

**STUDIES ON SOME PHYSICO-CHEMICAL CHARACTERISTICS OF  
GROUND WATER IN RURAL AREA OF SILLOD TEHSIL DIST.  
AURANGABAD FROM MARATHWADA REGION.**

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**ABSTRACT:** Assessments of hydro chemical parameters of domestic rural water supply samples report were carried out to characteristics. It studies about suitability for domestic appliances and even for use of agricultural purpose. Various hydro chemical parameters including physiochemical parameters (pH, turbidity, total hardness TDS and concentration of Nitrate, fluoride, Iron, Alkalinity) were determined during the study period. After analysis the results were compared with the recommendation limits of the World Health Organization (WHO, 2008), and all parameters compared with standards level of samples with the data from manual of Draft Indian Standard DRINKING WATER – SPECIFICATION (Second Revision of IS 10500). The results indicate that most of the samples shows excellent to good categories and are suitable for use of rural drinking purpose and also use of agriculture, irrigation purpose. Most of the water samples are not suitable for drinking and need treatment for irrigation; few samples are not suitable for any purpose because of pollution from different sources in the study area.

**KEYWORDS:** Physico chemical characteristc; Ground water; Rural area, Sillod.

**INTRODUCTION:**

Water is considered as universal solvent and most common liquid on earth. Whatever quantity available on earth of that only 2.5 % is fresh water .fresh water is basic source of drinking water for terrestrial life as well as some aquatic flora and fauna i. e. life .non contaminated cum safe drinking water is essential for human and life forms. All Indian people have right to adequate supply of safe and hygienic drinking water. In fact H<sub>2</sub>O doesn't provide calories and organic nutrients .however, life extinct without water. It is not only essential for life on earth but also is most important component of environment and economic growth, development of each nation. But India second largest country in world fallowed by China. So public water supply and its quality management is critical problem in India as well as developing nations. Water is primarily source of infectious diseases. The healthy aquatic ecosystem is depends on the physic-chemical and biological characteristics [1] (Venkateshraj et al 2010) About 80% infectious diseases are waterborne in developing countries as an average 50% deaths in children in India are water borne and 1/10<sup>th</sup> of each person's productive time is scarified to water related diseases. [2] (Manual for drinking water quality monitoring and assessment)

The present hydro biological studies are first attempt to investigate the status of rural ground water in various parts of Sillod tehsil. However there are no studies and water quality investigations published in journals from this region. Hence this comprehensive work provides database for future development and also management. Ground Water samples from various parts of Sillod tehsil are collected in two separate monsoon year July-2015 and July-2016. The collected

water samples are investigated by Public Health laboratory. The physical and chemical parameters are pH, Alkalinity Turbidity, Total Dissolved Solids (TDS) Total Hardness (TH) amount of Fluoride (F<sup>-</sup>) Nitrate (NO<sub>3</sub><sup>-</sup>) Chloride (Cl<sup>-</sup>), Iron etc.

#### BACKGROUND OF STUDY AREA:

Present study will be investigated with the rural freshwater drinking reservoirs around Sillod Tehsil, Dist. Aurangabad. Sillod is a major city and municipal council in the Aurangabad District of the Indian state of Maharashtra with an average elevation of 612 meters.

#### Latitude and Longitude of the Sillod city of India in other units:

Unit	Latitude	Longitude
Latitude and Longitude to decimals	20.0	77.0
Latitude and Longitude to degrees minutes seconds	20° 18' 0" N	75° 39' 0" E



Sillod Taluka has got four major districts near to it. In North there is Jalgaon 94 km far, in South West it has Aurangabad 65 km far, in South East there is a Jalna 67 km far in North East it has Buldhana 80 km far. As it has three main districts near to it the wholesale market in ginning and oil mills. The tehsil (administrative district) ranks number one in the production of maize (makka). Corn and maize cultivated in this area demand a special premium in the market [3] ([www.wikipedia.org](http://www.wikipedia.org)). Sillod is also a leading producer of corn, maize, chilli, cotton and ginger. The cultivation of major crops has changed over the last decade due to changes in the water landscape of the area. Prior to these changes the major crops were sugarcane, jowar, bajara (green millet) and cotton with very little cultivation of ginger.

#### MATERIALS AND METHODS:

**Sampling:** The drinking water samples were collected in two separate monsoon period July -2015 and July- 2016. The physicochemical parameters are pH, Turbidity, Total Dissolved Solids (TDS) Total Hardness (TH) Alkalinity (Alk) amount of Fluoride (F<sup>-</sup>) Nitrate (NO<sub>3</sub><sup>-</sup>) Chloride (Cl<sup>-</sup>), Iron etc. it is important to ensure that the water sample should be represent of the source to be examined and to avoid contamination of samples during sampling. Hence, proper procedure & methods should be adapted to collection and analysis. The analysis were carried out by standard method as described by National Rural Drinking Water Quality Monitoring and Surveillance Program-India (NRDWP) in Manual for Drinking Water Quality Monitoring and Assessment. BIS-Bureau of Indian Standards i.e. IS-3025/2488/1622. The representative water sample were collected from various parts of Andhari and Amthana block. The sample sources are tube well (Bore water), hand pump, Govt. as well as private well in Sillod Tehsil.

**Statistical methods:** Year wise (July-2015 and July-2016) arithmetic mean value of each parameter from two blocks are statistically calculated manually by more readable and formula.  $A = S/N$  Where A= Average (Arithmetic mean), S=Sum of all the numbers in list, N=Total numbers of atoms in list.

Note: 19 representative samples were analyses for 9 parameters. Minimum and maximum values each parameter has been calculated manually.

#### RESULTS AND DISCUSSION:

Block wise maximum and minimum values of each parameter presented in Table. 1 and 2. Comparison of each parameter with BIS: 10500:2009 shown in Table.3.



**Table: 1** Values of parameters in study period July-2015 and July-2016 Block: Andhari.

<b>BLOCK ANDHARI</b>						
<b>Sr. No.</b>	<b>Parameters</b>	<b>Year Mean</b>		<b>Statistical Parameters</b>		
		<b>Monsoon – 2015</b>	<b>Monsoon - 2016</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>
1	pH	7.9158	7.5526	7.2	8.5	7.7342
2	Alkalinity (mg/l)	124.74	88.421	30	280	106.5805
3	Turbidity (NTU)	0.1658	0.4021	0	0.94	0.28395
4	Chloride (mg/l)	57.105	51.842	15	180	54.4735
5	Fluoride (mg/l)	0.235	0.4828	0	1.12	0.3589
6	Iron (mg/l)	0.045	0.0479	0	0.18	0.04645
7	Nitrate (mg/l)	135.2	44.214	18	345	89.707
8	TDS (mg/l)	433.2	388.68	175	907	410.94
9	TH (mg/l)	217.4	171.05	70	430	194.225

**Table:2** Values of parameters in study period July: 2015 and July: 2016 Block: Amthana.

<b>BLOCK AMTHANA</b>						
<b>Sr. No.</b>	<b>Parameters</b>	<b>Year Mean</b>		<b>Statistical Parameters</b>		
		<b>Monsoon - 2015</b>	<b>Monsoon - 2016</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>
1	pH	7.9	7.4474	7	8.4	7.6737
2	Alkalinity (mg/l)	93.421	126.84	40	390	110.13
3	Turbidity (NTU)	0.3978	0.3832	0.01	0.9	0.3905
4	Chlorides (mg/l)	46.053	58.684	15	215	52.3685
5	Fluoride (mg/l)	0.2919	0.4463	0	0.99	0.3691
6	Iron (mg/l)	0.0422	0.03	0.008	0.26	0.0361
7	Nitrate (mg/l)	10.508	43.873	0.016	56	27.1905
8	TDS (mg/l)	554.26	558.47	272	1560	556.365
9	TH (mg/l)	236.84	217.89	90	480	227.365

**Table 3:** Comparison of ground water quality with drinking water standards BIS (Draft Indian Standard Drinking Water –IS: 10500:2009)

