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Research Papers

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DIVERSITY OF ZOOPLANKTON OF PUJARITOLA LAKE OF GONDIA DISTRICT (M.S)

Gunwant P. Gadekar
Department of Zoology, Dhote Bandhu Science College, Gondia

ABSTRACT
Zooplankton diversity reflects the quality of water hence constitutes the important ecological parameter to assess it. These are not only useful as bioindicators, but are also helpful for ameliorating polluted waters. Zooplankton community is cosmopolitan in nature and they live in all freshwater habitats of the world. Zooplankton is the transitional link between phytoplankton and fish. They are good indicators of the changes in water quality because they are strongly affected by environmental conditions & respond quickly to changes in water quality. Hence qualitative and quantitative studies of zooplankton are of great importance. In the present paper qualitative and quantitative studies of zooplanktons in Pujaritola lake of Gondia district were carried out during June 2015 to May 2016. Using microscopic studies of zooplankton, this investigation revealed that 11 genera belonging to five major groups i.e. Cladocera (two genera), Copepoda (three genera), Ostracoda (one genus), Protozoa (two genera) and Rotifera (three genera) were present.

Key words: Pujaritola lake, Zooplankton diversity, Gondia district,

INTRODUCTION
Zooplankton are microscopic, free floating organisms occurred in all natural water bodies. They are a major form of energy source between phytoplankton and other aquatic animals According to Dadhick and Saxena (1999) the zooplankton plays an integral role and serves as bio- indicators. Zooplanktons comprise the food source of organisms at elevated trophic levels (Gajbhiye, 2002). They occupy an transitional place in the aquatic food web (Altaff, 2004). It is a well suitable device for understanding water pollution status (Contreras *et al*., 2009). Due to their huge density, shorter lifespan, drifting nature, high species diversity and different tolerance to the stress, they are being used as indicator organisms for the physical, chemical and biological processes in the aquatic ecosystem.

A number of studies has been carried out on the condition of ecology and freshwater bodies in various parts of India (Smitha *et al*, 2007) but in some parts of Vidarbha region (M.S), the ecological studies of freshwater bodies especially zooplankton studies is very scanty. So the present study was undertaken to investigate the zooplankton diversity in Pujaritola lake through different months and season during the period June 2015 to May 2016 in order to assess the species composition, population density and seasonal fluctuation of this faunal group.

MATERIALS AND METHODS

STUDY AREA
Pujaritola is a village in Tirora taluka in Gondia District of Maharashtra state, India. It is situated 32 KM towards west from District head quarters Gondia. It is surrounded by Tumsar taluka towards west, Khairlanji taluka towards North, Gondia taluka towards East. Pujaritola is located latitudes 21.23 North and longitudes 80.43 East.

COLLECTION OF SAMPLE
Water samples were collected from lake every month during June 2015 to May 2016 in the morning between 6 AM to 7 AM. For collection of zooplanktons sample 25 litres of surface water passed through standard plankton net of bolting silk No. 25. The collected samples were preserved in 4% formalin solution and stored in 250 ml bottles.

The naming of zooplankton was made by using standard keys of Dhanapathi (2000) and Altaff (2004).The quantitative analysis of planktonic organisms was carried out using Sedgwick Rafter's plankton counting chamber.

OBSERVATION
As shown in Table 1 for month wise population density (No./lit) of unlike zooplankton groups from June 2015 to May 2016.

Cladocera: In this study two species out of 110 species recorded in India (Patil *et al*, 1989) were recorded. They play key role in food chain and energy transformation (Uttangi, 2001). The Cladoceran population showed minimum in monsoon, i.e. in June 40/lit and maximum in winter, i.e. in December 184/lit. This variation in

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population was due to favourable temperature and availability of food, while in monsoon the factors like temperature, turbidity, and transparency play an important role in controlling the diversity and density of Cladocera (Edmondson, 1965).

Copepods: In the present investigation, they were found to be maximum during summer, i.e. 130 in April and minimum during winter, 90/lit in October. They serve as food to several fishes and play a major role in ecological pyramids. Similar trend was observed in Renukalake, Himachal Pradesh (Chauhan, 1993).

