுசபையைச் சேர்ந்த குரு 1710 ஆம் ஆண்டு தமிழகத்துக்கு வந்தார். கான்ஸ்டன்டைன் ஜோசப் பெஸ்கி என்ற தனது இயற்பெயரை முதலில் தைரியநாதன் என்றுதான் மாற்றிக் கொண்டார்.பிறகுஅதுவும் சமஸ்கிருதம் என்று அறிந்து வீரமாமுனிவர் என்று வைத்துக் கொண்டார். தமிழில் 23 நூல்களை எழுதியுள்ளார். ஒன்பது மொழிகளில் புலமை பெற்றவர். பெயராலும், பண்பாட்டாலும் தமிழராகவே வாழ்ந்தவர். தனது 67-வது வயதில் மறைந்தார்.

அன்னைஅழுங்கல் அந்தாதியின் பெயர் காரணம்

'அழுங்கல்' என்பது வருந்துதல், துயர்படுதல், கவலை,அவலம், கையறு, வேதனைப்படுதல், மனக்கஷ்டம், உள்ளக்குமுறல் என்று பலபொருளில் அழுங்கல் என்பதற்கு விளக்கம் தரப்படுகின்றன. இத்துயரங்கள் அதிகமாகும் போது சிலர் கண்ணீர் வடித்து தங்களின் அவலத்தைக் காட்டுவார். இயேசுபெருமானின் சிலுவைப் பாடுகளைக் கண்ணுற்ற அன்னைமரியாள் துடித்து புலம்பி அழும் பாடல் தான் அன்னை அழுங்கல் அந்தாதியில் இடம் பெற்றுள்ளன.

அன்னைஅழுங்கல் அந்தாதியின் சிறப்பு

இவ்வந்தாதிக்கு ஒப்பாரிப்பாட்டு அல்லது ஓலமிட்டு அழுது புலம்பல் அழுகைப்பாட்டு என்ற ஒரு பொருளும் உண்டு. இப்பாட்டு தன் அன்பால், பாசத்தால், உயிரால் கலந்த ஒருவர் இறந்து விட்டால் அவர்களுக்காய் மனம் வருந்தி அழுது பாடும் அழுகைப் பாட்டுதான் இவ்வழுங்கல் அந்தாதி பாட்டு ஆகும். இங்கு அன்னை மரியாள் தன் ஒரே மகனின் துயரச் செய்தியினைப் பார்க்க முடியாத சூழலில், பங்கு பெறாதச் சூழலில் தான் இப்பாட்டு பாடப்படுகின்றது.

அன்னையின் துயர்

தன் மகன் சிலுவை சுமந்து செல்லும் காட்சியினைக் கண்டும்,அவர் பட்ட துயரங்களையும் ,உடலில் ஏற்பட்ட காயம், இரத்தக்கறை,தலையில் சூட்டிய முள்முடி பலர் கேலியாகப் பேசிய வார்த்தைகள் இவற்றை எல்லாம் பார்த்து அன்னை அழுது புலம்புகிறாள். அவற்றை,

"தாயவள் ஓங்குசிலுவையில் கண்டுதனித் துயரால்

நோயகல் ஆழியின் ஆழ்ந்தகரைபெற நோக்கியபோல்

சேயுடலோடு பிணித்தால் எனச் செழுங்கண்ணுறலே"[6]

இப்பாடல் வரி மூலம் அறியப்படுகிறது.

ஞானஅந்தாதி

மனிதனுக்கும் இறைவனுக்கும் இடையிலுள்ள அன்புத் தொடர்பினை கண்களால் அன்றிக் கருத்தாலும் மனத்தாலும் உணரப்படுகின்ற உள்ளத் தொடர்பாக சாஸ்திரியார் இப்படியோர் எழுத்தோவியமாக வழங்கியுள்ளார். நாயகன்-நாயகி பாவனை கொண்டு பாடப் பெற்ற சாஸ்திரியாரின் நூல்களில் இதுவும் ஒன்று.கிறிஸ்து நாயகனாகவும், திருச்சபை நாயகியாகவும் கூறப்படுகிறது. திருவிவிலியத்தின் பழைய ஏற்பாடுப் பகுதியில் உள்ள இனிமைமிகு பாடல் என்னும் சாலமோனின் பாடல்களை ஞான அந்தாதிக்கு முதநூலாகச் சாஸ்திரியார் கொண்டதாக அவரே நூலின் காப்புச் செய்யுளில் கீழ்கண்டவாறு கூறியுள்ளார்.