<b>Sr. No</b>	<b>Parameters</b>	<b>Andhari Block</b>			<b>Amthana Block</b>			<b>Standards of BIS: 10500:2009</b>	
		<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Required (acceptable limit)</b>	<b>Permissible Limit (in the absence of other source)</b>
1	pH	7.2	8.5	7.7342	7	8.4	7.6737	6.5 – 8.5	No Relaxation
2	Alkalinity (mg/l)	30	280	106.5805	40	390	110.1305	200	600
3	Turbidity (NTU)	0	0.94	0.28395	0.01	0.9	0.3905	1	5
4	Chloride (mg/l)	15	180	54.4735	15	215	52.3685	250	1000
5	Fluoride (mg/l)	0	1.12	0.3589	0	0.99	0.3691	1.0	1.5
6	Iron mg/l	0	0.18	0.04645	0.008	0.26	0.0361	0.3	No Relaxation
7	Nitrate mg/l	18	345	89.707	0.016	56	27.1905	45	No Relaxation
8	TDS	175	907	410.94	272	1560	556.365	500	2000



	mg/l					0			
9	TH mg/l	70	430	194.225	90	480	227.365	200	600

In the present study analyzed ground water samples showed the variable mean values of each parameter .most of them are desirable and acceptable limit but very few parameters are in undesirable and outside the acceptable limit.

1. **pH**-pH values of samples from Andhari block ranges from 7.2 to 8.5.whereas, samples from Amthana block pH values found varied from 7 to 8.4.(Table 1 and 2)
2. **Alkalinity** – total alkalinity of water samples from Andhari block shows yearly variation and ranges from 30 to 280 mg/L. whereas, alkalinity of samples from Amthana ranges from 40-390 mg/L. (Table 1 and 2)
3. **Turbidity**- Turbidity of all the water samples were under limits ranges between minimum 00 mg/L and maximum 0.94.
- 4.**Chloride** – the amount of chloride in ground water samples from both the regions are varied minimum 15 mg/L and maximum 215 mg/L in Amthana block in monsoon - 2016.(Table-2)
5. **Fluoride (F)**-amount of fluoride in ranges 0 to 1.12 mg/L .maximum Fluoride value 1.12 mg/l found in water samples collected from Andhari block in monsoon-2015. (Table 1, 2.)
6. **Iron (Fe)** - amount of iron as Fe varied from 0 mg/L to 0.26 mg/L .all the samples collected from two blocks in separate monsoon period showed acceptable limit of ferrous in drinking water maximum value found in Amthana block in monsoon -2015
7. **Nitrate (as NO<sub>3</sub>)**- during analysis of water samples from both the block amount of nitrate fluctuated between 0.016 mg/L to 345 mg/L.
- 8.**Total Dissolved Solids**-it ranges from minimum 175 mg/L and maximum 907mg/L in water samples collected from Andhari block whereas, in Amthana block showed minimum 272 mg/L and maximum 1560 mg/L
9. **Total Hardness** –in the present study total hardness as Ca CO<sub>3</sub> ranges from 470 mg/L to 480 mg/L. Maximum value as 480 mg/L found in Amthana block water sample in monsoon-2016.

## DISCUSSION:

The physico-chemical analysis of water samples collected from two different rural block 1. Andhari and 2. Amthana in monsoon-2015 and monsoon-2016 found variable values. Most of them are in desirable and acceptable limit as per Draft Indian Standard Drinking Water –Specification (Second Revision of IS 10500), and also referred to Manual for drinking water quality monitoring and assessment. Though few are in outside the acceptable limit but NO<sub>3</sub> found to be beyond the permissible limit.

**pH** of all the water samples are found to be slightly alkaline in nature (8.5) but not beyond the standard of BIS, our result supported by Lakew Wondimu Abhachire et al. [4] According to Harrison AD. And Hynes HBN [5] human activities in the form of washing cloths and other cleaning with detergents were responsible for increasing the pH of water. pH beyond 8.5 in drinking water will affects the .mucous membrane and water supply system. (Draft Indian Standard .IS:10500:2009)[6]

**Alkalinity** varied from monsoon to monsoon, minimum and maximum values are 30, 40-280, 390 respectively from two blocks. High value of alkalinity in study area might be due to poor rain falling and concentrated water bodies. These findings are similar to B. B. Tilekar et.al [7] noticed that alkalinity values were high during the summer and low in winter .the fall in values during monsoon may be due to dilution of water. We found out water sample having alkaline pH leads to more alkalinity.

**Turbidity (NTU)** in the present study all the samples were under the acceptable limit of turbidity i.e. under 1 (NTU).main cause of turbidity are clay slits, fine sand or soil particles ,planktons and microorganism. Medudhula. Thirupathaiah et.al. [8] reported that water turbidity from 0.5 to 10.5 NTU. Its findings supported by Dagaonkar and Saksera (1992) and Garg et. al. (2006 b) have also reported high turbidity during rainy season





**Chloride:** An amount of chloride is acceptable limit and ranges from 15 mg/L to 215 mg/L. A dietary intake of chloride for adults of 9 mg/kg of body weight has been recommended. (WHO) beyond recommends level in body hypertension might be arise. R. K. Garg and R. J. Rao et.al. [9] noticed that chloride concentration varied from 13.13-22.36 mg/l. Neerja Kalra and Rajesh Kumar et.al. [10] found out chloride limit maximum 57 mg/L samples collected from five blocks .

**Fluoride:** is a vital parameter to analyses its limit in drinking water. Excess limit in body associated with dental and skeletal fluorosis. However needed mount of fluoride in diet protects from dental caries especially in children's. In present investigation all the sample resulted desirable and under level as standards given in BIS and WHO. But only one water sample tested in monsoon-2015 from Takli (Kh) Andhari block found to be 1.12 mg/l but not beyond the permissible BIS limits (1.5 mg/l) In the World Health Organization's Guidelines for Drinking-Water Quality, a maximum of 1.5 mg F/L is recommended, [11] Dhanya Raj and E. Shaji et.al. [12] reported the high fluoride content in drinking water (up to 2.88 mg/L) and high salinity and is only confined to the Warkali formation. According to Maharashtra Human development report 2012. [13] Fluoride contamination above acceptable levels was found most frequently in Chandrapur, Yavatmal, Nagpur, Washim, Nanded, Parbhani and Beed and to a lesser extent in some other districts. Fuhong and Shuqin, [14] reported Fluoride concentrations in the groundwater of some villages in China were greater than 8 mg/liter.

**Iron (Fe):** is trace and essential element in human nutrition basically for Erythropoiesis. the ideal daily intake of iron in diet has been estimated to be in the range 15 to 22 mg. Drinking-water containing 0.3 mg/l would contribute about 0.6 mg to the daily [WHO and BIS-10500:2012] in case of gestation, mother consume at least 100 iron-folic acid tablets before term. [12]

In current analysis found out maximum iron 0.26mg/L which is lower than standards of WHO & BIS. Present findings are lower than the findings of Neerja Kalra and Rajesh Kumar et.al. [10] 0.83 mg/l iron in ground water. Amount of iron above standard limit 6.22mg/l noticed by Bagirtathi Behera and Mira Das [15] which was nearly similar to results of Ramesh. K. and Soorya Vennila [16].

**7. Nitrate (as NO<sub>3</sub>)** is major contaminant in ground water sources because it formed due to aerobic N cycle in nature .During analysis nitrate fluctuated between 0.016 mg/l to 345 mg/l. highest NO<sub>3</sub> 345 mg/l found in well water and many times over the prescribed limit of IS: 10500 as well as WHO guideline. It might be due to over and careless dose of N fertilizers in surrounding field. According to James R. Degnan, J. K. Bohlke and Krystle Pelham [17]

Fragmentation of bed rock with explosive for construction and mining is a potential source of NO<sub>3</sub> contamination of ground water, water quality status in Sillod taluka investigated by MPCB (during 2007-2011) reported maximum amount of NO<sub>3</sub> 107.0 mg/l .( MPCB-Maharashtra Pollution Control Board report April-2014) [18] Our findings was much more than the findings of Devendra pandey and Yashwant Katpatal [19] High NO<sub>3</sub> levels in water can cause "Methanoglobinemia" or "Blue Baby Syndrome", a condition especially found in infants under six months.