Ostracods: In the present investigation one species of ostracods were recorded. Maximum ostracods population was recorded in summer, 89/lit in March month while minimum in monsoon, i.e. 23/lit in July. They occur in all kinds of freshwater and marine environments. The abundance of these provides a good food for aquatic organisms. Similar observations were also made in Fort Lake of Belgaum, Karnataka (Sunkad *et al*, 2004).

Protozoa: Two species had been reported from the Pujaritola lake where density was maximum in winter, i.e. 167/lit in December, while it was minimum in monsoon, i.e. 14/lit in June. They are both herbivores and consumers in the decomposer link of the food chain. They also control bacteria populations and biomass to some extent (Alcamo *et al*, 2009).

Rotifers: The rotifers are being considered as the most important soft bodied invertebrates (Hutchinson, 1991). The dominance of rotifers was reported in several water bodies. In this study population density of rotifers was maximum in winter, 280/lit in December and minimum in monsoon, 35/lit in June.

RESULTS AND DISCUSSION

Zooplanktons are fine indicators of changes in water quality, because they are strongly affected by environmental conditions and responds quickly to changes in environmental quality. Hence, qualitative and quantitative studies of zooplanktons are of great importance. The monthly and seasonal variations of zooplankton are tabulated (Table 1).

In the present investigation, total 11 species of zooplanktons were recorded. Two species belonging to Cladocerans were recorded as *Alona pulchella* and *Ceriodaphnia cornuta*. Three species of Copepods were recorded as *Cyclops strenuus*, *Diaptomus pallidus* and *Heliodiaptomus viduus*. Belonging to Ostracods one species *Cypris subglobosa* were recorded. Two species of Protozoa were found as follows; *Vorticella, Paramecium*. In Rotifera three species such as *Asplanchna*, *Brachionus durgae* and *Keratella valga* were recorded.

The physiochemical parameters such as temperature, light, pH, organic and inorganic constituents and the interrelationship with their organisms play an important role in determining the nature and pattern of fluctuation of population densities of zooplanktons. Maximum species richness was observed during winter season and minimum was during monsoon. The maximum species richness was observed in group Rotifera and minimum in group Ostracods. The total number of zooplanktons was recorded maximum in the month of December and minimum number observed in month of June (Table 1).

Table 1: Monthly population density (No./ lit) of different zooplanktons.

Month	Monsoon Season				Winter Season				Summer Season				Total
Groups	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	
Cladocera	40	108	120	110	127	162	184	108	87	98	56	44	1244
Copepoda	72	66	93	100	90	88	90	89	103	124	130	115	1160
Ostracods	23	12	55	32	46	35	08	24	70	89	75	60	529
Protozoa	14	36	49	105	149	135	167	132	113	95	90	62	1446
Rotifers	35	54	48	187	219	246	280	266	126	106	99	80	1746

CONCLUSION

The zooplankton investigation showed that, the total zooplankton density was more in winter season due to low temperature, favourable for phytoplanktonic growth as an abundance of food.

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ETHNIC WEALTH OF TRIBES DWELING IN DEORI TALUKA, DISTRICT GONDIA (MS)

K. P. Ghoshal
Department of Botany, M. B. Patel College, Deori

ABSTRACT
Deori is a tribal taluka belonging to Gondia district of Maharashtra state, covers a total geographical area of 1,21355 hectors. Amongst which 5,4456 hectors is forest area and 45694 hectors is reserve forest. The region is rich in biodiversity and the tribes residing here still practices herbal remedies for treating various ailments. The present paper enumerates the status and traditional uses of several plant species by the ethnic and rural people of Deori taluka, and an attempt is made of verify the efficacy of claims with actual beneficiaries.