"ஞான மணவாளனின்மேல் நாயகிகொண்டாள் காதல்

வான மணவாளன் மகிழவே யானதனை"[7]

இங்கு ஞானமணவாளனாகவும் வானமணவாளனாகவும் குறிப்பிடுவது கிறிஸ்து நாயகி என்று கூறப்படுவது திருச்சபையாகும்.

வேதநாயகசாஸ்திரியார்

தஞ்சை வேதநாயக சாஸ்திரியாரின் தந்தை அருணாச்சலம் பிள்ளை திருநெல்வேலியில் வாழ்ந்த ஒருகவிஞர். தமிழ்ப் பற்றாளர். கி.பி.1760 ஆம் ஆண்டுதமது 25-வது அகவையில் கிறித்துவராக மனம் மாறித் திருமுழுக்கு கிறித்துவராக வாழ்ந்த இவர்களுக்கு 1774 ஆம் ஆண்டுவேதநாயகம் பிறந்தார். வேதநாயக சாஸ்திரியார் தஞ்சாவூரிலேயே தம் வாழ்வின் பெரும் பகுதியைச் செலவழித்ததால் அவர் தஞ்சைவேதநாயகம் ஆனார். அவருக்குக் கொடுக்கப்பட்டபட்டங்களில் ஒன்றான சாஸ்திரியார் என்பதோடு சேர்த்து அவர் தஞ்சைவேதநாயக சாஸ்திரியார் என்றழைக்கப்பட்டார். ஜெபமாலை,ஞானஉலா,ஞானஅந்தாதி போன்றவை இவர் இயற்றிய நூல்கள் ஆகும்.

தேவமாதாஅந்தாதி

கவிஞர் வேதநாயகர் தன்னைப் பெற்றதாயின் மறைவால் நைந்து. நொந்து உள்ளம் கரைந்துள்ள வேளையில் அன்னை ஆரோக்கியமாதா ஆலயம் சென்று தன்னை ஈன்ற தாயின் ஆன்ம சாந்திக்காக பூஜை செய்த நேரம் இருவகை அன்பும்

ஒன்றோடொன்று கலந்து அன்னையின் அந்தாதி பாட ஆரம்பித்தார். தேவமாதா அந்தாதி காப்புப் பருவத்தில் தொடங்குகிறது. வெண்பா யாப்பே மிகுதியாகக் காணப்படுகிறது.

சிறப்புப் பெயர்கள்

தேவமாதா அந்தாதி மாதாவினுடைய பெருமைகளைக் கொண்டு இயேசுவின் தாயான மரியாளுக்கு சிறப்புப் பெயர்களைச் சூட்டி புகழ்கின்றார். கிறித்தவர்கள் வாழும் இடங்களில் எல்லாம் அவரவர் தேவைக்கு ஏற்ப அன்னைக்குப் பெயரிட்டு திருத்தலமாக அமைக்கப்பட்டுள்ளன.

> "அரும்மதியேநீதான் அரும்மதியேஉள்ளாய்
>
> தருமவதிபாதத்தைச் சாரும் - பெருமைஉற
>
> என்னஉடாயம் எடுத்தாய் எனக்குஅதனை
>
> இன்னதெனநன்றாய் இசை"[8]

என நிலவு போன்ற குளிர்ச்சித் தன்மை உடையவளே நான் உன்னுடைய அமைதியான திருவடியை நினைத்து சார்ந்தேன். என்மேல் நீ வைத்துள்ள கருணையினை இன்னதென்று தெளிவாய் சொல்லுவாயாக என்று பாடப்படுகிறது.

நற்கருணைநாதர் அந்தாதி

பி.கே. ஜார்ஜ் என்பவர் நற்கருணைநாதர் அந்தாதி என்னும் நூலின் ஆசிரியர் ஆவார். இந்நூல் அந்தாதி அமைப்பில் 100 –பாடல்களைக் கொண்டது. கோதுமைஅப்பழும் திராட்சை இரசமும் இயேசுநாதரின் உடல்,குருதி,ஆகியவற்றின் குறியீடுகளாக அமைந்துள்ளன. இவை மக்களின் ஆன்ம உணவாக அமைகின்றன. கோதுமைஅப்பத்தைத் தன் உடலாகவும் திராட்சை இரசத்தைத் தன் குருதியாகவும் மாற்றி"இதைஎன் நினைவாக செய்யுங்கள்"[9]என்று இயேசுமொழிந்தார். இவ்வடிப்படையில் இயேசுநாதர் அப்பவடிவில் மக்களோடு வாழ்கிறார். மக்கள் மீதுகொண்ட கருணையால்