**Total Dissolved Solids-** Total Dissolved solids (TDS) are the concentration of all minerals in liquid except the water. Maximum values of TDS are 907, 1560 mg/l in ground water samples from Andhari and Amthana block res. And results are under the permissible limit prescribed in BIS. BIS desirable limit for TDS is 500 mg/l whereas permissible limit is 2000 mg/l. Current findings are higher than the findings of Bhagirathi Behera and Mira Das [15] 3555 mg/l TDS have been reported in ground water by Ramesh. K., Soorya and Vennila [16] Prolong intake of water with TDS level beyond the standard limit can cause the renal disorders.

**Total Hardness (TH)** –During the study period total hardness as Ca CO<sub>3</sub> ranges from 70 to 480 mg/l. maximum TDS value 480 mg/l has been found in water sample from Amthana block and same sample with high TDS. acceptable and permissible limits of total hardness in drinking water as per IS: 10500 are 200 and 600 mg/l. Nearly 12000 ground water



samples were analysed (by Ministry of Environment –Water Quality Check Program-1977-1993) [20] of which 5.4 % had hardness over 500 mg/l. Devendra Dohare and Shriram Deshpande [21] reported over limit of TDS in well water as compared to W.H.O standards.

## CONCLUSION:

The results of nine physico-chemical parameters were compared with Bureau of Indian Standards (BIS: 10500:2009) all the parameters are under the permissible limit prescribed in BIS: 10500:2009 except the concentration of NO<sub>3</sub> in water sources specially utilize for drinking purposes. Very few water samples found to be over NO<sub>3</sub> level highest NO<sub>3</sub> 345 mg/l found in well water, many times over the prescribed limit of IS: 10500 as well as WHO guideline. High NO<sub>3</sub> levels in water can cause "Methanoglobinemia" or "Blue Baby Syndrome", a condition especially found in infants under six months. Renal complains (Non heritable) more founds in individuals of Sillod taluka as compared to other territory. It might be due to over TDS in drinking water supply and lack of water filtration at house level.

As a result in this research vital concludes are –

- Over level of NO<sub>3</sub> might be due to over dose of fertilizers, disposal of animal manure legume crops, and domestic waste material around the drinking water sources. It should be avoided. However, Sillod tehsil is leading producer of cropping corn, maze, chilli and cotton. All these cropping pattern required regular and more appliances of fertilizer and pesticides. That can easily percolates water bodies.
- In order to have proper management and best possible filtration means should be use before its utilization. With the help of volunteer Gram panchayat should organize the program that brings awareness about hazards of polluted water especially in rural block.

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### **Analysis of some domestic species and their products in Ajanta hill ranges with reference to traditional medicine for health care in rural population.**

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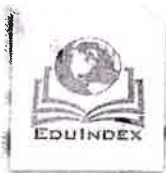
**Abstract:** This communication deals with the study of importance and use of domestic species of animals and birds in traditional health care system in Ajanta hill ranges of Aurangabad district in Marathwada region. During this research, the study area assessed the common knowledge of rural peoples regarding the domestic species in health care system. It is carried out through the standardized questionnaire, interviewing people from different villages from a total of 186 family background and socioeconomic status during this research. Three species of animals and two species of birds with domestic value, which are important and used in rural peoples for primary health care as well as for other purposes also. Meat, milk, urine and blood are most commonly used to treat common disorders such as hair crack bone fracture, cough, asthma and wound healing on the outside surface of the skin. Such findings are made in the study area that are used as a local remedial measures. It is therefore necessary to make rural people aware of the problems of the use of these animals, birds and their products against certain primary health issues. From the above analysis it is clear that such domestic species are of use to humans and are significantly help to conserve them.

**Keywords:** Domestic species, Ajanta, Traditional medicine, Health care, Rural population.

**Introduction:** According to the history of animals kingdom some of the species they are used for the domestic purpose to improve the economic status of the rural people. The common species of animals and birds as well as their products is also utilized for the purpose of traditional medicine against some common disorders of the health. The animals, birds and their products are also holding the medicinal properties that can be exploited for the benefit of human being like plants(Rajeev Vats et. al. (2015), The relationship of animals with human being since last 60







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years (Stricklin, W.R. 2001). In Ayurveda also there is description of use of several animal based drugs particularly from cow, buffalo, elephant, camel, ass, goat and sheep (Pandey V. N. 1996). The plants are most essential for medicine but animals and there products are also same important to cure disease (Oudhia P. 1995). The present study shows that the peoples of the villages in the study area referred to the use of several domesticated animals and birds as well as their products for improvement of various common disorders among the people. Compressive account provides vast wealth of traditional knowledge and healthcare (Holennavar P. S. 2015). After surveyed and observations it is concluded that the people of local communities in the study area they are used some common and domestic species of animals and birds for different purposes as well as including medicinal purpose against some common disorders of health in Ajanta hill ranges from the district Aurangabad, in Marathwada region of Maharashtra.

**Materials and Methods:** Ajanta hill ranges is nearby the Sillod tehsil place in the Aurangabad District and Marathwada region of the Indian state of Maharashtra. Ajanta hill ranges in Sillod tehsil has got four major districts near to it. In North there is Jalgaon, in South West it has Aurangabad, in South East there is a Jalna and in North East it has Buldana district of Vidarbha region. The topographical variation in the Ajanta hill ranges of Aurangabad district has resulted in to the diversity of habitats, flora and fauna includes various plant and animal species. From socioeconomic and cultural point of view Ajanta hilly area exhibits great diversity among community. Majority of the population belongs to Hindu community, followed by Muslim, Hindu community including Banjara, Bhilla, Koli, Rajput and others. Muslim community includes Tadavi and Mevati. All these communities are socioeconomically poor. Questionnaire method is used for the survey and collection of information regarding the knowledge about importance and use of domestic species of animals and birds and their products as a medicine against some common disorders of health

among the rural people in the study area. This method was used in the selected villages. About 186 peoples from different part of the study area were interviewed at personnel level. The peoples belongs to different communities, different age groups involve in the target group and





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through questionnaire survey, the information was collected on various aspects including the socio-economic status and family background of the people, the knowledge on the importance and use of domestic species of animals and birds, type of animal part or animal products that used for medicinal purposes, and for other purposes and the way of as a medicines are administered against some common disorders.

Results: The total 186 people of various communities are involve in this survey. After analysis of the data it was found that Hindu community responded positively about having traditional knowledge on importance and use of domestic species of animals and birds as a medicine followed by Muslim community. Among these people it was recorded that among the Hindu, the banjara community responded positively about having the knowledge on importance and use of domestic species of animals and birds for medicinal and other purposes followed by bhilla, koli, Rajput and other community. While Muslim community were actually catching or killing the domestic species of animals and birds and using them for medicinal and other purposes. The local people of different communities in the study area respondents that they used domestic species of animals and birds for different purposes. These animals belong to mammals and aves group i.e, birds. In the present study it was found that the people of this study area they use some common domesticate species of animals from mammals like cow, buffalo, goat and from aves or birds such as hen and pigeon against some common disorder of health.

Majority of the local people in the study area they use these species for their allied agriculture business to improve the economic status. While some of the caste of hindu community and muslim community they use the domestic species of animals and birds and their body parts or products are used for their food as a highly nutritious value and also for treating the various common disorders in human being (Table 1). These local people use different body parts or products of these domestic species of animals and birds for medicinal purposes against different common disorders occurring among the peoples and for food to recover and to gain various nutritive elements in the body in different ways.