Keywords: Deori taluka, Tribes, Ethnic

INTRODUCTION
Traditional medical practice has been recognized by the World Health Organization as a building block of primary Health care in tribal communities. A large number of ethno-medicinal information remains endemic to certain regions or people due to lack of communication (Mishra *et al*, 2008). Over 550 tribal communities are covered under 227 ethnic groups residing in about 5000 villages of India in different forest and vegetation types. Indigenous traditional knowledge is an integral part of the culture and history of a local community. It is evolved through years of regular experimentation on the day to day life and available resources surrounded by the community. This knowledge is handed over to generations through word of mouth and is extensively used for the treatment of various chronic and common diseases.

Gondia district is a tribal district comprising of 5,431sq.km of area and 08 talukas surrounded by 54,456 sq. km of forest area. People residing near forest areas still practices folk lore practices for treating various diseases. The folk culture is still vital in this region (Joseph *et al*, 2011). The tribes like Gond, Halbe, Dhiver still largely depend on their traditional system of medicines. They use numerous herbs for treating various ailments. They obtain raw material (plant parts or plant species) from the forest. Many species of these regions have revolutionized the allopathic systems of medicine, but with time the situation has reversed due to deforestation and uprooting the plants for fulfilling the requirements and craze for herbal globalization, the medicinal plants are under threat with the increased risk of loosing genetic diversity (Joseph 2011 and Balkrishna 2009). This could result in eradicating indigenous and traditional knowledge about methods of curing diseases from a particular plant species. Hence there is an urgent need to have a specific programme on medicinal plants; Research and Development programme for in-situ and ex-situ conservation, establish Germ plasm Bank, Documentation of traditional knowledge for database and development of Agro-cultivation techniques etc. for these regions.

ABOUT STUDY AREA
Geographically Maharashtra is located in the centre of North and South of India and is the third largest state with a geographical area of 307690 sq.kms and lies between 16°56' to 80°09'E longitude. Gondia district is situated in extreme eastern side of Maharashtra state, covering an area of about 5,431km square lying between North latitude of 20.39 and 21.38 and East longitudes of 89.27 to 82.42. Gondia district is a region to the south of Godavari river and the region is inhibited by arborigines. This region was ruled by Gond King and the rich dense forest reflects the culture of Gond people. The tribes used to collect lak (sealing wax) and gum from the forest. Gondia district is divided into two subdivisions Gondia and Deori. Almost half of the district has good forest cover with mountainous terrain, different grades of soil extreme climatic condition on one side and many rivers and rich biodiversity on the other side. Navegaonband National park and Nagzira wild life sanctuary adds beauty to the district.

The district has 8 talukas with temperature variations of very hot summers (48°C) and cold winters (10°C) with relative humidity of 62%, annual rainfall of about1200 mm/year. The study area Deori is subdivision surrounded by rich forest wealth. Deori taluka covers a total geographical area of 1,21,355 hectares amongst which 5445 hectares is forest area and 45,694 hectare area is reserved forest. People residing here still practices folk remedies for treating various ailments.

RESEARCH DESIGN AND METHODOLOGY
1. The traditional knowledge about the plants for treating the common diseases was collected from peoples, especially traditional healers and village medicine-men.
2. Monthly visit and interviews of local and tribal peoples of villages were carried out to assess the information regarding the wild medicinal plants and some of the threatened plants used for ethno-medicinal purpose.

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3. And their documentation was done to preserve their knowledge for future generation.
4. The collected plants were identified taxonomically using literature (Rendle, 1986) and the status of ethno-medicinal plants was compared with Red data book and other literature.
5. Voucher specimen collected from different sites is preserved as per suggested method.
6. Confirmation of the specimen was made with the help of floristic literature available.

In this way the data was generated by Ethno-botanical survey conducted with a view to gather information on medicinal plants used by the ethnic people of Deori taluka to treat various ailments. For a proper study, the sites were selected considering the population and density of flora. The data obtained includes list of medicinal plants with their correct botanical name, vernacular name, family, and plant part used is enlisted below.

According to the traditional healers some of the plant species which were threatened were compared with the Red Data Book and the other literature (Ugemuge, 1986 and Chaudhary, 2008) and the threatened plant were also recorded.