அப்பவடிவில் வாழும் இறைவன் நற்கருணைநாதர் என்னும் பெயர் பெறுகிறார். இறைவன் எல்லாப் பொருள்களிலும் கலந்துவாழ்கிறான். எங்கும், எவ்விடத்திலும், எக்காலத்திலும் அவன் தோன்றாப் பொருளாக உள்ளான். இவ்வாறு விளங்கும் இறைவன் கிறித்தவஆலயங்களில் அப்ப வடிவில் வாழ்கிறான். இக்கருத்தினை பி.ஜே. ஜார்ஜ்

> "தலமெங்கும் கோயிலில் அப்பவடிவினில் தான்மறைந்தே
>
> நிலவுவாய் மண்டியிட்டுன்னையாராதிப்பேன் நித்தமும்"   (ப. 383)

என்று கூறுகிறார். இறைவனை,

> "அந்தமும் ஆதியும் அற்றவர் மூவருள் ஆம்நடுவர்
>
> வந்தார் முதன்முறைமீட்பையும் தந்தார் மனுவுருவில்
>
> வந்தவர் நம்மிடைவாழ்கிறார் அப்பவடிவினிலே
>
> அந்தம் வருநாளில் நீதிஉரைப்பா்நின் நம்பரத்தே"[10]

என்று பி. கே. ஜார்ஜ் கூறுகிறார்.

> "நித்தமும் நின்முனேவந்துவணங்கவும் நின்தனையே
>
> மெத்தவும் வேண்டிவிரும்பியுட் கொள்ளவும் மேலுமென்றன்
>
> சித்தமும் நின் திருச் சித்தமும் ஒன்றாய்ச் செயல்படவும்
>
> இத்தரைமீதினிலத்தாயெனக்கருள் இன்னருளே."[11]

இறைவனைநாடி அவர் அருளைப் பருகி இறைவனுடன் கலந்துவிடும் பேரின்பத்தை விரும்புதல் அடியார்களின் இயல்பாகும். சமயப்பணியும் தமிழ்ப் பணியும் ஒருங்கே ஆற்றிவரும் இத்துறவியைப் பாராட்டி வி.ஜி.பி. சந்தனம்மாள் அறக்கட்டளை பரிசும் விருதும் வழங்கிச் சிறப்பித்துள்ளது

கோட்டூரந்தாதி

        1977 இல் எழுதப்பட்டு, 1978 இல் வெளியிடப்பட்டுள்ளது தஞ்சாவூர் புலவர் சு.தாமஸ் என்பவர் அந்தாதி இலக்கிய மரபில். கட்டளைக்கலித்துறையின் இலக்கணம் பொருந்த நூறு பாடல்களில் பாடியுள்ளார். இது தலத்தின் பெயரால் 'கோட்டூரந்தாதி'என்றபெயரைப் பெற்றுள்ளது. திருக்கோட்டூரில் எழுந்தருளியுள்ள ஆரோக்கியஅன்னையைத் தொழுவோர் என்றும் வாழ்வர் என்பதை இப்பாடலின் மூலம் அறியமுடிகிறது.

"போயார் திரும்பினர்? கோட்டூரில் வைகும் புனிதமரி

சேயார் தனைத்தொழுவாரிறவாதென்றும் சீவிப்பரே"[1]

இறைவன் நமக்குச் செய்தசகலநன்மைகளுக்கும் நாம் நன்றியுணர்வுள்ளவர்களாக இருத்தல் வேண்டும். இதனைப் பிறருக்குஉதவுவதன் மூலம் மட்டுமின்றி, இறைவனைப் புகழ்ந்தேத்துவதன் மூலமும் வெளிப்படுத்தலாம் என்பதை,

"ஆண்டாளும் நீநல் அடியாளும் நீஅகலாதநன்மை

பூண்டாளும் நீபழிபூணாளும் நீபுவியோர்தமைப்போல்

மாண்டாளும் என்றும் மரியாளும் நீமகிழ் கோட்டூநகர்

தாண்டாளும் நீயெமக் காய்மனுப் பேசும் தயாபரியே"[13]

என்று இப்பாடலில் அன்னைமரியாளுக்கு ஆண்டாள், அடியாள், அமலி,அருள் செல்வி,தயாபரி, பரிந்துரைப்பவள், என்று பல பெயர்கள் சூட்டிப் புகழ் மாலை சாற்றுகின்றார்.