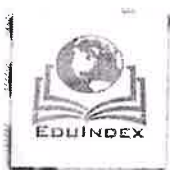


Table: 1. Traditional knowledge on importance and use of domestic species of animals and birds and their parts/ products for the beneficial effect on the health of the rural population.

Sr. No.	Name (English)	Name (Local)	Name (Scientific)	Used parts/products	Mode of medicinal use
01	Goat	Bakara	Capra hircus	Milk Meat	Used for recovery of calcium deficiency and maintain the blood pressure. Recovery of Mouth ulcer.
02	Cow	Gai	Bos Taurus	Urine	Used for recovery from the weakness by fever.
03	Buffalo	Mhais	Bubalus bubalis	Dung	Used as insecticides.
04	Hen	Kombadi	Gallus domesticus	Blood Meat	Used for massaged on the aching part of body. To improve the protein content in the body.
05	Pigeon	Kabutar	Columba livia	Blood	Used for massaged externally to recover the minor paralysis.

The domestic species of animals and birds have rich in protein contents therefore their consumption is provided protein to the poor population for improvement in the health status and ultimately it acts as a medicine against some common disorder among the poor population. Thus improvement in the health status and recover the commonest disorder with the help of domestic animals and birds species. Blood and meat of the common consumable domestic species of







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animals and birds are most commonly used animal products to treat various illnesses among the peoples.

Discussion: Rural population from the study area used some common domestic species for health care these finding are more or less correlated to the findings of (Leena Gupta et. al. 2003) they reported that near about 34 animal and bird species, including 28 wild and 6 domestic, which are used in primary health care needs of human beings and livestock and for other purposes and (Negi et. al. 2007) reported that 38 species from mammals 20, birds 6, reptiles 5, insect 4, fishes 2 and amphibian used to treat approximately 19 different diseases. (Kakti et. al. 2006) reported that near about 25 different vertebrate species used to medicine therapeutic in Nagaland. These local people of the study area use different body parts and products of domestic species for medicinal purposes against some common health disorders these findings are more or less similar to the finding of (Chakravarty et. al. 2011) In Arunachal Pradesh tribes and villagers 32 different vertebrate species for medicinal purpose from animals 50% are mammals, birds 22%, and fishes 17%, reptiles 8%, ambhibian 3%. Blood and meat of domestic species are commonly used to treat against some common diseases by the people in the study area, these finding are more or less similar to the findings of (Leena Gupta et. al. 2003) they are reported that blood and flesh are most commonly used animal products to treat diseases such as asthma, cough, rheumatism and healing of external injuries. Thus common domestic animals and birds species based medicines have played a very important role in the overall health care of the people. (Rajeev Vats et. al. 2015) reported that animals and their products are also holding the medicinal properties that can be exploited for the benefit of human being like plants, during this study they verity of 30 different medicines from 42 animal's species for stoppage bleeding, reproductive disorders, asthma, weakness, tuberculosis, cough, paralysis. Includes species belongs to 17 mammals, 7 birds, 4 reptiles 8 arthropod, 2 molluscs etc. Along with the natural treatment by utilizing these species as a food as well as treating against the common diseases among the rural peoples, it also help to reduce or to minimize the health related problems such as body pain, wound healing on the external surface of the skin, healing of hair crack fractured bones, these





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findings are more or less correlated to the findings of (Pandey 2015) reported that near about 109 animals are used to 270 medicine purpose in India and most of the used to cure respiratory problem such as asthma, cold and cough. Therapeutics uses of animals and their products were recorded by (Madan Mohan, et. al. 2006), they used for different ethno medical purposes including tubercularasis, asthma, paralysis, jaundice, earache, constipation, weaknesses, snake poisoning.

Conclusion: From the above study and observation it is concluded that the common domestic species of animals, birds and their products are used directly or indirectly as a local remedial measure against some common disorder by the peoples. It also beneficial to the human being in the form of different manners. So it is necessary to aware the rural people regarding the use of this animals, birds and their products against some health disorders. We hope from this study the information will be helpful in the further study in the field of pharmacology and conservation of these common domestic species of animals and birds.

Acknowledgement: Authors are thankful to Principal, Y. C. College, Sillod, Dist. Aurangabad (M.S.) India for providing laboratory and library facilities and also thankful to the rural people in the study area for their cooperation and help during the work.

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**EFFECT OF *MERCURIUS CORROSIVUS* - A HOMOEOPATHIC MEDICINE AGAINST COCCIDIOSIS OF BROILER CHICKS AND INVESTIGATIONS ON HISTOCHEMICAL CHANGES IN INTESTINAL TISSUE.**

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**ABSTRACT**

The present work deals with the effect of homoeopathic medicine *Mercurius corrosivus* on experimental caecal coccidiosis of broiler chicks, which was induced by the dose of 50,000 sporulated oocysts of *Eimeria tenella*. The treatment of various potencies of *Mercurius corrosivus* was given to four infected groups of broiler chicks. Histochemical analysis of intestinal tissue was carried out in different groups. The lipid content varied in different regions of the intestinal tissue, as well as in different groups of broiler chicks. The amount of fat in normal uninfected intestinal tissue was high whereas it decreased in highly infected and untreated groups. The lipid content in intestinal tissue of treated broiler chicks was relatively high, than that in untreated group. The effect of homoeopathic *Mercurius corrosivus* in this respect has been discussed.

**Key words:** Homoeopathic medicine, coccidiosis, broiler chicks, histochemical changes, intestinal tissue.

**Introduction:**

*Eimeria tenella*, causes caecal coccidiosis in poultry by infecting epithelial cells of the intestine. In this context Narhari (1996) and Madrewar (1996) have suggested homoeopathic drug treatment to control coccidiosis. During present investigation, the same was used to treat healthy and disease induced poultry animals. For comparison, anticoccidial drug, Amprolium (Merck) was also used in the experiment.

**Materials and Methods:**

Two hundred and ten a days old white leghorn broiler chicks, vaccinated against Marek's disease were procured from a commercial hatchery. After maintenance for 3 weeks, those were kept on starter and finisher ration for three weeks each. The birds were then randomly divided into seven groups of 30 birds each. Group A served as healthy control,

while groups B to G were infected with 50,000 sporulated oocysts of *E. tenella* on 23<sup>rd</sup> day of age. Out of these, Group B was infected untreated, and group C was infected and allopathic drug Amprolium treated. Group D to G were infected and treated with homoeopathic medicine *Mercurius corrosivus* of 30X, 200X, 1M and 10 M potency treated respectively. The treatment was given from 3 to 5 days after infection. The birds from each group were observed up to the age of sixth week.

The intestine of dead and scarified birds were subjected to histochemical examination for lipid content. For this purpose, suitable pieces of intestine were collected and fixed in buffered neutral formalin (Singh, and Sulochana, 1997). The tissues were processed to obtain paraffin sections of 7 micron thickness (Mukharji, 1990) and stained with sudan black-B stain. Presence of lipid was indicated by the presence of black-brown colour.

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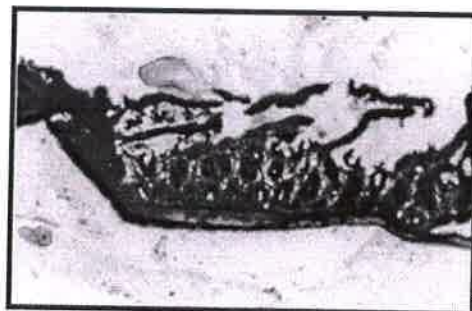
### Results and Discussion:

Histochemical examination of normal intestine showed high concentration of lipid in villous tissue, moderate in connective tissue while low in muscular layer, mucosa, and sub mucosa. (Plate: 1). On 5th day of post infection, intestinal tissue of infected and untreated group B showed presence of lipid content in muscular layer, mucosa and sub mucosa in moderate concentration. The intestinal tissue

of infected and allopathic Amprolium treated group C showed high amount of lipid in villous tissue. However, the muscular layer, mucosa, sub mucosa showed low concentration of lipid content.