Table: List of Ethano-medicinal plants with their indigenous uses

Sr. No	Botanical Name with Family	Local Name	Part used	Name of Disease/Uses
1	*Adhtodavasica* Acanthaceae	Adulsa	Leaves, roots, flowers and	Cough and cold
2	*Mangiferaindica* Anacardiaceae	Amba	Leaves, barks, fruits and Seeds	Diarrhea, Dysentery
3	*Phyllanthusemblica* Phyllanthaceae	Awala Leaves	fruits and seeds	Vitamin deficiency
4	*Curcuma longa* Zingiberaceae	Haldi	Rhizomes	Anti-bacterial, Wound healing
5	*Aeglemarmelos* Rutaceae	Bel	Leaves, root and fruits	Antidysentery, diabetes
6	*Punicagranatum* Punicaceae	Darimb	Fruits and bark	Anti-dysentery, anemia
7	*Madhucaindica* Sapotaceae	Moha	Bark, heart-wood, fruits and seeds	Wounds, diabetes
8	*Tectonagrandis* Verbenaceae	Sagwan	Leaves and barks	Snake bite
9	*Buteamonosperma* Fabaceae	Palas	Barks, leaves, fruits, seeds and gums	Diabetes
10	*Ficusbenghalensis* Moraceae	Vad	Bark, leaves, fruits, seeds and latex	Anti-diabetic, wound
11	*Azadirachtaindica* Meliaceae	Kadunimd	Bark, leaves, flowers and seeds	Antibacterial
12	*Zizyphusjujaba* Rhamnaceae	Bor	Fruits	Vitamine-B
13	*Psidiumguajava* Myrtaceae	Jam	Leaves, fruits and root	Anti-diarrhea
14	*Terminaliaarjuna* Combretaceae	Arjun	Bark	Diuretic, Cardio tonic
15	*Ricinuscommunis* Euphorbiaceae	Yerandi	Leaves and seeds	Anti-swelling
16	*Acacia nilotica* Fabaceae	Babul	Pods, leaves, bark and	Dental use
17	*Ficusracemosa* Moraceae	Umbar	Fruits	Anti-helmentic

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18	*Pongamiapinnata* Fabaceae	Karanj	Leaves, flowers, seeds and	Wound healing
19	*Cynodondactylon.* Poaceae	Harari	Leaves	Astringent
20	*Alstoniascholaris* Apocynaceae	Saptparni	Leaves	Snake bite
21	*Pithecellobiumdulce* Fabaceae	Vilayati chinch	Fruits	Anti-oxidant
22	*Vitexnegundo* Verbenaceae	Nirgudi	Flowers and roots	Anti-inflammatory, Bone fracture
23	*Tridaxprocumbems* Asteraceae	Kambar modi	Leaves	Kraking foot
24	*Vincarosea* Apocynaceae	Sadafuli	Leaves and flowers	Leukemia
25	*Calotropisprocera* Asclepidaceae	Rui	Whole plant	Cough
26	*Hibiscus cannabinus* Malvaceae	Ambadi	Leaves and fruits	Sunstroke
27	*Allium sativum* Liliaceae	Lasun	Bulbs	Cough
28	*Ocimum sanctum* Lamiaceae	Tulas	Whole plant	Fever
29	*Terminaliabellirica* Combretaceae	Behada	Bark and fruits	Vomiting, skin diseases
30	*Momordicacharantia* Cucurbitaceae	Karella	Fruits and seeds	Diabetes, blood purifier and antihelminthic
31	*Aloe vera* Liliaceae	Korphad	Leaves	Abortifacient
32	*Andrographispaniculat a* Acanthaceae	Kalmegh	Leaves and whole plant	For digestion, Liver function, Whooping cough and Leprosy
33	*Bacopamonnieri* Scrophulariaceae	Brahmi	Root, leaf (whole plant)	Cataract, epilipsia, astringent
34	*Commelinaerecta* Commelinaceae	Kanseera	Leaf	Rheumatic, burn,sweelings, injuries
35	*Asparagus racemosus* Asparagaceae	Kurilo	Tuberous root	Diabetes, jaundice, urinary disorder
36	*Aconitum ferox* Ranunculaceae	Bikh, Bish	Tuberous roots	Cough, asthma, leprosy, fever snakebite, skin diseases
37	*Astilbe rivularis* Saxifragaceae	Buriokahti	Leaves/ roots/ Rhizome	Diarrhea, dysentery, blood purifier
38	*Adhatoda vasica* Acanthaceae	Asuru	Bark, root, leaf and flower	It is good insecticide, leaves & root expectorant & antispasmodic. It is used as remedy for asthma, cough, fever, gonorrhea leprosy, Phthisis
39	*Azadirachta indica* Meliaceae	Nimpati	Roots, bark, leaves, flower, fruits, seed &gum juice	As an anti-septic, treatment of small fox, as tooth brush, prophylactic for mouth & teeth, used as febrifuge
40	*Allium wallichi*	Ban Lasun	Leaves	Seasoning spices