உண்மைக் கிறித்தவனாயிருத்தல்

உண்மையான கிறித்தவன் யார் என்பதை,

"இமயப் பெரும்புகழ் கொண்டாடியேநின் திருவுளத்திற்

கமையப் புரிபவரன்றோகிறித்தவர் ஆகுவரே"[14]

கோட்டூரன்னையின் திருவடிகளைப் பணிந்தவரையன்றிப் பிறரைப் பணியேன் என்னும் கூறுகின்றார். அடியாரைத் தொழுதால்,ஆண்டவனையே தொழுதற்கு ஒப்பாகும். மக்களுக்கு அவரவர் சார்ந்துள்ள சமயத்தில் பற்று இருக்கவேண்டும். இதுவே சமயவெறியாகிவிடக்கூடாது. உண்மையான சமயவாதி மனிதநேயத்தைக் கொண்டிருப்பான் ஆகவேதான் உண்மைக் கிறித்தவனாக இருக்கவேண்டும் என்கிறார். இஃது எல்லாச் சமயத்தினருக்கும் பொருந்தும்.

வேளைஅந்தாதி

கலை,அறிவு,தவம்,ஞானம்,குலம்,பேர், இவை மனிதனுக்குத் தேவையான வாழ்வியல் அறத்தை நல்குபவை எனவும், இப்பாடலின் மூலம் அறியலாம்.

"தேறுங் கலையறிவும்தவஞானமும் சேர்குலமும்

பேருங் கெடவருமோர்மிடியால் மனம் பேதலித்தேன்"[15]

வேளையந்தாதியில் விருந்தோம்பல் பண்பு

கானாவூரின் திருமணத்தில் வந்திருந்த விருந்தினர்க்கு திராட்சைரசம் போதாமல் போகவே மரியன்னைதன் மைந்தனாகிய இயேசுபிரானிடன் வேண்டுகிறார். இயேசுபிரான் தன் சீடர்களிடம் ஆறு கட்சாடிகளில் நீர் நிரப்பிக் கொணருமாறு வேண்ட, அவர்களும் கொண்டு வருகின்றனர். நீர் இயேசுபிரானின் ஜெபத்தினால் திராட்சைரசமாகியது. பின்னர் உயர்ந்தோர்,தாழ்ந்தோர் எனஅனைவரும் வேறுபாடு கருதாது பரிமாறப்பட்டது. அவ்வாறு

இறைமைந்தன் புலவர் தாமஸ் அவர்கள்,

> "கற்கின்றகல்வியும் போதமெய் ஞானமுங் கைப்பொருளுஞ்
> சொற்கொண் டிருந்தவமும்பலி,பூசையுந் தூய கற்பும்
> பொற்குன்றமாயொளிர் வேளையிற் தாயருள் பூண்டவர்க்கே
> நிற்கும் பெரும்பயன் தந்தழியாதென்று நீடிக்குமே"[16]

என்கிறார்.

இருவகைவினை

மனிதனின் செயல்பாடுகளை இருவகையில் பாகுபாடுசெய்யலாம். ஒன்றுநல்வினை, மற்றொன்றுதீவினை, இதனை வான்புகழ் வள்ளுவர்,

> "இருள்சேர் இருவினையும் சேரா இறைவன்
> பொருள்சேர் புகழ்புரிந்தார் மாட்டு."[17]

என்கிறார். இக்கருத்திணை அடியொற்றியே புலவர். சூ.தாமஸ் அவர்களும் வேளைஅன்னையிடம்.

> "மாலைகரங் கொள் புண்ய வதியாய் இலங்கிடும்
> நீயேன் வல்வினை தீர்த்துவைக்க"[18]

> "வளத்தாமரைத்தடவேளையைப் போலிந்த வல்வினையேன்"[19]

> "திருவேயிருவினை தீர்மருந்தே"[20]

வேளாங்கண்ணி அன்னையே இருவினைகளையும் தீர்ப்பார் என்பதனை, இப்பாடல் மூலம் அறியமுடிகிறது.

அருள் திரைஅந்தாதி

அருள்திரை அந்தாதி எனும் நூலை இயற்றியவர் மு.நல்லசுவாமிபண்டிதர் ஆவார்.