The intestinal tissue of infected and homoeopathic medicine *Mercurius corrosivus* 30X potency treated group D showed variation in the lipid concentration. In the muscular layer, mucosa and sub mucosa showed low concentration of lipid content. The villous tissue showed low concentration of lipid content.

**Plate 1: Transverse section of normal intestine uninfected (healthy) showing the distribution of lipid content (Group A)**



**Group A (40x)**

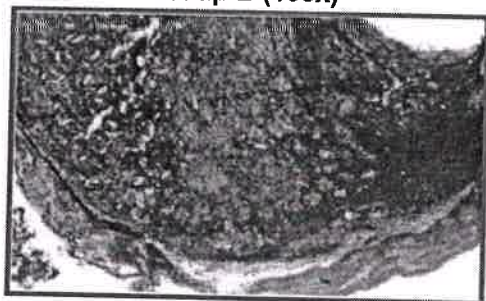
**Plate 2: Transverse section of intestine showing lipid distribution in infected group B and infected treated group C, D, E, F and G on 5<sup>th</sup> day post infection.**



**Group B (100x)**



**Group C (40x)**

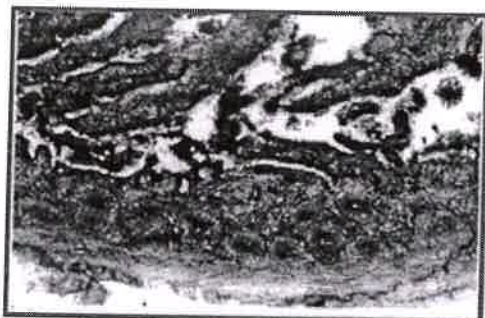


**Group D (100x)**

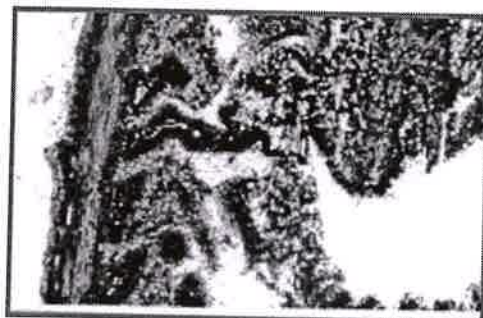


**Group E (100x)**





Group F (100x)



Group G (100x)

The intestinal tissue of infected and homoeopathic medicine *Mercurius corrosivus* 200X potency treated group E showed high concentration of lipids in some places of villous, however, low concentration of lipids was shown in muscular layer. The intestinal tissue of infected and homoeopathic medicine *Mercurius corrosivus* 1M potency treated group F also showed high concentration of lipid content in villi and glandular tissue, while moderate in muscular layer. The intestinal tissue of infected and homoeopathic medicine *Mercurius corrosivus* 10M potency treated group G showed high concentration in the villi and lower in muscular layer but showed dark colour in villous tissue. (Plate: 2). The lipid content differed in different region of the tissue.

It can thus be concluded that the efficacy of different potencies of homoeopathic medicine, *Mercurius Corrosivus* shows better effect in terms of histochemical examination, particularly the lipid content in intestinal tissue of broiler chicks as compared to other groups.

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## BIOSENSORS AND FOOD TECHNOLOGY

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**Abstract:** Food industry is an important and growing industry in the world. Food safety is also an important part of the industry. This demand of society can be overcome with the help of application of Biosensors in food industry. Biosensors are used for various purposes like processing, preserving, and packaging. Biosensors are safe and fast to use in the food industry. Biosensors are small, safe and easy to handle. It is a sensitive device and works in a cost-effective manner. Present review paper includes the applications of biosensors in food Technology.

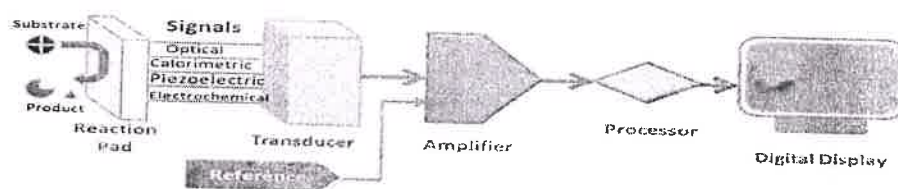
**Key words:** Biosensors, Food Safety, Food Technology, Applications.

**Introduction**

Food is a basic need of living animals. Food provides nutritional support to the body. As the population is going on increasing rapidly the need of food also increasing. Fast life of human requires the packed and safe food. There is a global importance of food safety. This is due to sub equality foods being linked to increased morbidity, mortality, human suffering, and economic burden [1]. This demand of society can be overcome with the help of biosensors. Biosensors are examples of new, innovative methods. It became a powerful instrument in clinical, environmental and food analysis by tackling old but important problems [2]. Biosensors are used for various purposes in food industries. It is widely used in food processing, food production, food safety, security food packaging food supply. It is fast and safe process in food technology. Extensive development of biosensors for food safety and quality control were stimulated by acquiring several new food safety and key quality concepts during the last decade, such as Hazard Analysis Critical Control Points (HACCP), [3]. Total Quality Management (TQM), and ISO 9000 Certifications. The wave of terrorist acts and foodborne disease outbreaks has raised the importance of the food traceability and authentication [4, 5]. There are specific safety problems (pathogenic micro-organisms, BSE, GMF, pollutants, etc.) that require intensive control, data logging, and data treatments, which can be controlled effectively only with the new generations of bio detection systems [6]. All these tasks require rapid response sensors for new integrated data analysis systems and is an indispensable part of the modern supply chain operation paradigm

**Biosensors**

Biosensors are the short of 'Biological Sensors'. The concept of biosensor was first introduced in 1960 and in 1962 Leland C. Clark presented the model of biosensor with the help of enzyme electrodes. It consists of two main parts: Bioreceptor and Transducer. Transducer is main key component of Biosensor. It makes use of a physical change accompanying the reaction. Biosensors utilize biological molecules or living organism to identify chemicals. General working principle of a biosensor is shown in the fig. 1





Several newly developed techniques ranging from electrochemical, optical including fluorescence-based, and electromechanical are modern transducing methods, which are widely utilized in the development of biosensors [7]. It is easily available and with low cost.

### **Biosensors and Food Industry**

The food industry has a general need for methods which are simple, rapid, inexpensive, readily available, stable reagents and are ideally automated [8]. Biosensor Technology in Food Industry offers a new and rapid type of monitoring and measuring device. Electrochemical biosensors allow for the measurement of at least 90 substances like Amino Acid, Gases, Cofactors, Carboxylic Acid, Antibiotics, Sugar, Starch, Alcohol, Phenols, and Vitamins etc. [9]. Biosensors can be used in Wine, Beer, Yogurt and soft drink producer Industries. Immune-sensors have important potential in ensuring food safety by detecting pathogenic organism in fresh meat, poultry or fish. [10].

### **Food Packaging**

Biosensors and its potential applications are an emerging technology in food packaging. This Technology may be used to enhance the safety and quality of food product in packaging system. The main functioning of sensors in packaging is to maintain the hygiene of the surrounding, product status, data exchange with the external database providing information for decision making of the food stuff [11]. Biosensors are used in the direct and indirect detection of pathogens of food stuffs [12].

### **The Heavy Metals**

Biosensors are used for detecting heavy metals such as: lead, mercury and cadmium down to the EPA limit for these metals in drinking water, food packaging samples such as rice bags and other food products. [13].

### **Agrochemicals of Food**

Numerous pesticides are used in the field to protect the crop and to increase the yield. These pesticides and chemicals can be detected by the biosensors and food quality [14].

### **Unpermitted Chemicals and Nutrients in Food**

Unpermitted chemicals are often added in milk or milk products. This contaminated milk can be studied with the help of biosensors [15, 16]. Nutrients of food and chemicals in food products can be detected with the help of biosensors. [17].

### **Food processing**

Process control in the food industry is more difficult than in other industries due to the utilization of more complex and variable raw materials having measured parameters which are often difficult to define [18].