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	Liliaceae			
41	*Aloe barbadensis* Liliaceae	Ghiukumari	leaves and flower	Used on burns, purgative, efficacious in treatment of leucoderma
42	*Alstonia scholaris* Apocynaceae	Chatiwan	Bark, latex and flower	Bark as tonic, in fever, skin disease in treatment of leucoderma.
43	*Amomum subulatum* Zingiberaceae	Elaichi	Seed	Stomachic, heart and liver tonic
44	*Bauhinia vahlii* Caesalpiniaceae	Verla	Seeds, bark and leaves	Seeds used as tonic, aphrodisiac, leaves demulcent, bark is useful in skin disease, diarrhea
45	*Bauhinia variegate* Caesalpiniaceae	Koirala	Flower / fruits	Flower juice is taken to cure dysentery, diarrhea & stomach pain. The flower buds are taken for skin disease & ulcer. Fruits are used for blood purification.
46	*Bauhinia purpurea* Caesalpiniaceae	Tanki	Flower, Roots and Bark	The astringent bark is used to control diarrhoea. The flower are laxative and root is carminative The bark root and flowers are also useful as maturant for boils and abscesses. Used against animal bite.
47	*Bombax ceiba* Bombasaceae	Simal	Root	Used for curing diarrhea & dysentery
48	*Calotropis gigantean* Asclepiadaceae	Ankh	Latex	Used in sprain & swelling
49	*Carica papaya* Caricaceae	Mewa	Leaf	The digestive enzyme papain is extracted from the milky sap.
50	*Cassia fistula* Caesalpiniaceae	Raj briksha	Fruits, leaves	The fruits are used for asthma, diabetes and eczema. Leaves used for treating skin diseases
51	*Cassia sp.* Caesalpiniaceae	Methizar	Leaf & root	The leaf powder is given to relieve indigestion & stomach pain. The root paste is used for ringworm
52	*Citrus indica* Rutaceae	Chaksi	Fruits	Stomach problems
53	*Costus speciosus* Zingiberaceae	Bet laure	Root	Useful in fever, bronchitis, anemia, rheumatism and diabetic
54	*Calendula officinalis* Compositae	Calendula	Flower, Leaves	It is antiseptic and antifungal, contains hormones and vitamin A. It is diaphoretic, stimulant, antispasmodic and small pox.It is also used in

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				healing wounds, ulcers, burns.
55	*Dolichos uniflorus* Papilionaceae	Gahat	Seeds	Seeds cure Measels, Chicken pox, tumors, asthma.
56	*Dioscerea bulbifora* Diascoriaceae	Gittha	Tuber	Aphrodisiac, stomachic, improves appetite
57	*Dichroa febrifuga Saxifragaceae*	Basak	Roots& Leaves	Fever, malaria
58	*Euphorbia royleana* Euphorbiaceae	Siwri	Latex	The latex is used to cure cuts & stop bleeding; It is also used to relieve earache, cough & asthma.
59	*Ferula narther* Umbelliferae	Hing	Gum	Gum used in asthma, cough, hysteria & epilepsy.
60	*Foeniculum vulgare* Umbelliferae	Sounp	Leaves, tender shoots, fruit	It is used as flavouring agent of foods, curries and salad. Seeds are good in digestion, removes stomach pain regulates menstruation, improves apposite, breast milk production

DISCUSSION AND CONCLUSION

Ethno-botany is multidisciplinary science defined as the interaction between plants and people (Chaudhary, 2008) which record the history and current state of human kind even while foretelling the future (7). The World Health Organization has already recognised the contributions of traditional health care in tribal communities.