அருள் என்பது இறைவனின் அருளைக் குறிக்கின்றது. திரை என்பது ஆரம்பித்துத் திரையில் முடிகிறது. ஆண்டாள் திருப்பாவைபோன்று ஒருநாளைக்கு ஒருபாடலைப் பாடத் திங்கள் முழுவதும் இறையருள் வேண்டுவதற்கு ஆவனசெய்யும் வகையில் இந்நூல் அமைந்துள்ளது. ஆண்டில் ஏழு திங்கள் 31 நாட்கள் உள்ளனஎனவேதான் 31 பாடல்கள் பாடியுள்ளார்கள். இயேசுபிரானின் மீதுஅளவற்றபற்றுக் கொண்ட ஆசிரியர் இயேசுபிரானின் மீதுகொண்ட அன்பினைப் பாக்கள் தோறும் வெளிப்படுத்தியிருக்கிறார். பெறும்பேறு குறித்து ஆசிரியர் வெளிப்படுத்துகிறார். இயேசுபிரானை வணங்கிப் போற்றுபவர்கள்,

"கூடியசெல்வமும் நன்மகப் பேறும் குறைவிலராய்

நாடியநன்மனையோடிருத் தேபுகழ் நாட்டிடுவார்

நீடியசீரேசுநாயகனாமந்தநின் மலனைத்

தேடிஅறத்தினைச் செய்தேஉயிர்வாழ் திருவினரே"[21]

என்று நூலாசிரியர் குறிப்பிடுவது இயேசுபிரானின் மேன்மையானஅருள் நிலையினை எடுத்துக் காட்டுகிறது. குறைகள் ஏதும் என்னை அணுகாமல் எனக்குஅருள் புரியவேண்டும் எனக் கூறுவது பக்தர்களை இயேசுபிரானை நோக்கி ஆற்றுப்படுத்தும் அருள் செய்தியாக அமைகிறது. பொதுவாக அந்தாதி நூல்கள் ஊர்ப்பெயராலும், இறைவன் பெயராலும் அமையும். ஆனால் 'அருள்திரை அந்தாதி' இறையருளை மறைக்கும் மாயையாகிய திரையைத் தன் பெயராகக் கொண்டு அமைந்துள்ளது மு. நல்லசுவாமிபண்டிதர்,

"தேசம் புகழும் கிறிஸ்தேசுநாதன் தெரிசனையில்

மோசம் செய் தேநமைக் காணவொட்டாதிங்கு மூடுவது

நாசம் தருமிவ் வுலகத்தவர்பலர் நன்றிதெனப்

பேசும் பெருமைஉடையதுமாயைப் பெருந்திரையே"[22]

என்று அருள்திரை அந்தாதியில் பாடுவது கொண்டு இறைவனின் அருளை மறைக்கக் கூடிய திரையாக மாயை இருப்பதை உணரமுடிகிறது.

மு.நல்லசுவாமிபண்டிதர்

திருநெல்வேலி மாவட்டம்,பரங்குன்றாபுரம் என்னும் ஊரினர் இலக்கண வரம்பில் நின்ற மரபுவழிக் கவிதைகள் யாப்பதில் வல்லவர் சங்கச் சான்றோர் வழிநின்று

'புலவராற்றுப்படை'பாடியுள்ளார். உணர்ச்சிக்கேற்ற சந்தநயமிக்கப் பாடல்களை இவர் புனைந்துள்ளார். 'சிலுவைத்தியானமாலை' என்னும் நூல் இவருடைய சிற்றிலக்கியங்களில் தொகுப்பாக விளங்குகிறது.

திருவீற்றுமுதல் அந்தாதி

மு.பவுல் இராமகிருட்டிணன் வெண்பா யாப்பில் ஒன்றும்,கட்டளைக் கலித்துறையாப்பில் ஒன்றுமாக இரு அந்தாதி நூல்களைப் படைத்துள்ளார். இவை ஒவ்வொன்றும் 100 பாடல்களைக் கொண்டு 'திருவீற்றுமுதல்' என்னும் பெயரைப் பெற்றுள்ளது. இவ்விரு நூல்களும் இயேசுநாதரின் சிறப்புக்களையும், அருஞ்செயல்களையும் புகழ்வனவாக அமைந்துள்ளன. இயேசுநாதர்,

> "யானளிக்கும் ஊனுண்டுதான்பருகின் என் குருதி
>
> நானிலத்தில் நன்மையுண்டு…….."[23]