### **Conclusion**

Several different types of biosensor are used in food industry. Food hygiene, processing, safety, purity can be easy and cheaper with the use of biosensors. This article focused on different types of biosensors in food industry. Each biosensor has its own applications, characteristics, advantages and disadvantage in terms of the equipment required, sensitivity, simplicity and cost-effectiveness. Use Biosensors in food industry in a simple effective technique.

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# NEW SPECIES OF THE GENUS DAVAINA (CESODA : DAVAINIDAE) FROM STREPTORETIA SENGELANSIS

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DEPARTMENT OF ZOOLOGY, BHAGWAN MAHAVIDYALAYA, ASHTI



## ABSTRACT :

The present communication deals with the description of a new species *Davainea singhi* n.sp. which is having the characters, scolex small, dome shaped, with four suckers, with armed rostellum, suckers are medium, oval, arranged in two pairs. The rostellar hooks small, single pronged, having two rows of rostellar hooks, in each row 90 rostellar hooks total number of hooks 180 which are straight, curved, with pin head shaped base. Neck short, mature segments medium in size, broader than long; testes 77 in number, Cirrus pouch medium, cylindrical, elongated, placed at  $1/4^{\text{th}}$  from the anterior margin of the segments; ovary is medium, distinctly bilobed obliquely placed, situated anterior to the middle of the segments mostly in the aporal half of the same, with irregular margins, with 6-8 short, blunt, round acini; vagina is thin tube, placed posterior to the cirrus pouch; vitelline gland is large, bean shaped, elongated, postovarian, having knotch at the anterolateral side; genital pores small, oval, marginal, unilateral,  $1/4^{\text{th}}$  from the anterior margin of the segments; gravid segments medium, squarish, broader than long, bears numerous uterine capsules 2 to 11 eggs are present in different capsules; uterine capsules are large, oval.

Key words : cestode, New species, *Davainea*, *Gallus domesticus*.

## MATERIAL AND METHOD :

Nine specimens of the cestode parasites were collected from the intestine of Dove, *Gallus domesticus* at Paranda Tal. Paranda Dist. Osmanabad, India. All the worms were flattened, fixed in 4% formalin, stained with Harris haematoxylin, passed through various alcoholic grades and mounted in D.P.X. Drawings are made with camera lucida. All measurements are in millimeters.

## DESCRIPTION:

All the worms were small, having thin musculature, with scolex, numerous immature and mature proglottids.

The scolex is medium, dome shaped, broader anteriorly, narrow posteriorly, distinctly marked off from the strobila, with four suckers and armed rostellum and measures 0.335-0.409 in length and 0.296-0.359 in breadth. The suckers are small, oval arranged in two pairs, one pair in each half of the scolex, suckers of one pair overlapping on each other, where as suckers of another pair not overlapping, but adjacent to each other and measure 0.063-0.067 in length and 0.058-0.063 in width. The rostellum is medium, oval armed with hooks and measure 0.150-0.189 in length and 0.102-0.146 in width. The rostellar hooks small, single pronged, having two rows of rostellar hooks, in each row 90 rostellar hooks total number of hooks 180 which are straight, curved, with pin head shaped base and measure 0.009-0.018 in length and 0.001 in breadth. The neck is short, squarish, broader than long and measure 0.078-0.087 in length and 0.029-0.040 in width. The mature proglottids are medium, broader than long, almost two times broader than long, with short, blunt, round, big projections at the posterior corners of the segments and measure 0.409-0.447 in length and 1.010-1.097 in width.

The testes are medium, oval 77 in number, almost evenly distributed, in the central medulla, laterally bounded by the longitudinal excretory canals and measure 0.034-0.058 in length and 0.024-0.029 in width.

The cirrus pouch is medium, cylindrical, elongated, placed at  $1/4^{\text{th}}$  from the anterior margin of the segments, narrow proximally, broad distally, obliquely placed, anteriorly directed, curved posteriorly, short, not reaching up to the longitudinal excretory canals and measures 0.102 in length and 0.019-0.029 in breadth. The cirrus is thin tube, coiled, contained within the cirrus



pouch and measures 0.019 in length and 0.005 in width. The vas deference is thin tube, medium in length, coiled anteriorly directed and measures 1.238 in length and 0.005 in breadth.

The ovary is medium, distinctly bilobed obliquely placed, situated anterior to the middle of the segments mostly in the aporal half of the same, with irregular margins, with 6-8 short, blunt, round acini and measures 0.155-0.189 in length and 0.087-0.126 in breadth. The isthmus is short, wide, obliquely placed at  $1/3^{\text{rd}}$  from anterior margin of the segments, longer than broad and measures 0.092 in length and 0.024 in width.

The vagina is thin tube, placed posterior to the cirrus pouch starts from the genital pore, runs slightly obliquely, directed anteriorly, crosses the longitudinal excretory canals, runs transversly for a long distance, then turns posteriorly crosses the isthmus, reaches and opens in to the ootype and measures 0.611 in length and 0.010 in breadth. The ootype is small, round, postovarian, situated in the concavity of the ovarian lobes and measures 0.029 in diameter.

The vitelline gland is large, bean shaped, elongated, postovarian, having knotch at the anterolateral side and measures 0.097-0.102 in length and 0.053-0.067 in width.

The genital pores small, oval, marginal, unilateral,  $1/4^{\text{th}}$  from the anterior margin of the segments and measures 0.019 in length and 0.019 in breadth.

The longitudinal excretory canals are narrow and measure 0.005 in width.

The gravid segments medium, squarish, broader than long, bears numerous uterine capsules 2 to 11 eggs are present in different capsules and measures 0.787-0.826 in length and 1.500-1.546 in width

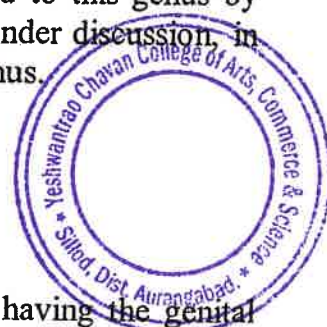
The uterine capsules are large, oval and measures 0.136-0.212 in length and 0.136-0.159 in breadth.

The eggs are small, oval and measures 0.038-0.068 in length and 0.038-0.068 in breadth.

#### DISCUSSION:

The genus *Davainea* was established by Blanchard, 1891 (Davaine, 1860) as a type species *Davainea proglottina* from *Gallus domesticus*. Later on 15 species are added to this genus by different workers in the world. After going through the literature, the worm under discussion, in having the testes 77 in number comes closer to the following species of the genus.

1. *Davainea paucisegmenta*
  2. *Davainea nana*
  3. *Davainea tetraoensis*
  4. *Davainea retharei*
  5. *Davainea thapari*
1. The present tapeworm, differs from *Davainea paucisegmenta* which is having the genital opening unilateral, diameter of the scolex 0.70, diameter of sucker 0.01, length of cirrus pouch 0.20, number of testes 40 and collected from the host *Numida ptilorhyncha*.
  2. The present cestode, differs from *Davainea nana* which is having the genital opening regularly alternate, diameter of the scolex 0.342, diameter of the sucker 0.046, length of hooks on rostellum 0.01, number of rostellar hooks on rostellum 170-200, length of cirrus pouch 0.34, number of testes 50 and collected from the host *Numida ptilorhyncha*.
  3. The present cestode differs from *Davainea tetraoensis* which is having the genital pore regularly alternate, diameter of scolex 0.20, diameter of suckers 0.04, length of hooks on rostellum 0.009, number of rostellar hooks on rostellum 120-130, length of cirrus pouch 0.18-0.22, number of testes 30 and collected from the host *Tetrao urogalli*.
  4. The present cestode differs from *Davainea retharei* which is having the genital opening regularly alternate, diameter of the scolex 0.163X0.142-0.171, diameter of sucker 0.043-0.048X0.027-0.037, length of hooks on rostellum 0.003, number of rostellar hooks on rostellum 35-4, length of cirrus pouch 0.180, number of testes 45-75 and collected from the host *Streptopelia decaocta*.
  5. The present cestode differs from *Davainea thapari* which is having the genital opening unilateral, diameter of the scolex 0.0562X0.123-0.388, diameter of the sucker 0.116-



0.135X0.116-0.126, length of hooks on rostellum 0.053-0.063, number of testes 20-25(21) and collected from the host *Gallus domesticus*.