The present study focuses mainly on plants species reported by the local people in and around the study area for their medicinal uses. The present investigation reveals about 50 medicinal plants collected from different sites used to treat various diseases (Table no 1). It was observed that some of the species like *Andrographis paniculata, Azadirachta indica, Butea monosperma, Syzygium cumini, Momordica charantia, Trigonella foenum-graecum, Aegel marmelos,Costus ignus, catheranthus roseus,Coccinia* were commonly used to treat deadly disease diabetes. Rest of the plants species were effectively used to treat various other diseases.

All the species collected contains valuable phyto-constituents which are useful to cure various human ailments. The survey data also shows that various plant parts like 30% leaves, 15% fruits, 13% roots/rhizomes, 10% of buds, flowers, 7% seeds, 5% of gum and latex were used in different preparation to treat diseases. It is therefore concluded that the people of the area possess good knowledge of herbal drugs but as the people are in progressive exposure to modernization their knowledge of traditional use of plants may be lost in due course. So it is important to study and record the uses of plants by the tribes and sub-tribes for future studies. Further such type of studies may provide information to biochemists and pharmacologists in screening and assessing phyto-constituents for the treatment of various diseases.

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THERMODYNAMIC PARAMETERS STUDY OF ASPIRIN BY CONDUCTIVITY METHOD

R. R. Tayade[1] and M. P. Wadekar[2]
[1]Department of Chemistry, Govt. Institute of Science, Nagpur
[2]Department of Chemistry, GVISH, Amravati

ABSTRACT
This research work deals with conductometric measurement Aspirin drugs at two different concentration 0.005M and 0.01M by changing the temperature. The thermodynamic parameters viz., Gibbs free energy (ΔG), enthalpy (ΔH) and entropy (ΔS) of analgesic and antipyretic drug (aspirin) were calculated from solubility of aspirin in alcoholic medium at different temperature. It was found that solubility and solubility product of aspirin decreases with decreased concentration in ethanol.

Keyword: Conductivity, Solubility, solubility product, thermodynamic parameters, etc

INTRODUCTION
It is well known that electrolyte solutions frequently obey Ohm's Law, where the conductance (reciprocal of the resistance) is the electrical property of the solution that establishes readily the inherent facility with which it transports electric charges, under the influence of an electric field , .The conductance depends on the temperature, the solution's composition, and the geometry of the electric field applied in reference to the solution. However, the electrical conductivity of the system can also be defined, which does not depend on the said geometry, Aspirin is analgesic and antipyretic drugs, typically used as mild to moderate fever and pain control. In the present research work conductance measurement was used for the study of influence temperature on solute-solvent interaction in alcoholic medium.

Conductivity method is used for the study of the dissolution of compound in mixed solvent system . Also it is an important tool to measure degree of disassociation of weak electrolyte, to measure degree of hydrolysis and for the analysis of the physicochemical properties of electrolyte in solution . Conductometric measurement at different temperature gives idea of solubility product of drugs. Which is useful to explain the thermodynamic properties aspirin in alcoholic medium. Molar solubility "S", solubility product "Ksp" and Gibbs free energy "ΔG" is determined from the following equation

$$Ksp = [A+]\,[B-] = S \times S = S2 \qquad ..(1)$$

$$\Delta G = -RT \ln (Ksp) \qquad ..(2)$$

Where "R" is the universal gas constant, 'T" is the absolute temperature and "ΔG" is Standard Gibbs free energy is related to "ΔH" and "ΔS" by following relation

$$\Delta G = \Delta H - T\Delta S \qquad ..(3)$$

The value of thermodynamic parameters are calculated at two different temperature T1=301K and T2 = 308K by considering temperature range 301K to 318K

MATERIAL AND METHOD
In the present research work, conductivity method was used for the study of the influence of temperature on solute-solvent interaction in alcoholic medium. All reagents are used such as Aspirin (E. Merck), Ethanol (E. Merck) each of these analytical grade reagent. These stock solutions were prepared in double distilled ethanol. Digital Conductivity meter ELICO (CM-180), JCE (LJ-101) magnetic stirrer, Thermostat (No.51633075, India) Pioneer Analytical Balance (SCPA64C) were used to carried out experiment.