எனக் கூறித் தன் உடலையும்,குருதியையும், இம்மண்ணக மாந்தர்க்கு வழங்கினர். கல்வாரிமலையில் தம் இன்னுயிரை நீத்தார். பவுல் இராமகிருட்டிணர் தமது 56 ஆம் அகவையில் ஆண்டவராகிய இயேசுகிறித்துவைத் தமக்குரிய இறைவனாகவேற்றுக் கொண்டவர். இயேசுவின் தூய குருதியால் ஈடேற்றம் பெற்றவர். அவருக்காகச் சான்றுபகர முற்பட்டவர். தம் உள்ளத்தில் அரும்பிய பாடல்களைஅவரின் திருவடிகளுக்கு மாலையாகச் சூட்டுபவர்.. இயேசுவின் பெருமைகளை அழகாய் எடுத்துரைக்கும் இவ்விரு நூல்களும் அந்தாதி இலக்கண முறைப்படி அமைந்துள்ளன.

மு.பவுல் இராமகிருட்டிணன்

1916 ஆம் ஆண்டு மதுரையில் பிறந்தார் வைணவசமயம் சார்ந்த இவர் பெற்றோர். இராமகிருட்டிணன் என்றுபெயரிட்டு தம் பிள்ளையைப் பேணிவளர்த்தனர் தம் ஐந்தாம் வயதில் கிறித்தவத் துறவிகள் நடத்தும் பள்ளியில் இவர் சேர்க்கப்பட்டார். அப்போது'கர்த்தர்'என் மேய்ப்பராய் இருக்கிறார் என்னும் விவிலியவாசகம் இவர் மனத்தில் பதிந்தது. பக்தி நூல்களையும்,சித்தார்தம்,யோகம். முதலியவற்றையும் பயின்றார் இவற்றிலெல்லாம் அவர் மனம் நிறைவுகொள்ளவில்லை. திராவிடத் தந்தைபெரியார் இயக்கத்தில் சேர்ந்து இறைமறுப்புக் கொள்கையில் பல்லாண்டுகள் தீவிரமாக ஈடுபட்டடார். வாழ்க்கையில் பல துன்பங்களை ஏற்று உழன்ற ஆசிரியர் சுந்தரம்பிள்ளை என்னும் சான்றோர் காட்டிய வழியில் தன் உள்ளத்தைச் செலுத்தினார்.

எழுத்தராகவும்,காவல் துறைவீரராகவும் விளங்கியஆசிரியர் திரைபடத்துறை, கூட்டுறவுத்துறை ஆகியவற்றிலும் பணியாற்றினார். பின்னர் ஆசிரியராகவும், பேராசிரியராகவும் தம் வாழ்நாளைக் கழித்தவர் ஐம்பத்தாறாம் வயதில் கிறித்தவச் சமயம் சார்ந்தனார். அதுமுதல் தன் இறையனுபவத்தைப் பாமாலையாக்கிப் பலசிற்றிலக்கியங்களைப் படைத்துள்ளார். திருத்தமுறைக் கிறித்தவப்பிரிவைச் சேர்ந்த மு. பவுல் இராமகிருட்டிணன், இயேசுநாதரைமையமாகக் கொண்டுபலசிற்றிலக்கியங்களைப் படைத்துள்ளார். புதியசொல்லாக்கங்கள் பலவற்றை இவர்தம் படைப்புக்களில் காணமுடிகிறது யாப்பமைப்பில் புதிய முயற்சியை மேற்கொண்டுள்ளார். தமிழ் இலக்கிய இலக்கணங்களை கற்றுத் தோய்ந்த பட்டறிவு இவர்தம் சிற்றிலக்கியங்களில் பளிச்சிடுகிறது

முடிவுரை

கிறித்தவப் பாதிரியார்கள் மட்டுமல்லபொதுநிலையினரும் உலகம் இயேசுகிறித்து, தேவமாதா, ஆகியோரின் அருளால் ஈடேறவேண்டும். மக்கள் மனமகிழ்வுடன் நல்வாழ்வு வாழவேண்டும் என்னும் எண்ணத்தை அந்தாதி இலக்கியங்களில் வெளிப்படுத்தியிருக்கின்றனர். மக்களுக்கு நல்வழிகாட்டும் முகமாகப் படைக்கப்பட்டுள்ள அந்தாதி இலக்கியங்கள் தீமைகளைக் களைந்து இறைவழி நின்று ஈடேறவேண்டியதன் முக்கியத்துவத்தை உணர்த்துவதாக அமைகின்றது எனலாம்.

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23.   மேலது., ப. 437

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