The above noted characters, are enough to erect a new species, for these worms and hence the name *Davainea singhi n.sp.* is proposed after the locality.

Type species : *Davainea singhi n.sp.*

Host : *Gallus domesticus*

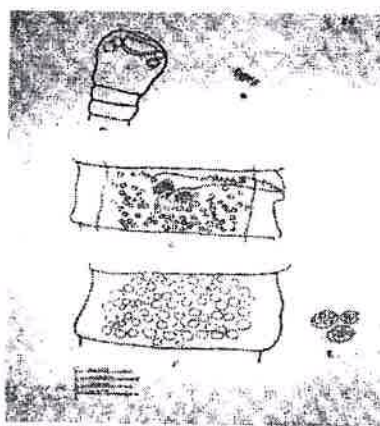
Habitat : Intestine

Locality : At. Paranda, Dist. Osmanabad, India.

**Type specimens** : Holotype and paratype are deposited in Helminthology Laboratory, Department of Zoology, Dr. B. A. M. University Aurangabad.

#### ACKNOWLEDGEMENT :

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### A REVIEW ON FUNDAMENTAL RESEARCH OF ANIMAL REGENERATION

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**Abstract:** The basic terminology of regeneration is the specialized feature of metazoan animals to recover body parts that was lost. In another term it is a fundamental property of body to restore injured tissue. 2004 years ago Aristotle first noticed that lizard regrow a lost tail. For regrow the mechanism responsible cell signalling by both ways as extrinsic and intrinsic pathway. A various research on regeneration following that number of vertebrates and invertebrates animals shows greatly regeneration even certain mammalian organs. Amazingly stem cell produces billion of cells every day in our body. The animals shows variation in regenerative capacity through phylogeny ontogeny and aging. still research is going on why some animals regenerate and other apparently not? In the nature regeneration followed by three ways such as epimorphosis is characteristic of regenerating limbs, morphallaxis regeneration occurs repatterning of existing tissues, and there is little new growth and compensatory regeneration the cells divide, but maintain their differentiated functions. Recently molecular genomics studies shows variety of genes helps during regeneration such as the MRF4 and myf5, msx1, Egr1 (Krox24), JunB, Myc, Fos11, and I-Kappa-Ba (Nfkbia) Hoxa and Hoxd gene along numerous growth factor. On other hands scientists have successfully find out key to regenerate nerves and spinal cord of human body (neuroregeneration). The regeneration biology is the future of Life Science if whole idea about mechanism of naturally regeneration discovered then possible to applying this knowledge in medical science will be cure and treat number of disease, and it will be mostly helpful for the health of human races. In this present paper analysis of regeneration in different animals along with the theories and experiments on regeneration carried out by various researchers. After review of related research papers it shows that specific cellular responses is the most essential for regeneration of tissue and also found that certain unique specialized genes are work during regeneration pathway.





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**Keywords:** Animal regeneration, Metazoan animals, Molecular genomics, Research.

**Introduction:** The active focus of biological research on regeneration at the end of 18<sup>th</sup> century and the beginning of 19<sup>th</sup> century early history of regeneration research, (Morgan 1901; Emmel 1905; Dinsmore 1991, 1996). By the over pass of 1960s works on regeneration process is the development in general. At the natural phenomenon of regeneration is characterized by abiotic and biotic effects( Emmel 1905) recorded that head of hydra grows faster in the warmer environment. While Spallanzani (1768, cited in Dinsmore 1996) stated that nutrient limitation could alter rates of regeneration), In 1712, Reamur suggested that small eggs existed underneath a lost leg, and once that leg was removed, these eggs would re-create the lost appendage. Plufger (1883, cited in Emmel 1905) suggested that food material was taken up at the wound surface and organized into the substance of a new leg. In 1740, Abraham Trembley (1710±1784) discovered an microscopic animals tentacles regenerate completely, Trembley gives name Hydra. In 1766 the Peter Simon Pallas (1741±1811) reported singular regenerative properties of "obscure" species of animals, today known that animals as the planarians. Lazzaro Spallanzani (1729±1799) published amphibian tadpoles were able to regenerate tail while salamander as jaws, limbs, tails and eyes. Researchers are trying to understanding polarity, patterning, and the control of size and proportion in animals. But now in current century with the advanced techniques genetic engineering and genome sequencing of biological significance and molecular mechanisms solving this remarkable phenomenon. Researcher carrying out there experiment on animal model such as Drosophila, axolotls, pleurodeles and other salamander, Caenorhabditis elegans, zebrafish, Xenopus, chickens and mice. understanding would shed light on issues such as tissue polarity, patterning, and the control of size and proportion in animals, what do we biologists in the age of genetic engineering and genome sequencing projects know about it? Surprisingly, we know little about the biological significance and molecular mechanisms underpinning this remarkable phenomenon. In fact, of all long-standing biological problems, regeneration is one of the least understood. The basic fundamental regenerative processes happened may be part of the normal life cycle of an animal whereas others are due to external, largely unpredictable, causes, such as injuries. Regeneration is the example of postembryonic morphogenesis which occurred in adult animals. This one shows to repair part after injury.





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although development is a universal feature of metazoans, this is not the case with regeneration. Not only all adult animals regenerate their primary and secondary part and not found all phyla its demonstrated by (Hughes 1989, S'anchez Alvarado 2000). In this review article, we firstly we will mentioned the meaning of the phenomenon of "regeneration" and we will display that its comparatively different types of processes. Then we will discuss on differences between vertebrate and invertebrate about regeneration. We also mentioned on regeneration mechanism after amputation and injury in different metazoans. We will then perform a comparative analysis of regeneration versus "molecular" developmental processes.

**Modes of Regeneration:** Morgan (1901) proposed there are two main modes of regeneration found in animals. Regeneration that does not require cell divisions is referred to as morphallaxis—the restoration of the missing body part. There are only a few examples of morphallactic regeneration, such as the initial phases of head regeneration in Hydra and of liver regeneration (after acute pancreatitis) in mammals. In most cases, regeneration requires cell proliferation—such as epimorphosis. Epimorphic regeneration again divided into 2 main categories .depend on whether the formation of a regenerative blastema is involved or not (Sa'nchez Alvarado 2006; Sa'nchez Alvarado and Tsonis 2006). A blastema is a specialized structure forms upon amputation or injury. Blastema made by two cells compartments these are a layer of epithelial cells covering the whole blastema and an inner mass of mesenchyme-like cells. Regeneration occurred by differentiation of the cells of the blastema. Whole-body regeneration of flatworms and limb/tail regeneration in vertebrates are examples of blastemal planarian regeneration, blastema formation is due to the migration toward the wound of pre-existing stem cells, named neoblasts, their proliferation, and the subsequent differentiation of most of their daughter cells (Sa'nchez Alvarado and Tsonis 2006). regeneration. In vertebrate limb regeneration. blastema formation mainly involves the dedifferentiation of differentiated cells of the remaining tissues, such proliferation of the dedifferentiated cells redifferentiation into the original and/or other cell types when a cell type different from the original one is produced, the process is named transdifferentiation (Brockes and Kumar 2008) Non-blastemal epimorphic regeneration is also common and can be achieved by various manners (Sa'nchez Alvarado 2006).