0.01M aspirin prepared by M/1000 molecular weight into 100ml of ethanol.Solution of 0.005M concentration were prepared by considering 0.01M stock solution. And this solution was stirred for 30 minutes and then this solution was kept overnight to get maximum saturation. On next day the conductivity of different concentration solution were recorded at different temperature using digital conductivity meter. The solution was placed in water bath during the measurement of conductance and temperature was controlled by thermostat at a fixed temperature.

CALIBRATION OF CONDUCTIVITY METER
At the given reading of the conductivity cell the knob of the conductivity meter was adjust and the conductivity cell was dipped in conductivity water so that the calibration was done.

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DETERMINATION OF CELL CONSTANT

The 0.1 N KCl solution was prepared in 100 ml of distilled water then conductivity cell was immersed in a beaker which containing KCl solution and the conductance was recorded. that gives value specific conductance of KCl by considering following equation.

Cell Constant=Specific Conductance / Observed Conductance …(4)

Table: 1

Temp in K	Equivalence conductance(λ) of 0.1M KCl in $x10^{-3}$ Scm^2eq^{-1}	Observed conductance(λ) of 0.1M KCl in $x10^{-3}$ Scm^2equ^{-1}	Cell Constant (k) in cm^{-1}
301	13.24	14.78	0.8961
308	14.75	15.02	0.9820
318	17.02	17.24	0.9872

DETERMINATION EQUIVALENT CONDUCTANCE

It is defined as the conducting power of all the ions produced by dissolving one gram equivalent of an electrolyte in solution.It is expressed as Λ_e and is related to specific conductance as

$$\Lambda_e = \frac{\kappa \times 1000}{C} = \kappa \times \frac{1000}{M} \quad \ldots(5)$$

where C is the concentration in gram equivalent per litre (or Normality). This term has earlier been quite frequently used. Now it is replaced by molar conductance. The units of equivalent conductance are $Ohm^{-1}\ cm^2(gm\ equiv)^{-1}$.

RESULT AND DISCUSSION

Solubility is the amount of substance dissolved into the solution. If the compound is soluble in major extent it means that its dissolution is in large amount, i.e form large numbers of ion in a solution. that's why solubility is directly related to conductance of solution.

The solubility and solubility product of solutions of aspirin in alcoholic medium were calculated at 301K, 308K and 318K shown in the table no 2.

In general solubility of substance increases with temperature but from table 2 it is observed that solubility and solubility product decreases with temperature. This is because of association of aspirin molecule takes place when temperature of solution increases.

The plot-1 between concentration of aspirin and observed conductance tells that conductance decreases with decrease in concentration of solution this is because of less numbers of mobile ions present in a solution.

The plot-2 shows that solubility product is low when concentration is less but with increase in concentration solubility product increases.

Table 2: Conductance measurement of Aspirin solution at different concentration and different Temperature in Ethanol solvent

Temp(T) in K	Concentration in Mole/lit	Observed conductance(λ) of Aspirin in $x10^{-3}$ Scm^2equ^{-1}	Specific conductance (k) of Aspirin	Solubility (S)	Solubility Product (Ksp) $x10^3$	logKsp
301K	0.01	3.85	3.44	246.78	60.90	11.016
	0.005	1.78	1.59	114.09	13.01	9.474
308K	0.01	2.15	2.11	149.95	22.48	10.020
	0.005	1.98	1.94	138.09	19.06	9.855
318K	0.01	0.49	0.49	38.09	1.45	7.280
	0.005	0.34	0.34	26.49	0.70	6.553

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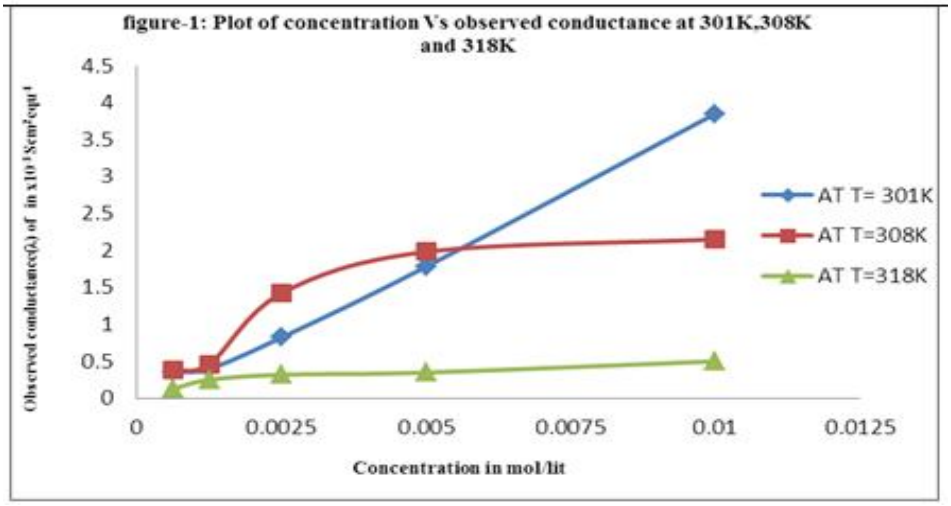

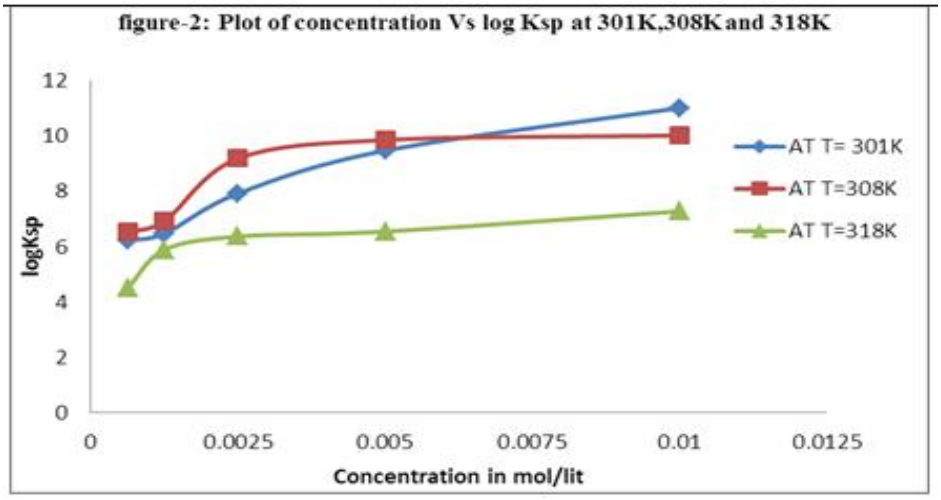

Table-3: Thermodynamic parameters of aspirin drug at different concentration & temperature difference

In between temp	Concentration in Mole/lit	ΔG in Joule/mole x 10^3	ΔH in Joule/mole x 10^3	ΔS in Joule/mole
301K-308K	0.01	-27.570	252.668	931.026
	0.005	-23.709	296.816	1242.881
308K-318K	0.01	-25.659	513.894	1751.8
	0.005	-25.238	619.255	2092.51

Form table no.3 it is observed that value of ΔG is negative in all cases which indicate process of dissolution of aspirin in alcohol is spontaneous and moving in forward direction. Spontaneity of reaction is depends upon magnitude of ΔG. If value of ΔG is higher greater is the spontaneity of reaction.

Positive value of ΔH indicate endothermic reaction and process of crystallization. Crystallization increases with increase in temperature.

ΔS is the measure of disorder or randomness. System is stable when value of ΔS is high. At high temperature molecule associate with energy which increase randomness of molecule, hence ΔS has greater value at high temperature.

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