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**Regeneration in Urodeles and Zebrafish:** Fin regeneration in zebra fish is emerging as an important context for vertebrate regeneration in a powerful genetic system (Curado et al. 2007). The early limb bud consists of a mass of apparently homogeneous undifferentiated mesenchymal cells covered by ectodermal cells, some of which form the apical ectodermal ridge (AER) required for bud outgrowth. It has been often suggested that the regeneration blastema behaves like a developing limb bud (the wound epithelium playing the role of the AER) and therefore that limb regeneration is highly similar to limb formation (e.g., Bryant et al. 2002; Galis et al. 2003).

**Planarian regeneration:** Planarians are flatworms and one of the classic model systems for the study of regeneration. Planarians are capable of re-growing new heads, tails, sides, or even entire organisms from tiny body fragments (Morgan, 1898; Randolph, 1897). It shows bilateral symmetry and complex internal anatomy, including nervous system, musculature, excretory system, epidermis, eyes, and intestine (Hyman, 1951; Reddien and Sánchez Alvarado, 2004) in this animal regeneration involves changes in pre-existing tissues and formation of an outgrowth at wounds called a blastema, in which missing tissues are produced. All of the various organ systems and cell types of the body can be produced in the adult. A population of adult dividing cells, called "neoblasts", has long been prominent in planarian regeneration research. Dividing somatic cells (neoblasts) are distributed throughout the planarian body in a tissue region called the parenchyma, which is beneath the basement membrane and body wall musculature, and surrounds the intestine and nervous system (Hyman, 1951; Pedersen, 1961). In the late 1800s, dividing cells with simple morphology were described to exist in the bodies of flatworms (Curtis, 1902; Keller, 1894; Lehnert, 1891; Wagner, 1890).

**Regeneration in Hydra:** *Hydra*, like planarians, display some of the most dramatic regenerative feats known to occur in the animal kingdom (Galliot and Schmid, 2002). *Hydra* are cnidarians metazoans that possess two germ layers and represent an outgroup to the Bilateria (Adoutte et al., 2000; Putnam et al., 2007). *Hydra* were the first subjects of described regeneration experimentation (Lenhoff and Lenhoff, 1986) and are capable of regenerating entire polyps from tiny body fragments (Bosch, 2007; Holstein et al., 2003). Tissue pluripotency in *Hydra* involves three stem cell types (ectodermal and endodermal epithelial cells, and interstitial stem cells) that





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enable continual new tissue production (Bosch, 2007). Numerous factors have been identified that regulate the process of *Hydra* regeneration, including Wnt signaling and the MAP kinase-CREB pathway (Bosch, 2007; Galliot and Chera, 2010) Small bodyfragments can regenerate polyps through morphogenetic changes, which can then feed and grow to produce an individual similar to the original (Bode and Bode, 1980). Numerous factors have been identified that regulate the process of *Hydra* regeneration, including Wnt signaling and the MAP kinase-CREB pathway (Bosch, 2007; Galliot and Chera, 2010).

**Regeneration in salamander:** This species of salamander have extensive regenerative properties and can regenerate their limbs, tail, spinal cord and even parts of their brain. After the limb has been amputated, neurotrophic factors called **fibroblast growth factors (FGF)** act on the wound epithelium of the area forming an apical epithelial cap which is a layer of signaling cells. This apical epithelial cap, along with the cut nerve, help to inhibit wound healing. While this cap is forming, fibroblasts from the surrounding connective tissue migrate to the amputated area. Another signaling pathway involved in the dorsal-ventral patterning of many animal embryos is the transforming growth factor b (TGF-b)/bone morphogenetic protein (BMP) pathway. These fibroblasts form a **blastema** which is a mass of cells located at the amputated site that are capable of regeneration. At first these blastema were thought to contain undifferentiated **pluripotent** cells but it is now believed that these blastema may contain cells that remember the cells of the former limb. This means that these cells are a collection of restricted progenitor cells. Once the limb bud forms, research has shown that the same **developmental genes (such as HoxA and HoxD)** that were seen in the developing limb in the embryo are also present in this limb regeneration. Once these genes are presented, the limb reforms in the span of about a month to two months and is indistinguishable from the former limb.

**Stem cells in regeneration:** In addition to dedifferentiation and transdifferentiation there is another possibility for the origin of regenerating tissues: pre-existing stem cells that proliferate and differentiate into new organs. Stem cells are cells with the capacity to differentiate and to form multiple type of cells. In general terms each tissue regenerate after healing or injury by the adult stem cells. Surprisingly human pancreatic tissue recover lost part. and whether stem cells exist in these tissues is still controversial (Dor, Y. et al. (2004) Several types of stem cell





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niches appear closely associated with the vasculature in multiple tissues, and the activity of stem cells and/or niche cells are regulated by soluble factors released from the vasculature, such as IGF-1, VEGF and Wnt signaling molecules (Massouh, M. and Saghatelian, A. (2010) & Mayack, S.R. et al. (2010)). Also, stem cells themselves migrate on blood vessels. Neuroblasts have been observed to migrate from the posterior subventricular zone to the anterior olfactory zone along blood vessels in the adult mammalian forebrain (Snayyan, M. et al. (2009)). In planaria and in hydra, adult stem cell remarkable ability of these organisms to regenerate (Shibata, N. et al. (2010)), Galliot, B. et al. (2006). What types of signals maintain these cells as stem cells in the adult body and control their activity after injury, is still not clear. Stem cell-specific markers identified in this decade and novel imaging technologies are expected to find the answers to these questions in the future (Shibata, N. et al. (2010) & Bosch, T.C. et al. (2010)).

**Future directions:** In this final section, we propose research ideas that gaining of knowledge about fundamental mechanism in regeneration of animals will make new world of sciences. Although there are lots of problems in medical treatment, surgery development and making hybrid technologies as well as bio engineering so above problems should be cleared by applying knowledge of regeneration process.

**Conclusion:** The ideas presented in this essay to overview and observation among the animal regeneration. I found that its mechanism is surprising to experimental biologist. We also found that these ideas have to be tempered with molecular experimentation. Future research on regeneration must become multiphyletic and integrative in nature. It is possible to point to molecules such as MMPs or muscle segment homeobox proteins (Msx) that are widely expressed and play important roles in tissue remodeling or modulating the differentiated state and the cell cycle. Somewhat stronger evidence is provided by common signal transduction pathways (Sánchez Alvarado & Isonis 2006, Stoick-Cooper et al. 2007a), for example, the role of the Wnt pathway in planarian and cnidarian regeneration.

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**Disclosure statement:** Authors are collected outline information about regeneration in animals from various research papers. We didn't have carried out experiment on any animals for







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regeneration. It's a review article in this reviews some of matter should be same as will be found in some ones research work. The authors are not aware of any biases that might be perceived as affecting the objectivity of this review.

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# Study of Indoor Environmental Facilities among the Poultry Production Systems from District Aurangabad (M.S.) India

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**Abstract:** The present communication deals with the observations and studies of indoor environmental facilities among poultry production systems from the district Aurangabad in Marathwada region of the state Maharashtra. For this study poultry production systems were selected randomly for collection of relevant information about the facilities of indoor environment. From the above study and observations it revealed that majority of the poultry production systems are maintained the facilities of indoor environment for the better life and health of birds and for increase the productivity. Indoor environmental facilities includes humidity, temperature, natural light sources etc. while some of the poultry production systems not maintained the facilities of indoor environment due to that it affect the overall poultry production and ultimately it affects the general economy of poultry production system. It also encouraged the distribution and development of diseases in the poultry birds. From the above study it is clear that majority of poultry production systems from the study area are aware about the facilities of indoor environment but some of the poultry production systems and its associated peoples are need to create the awareness about the facilities of indoor environment for improvement in the poultry production system in the study area.

**Keywords:** Indoor environment, facilities, Poultry production Systems, Aurangabad, India.

## I. INTRODUCTION

In many developing countries the small scale poultry are the main producers of large scale poultry production systems. Poultry industry provides employment at village level and also to minimize the need for migration to overcrowded cities. It provides protein rich food for deadly growing poor population. Poultry plays an important socio-economic and nutritional role in the livelihood of rural households in many developing countries, (Adesiji, et. al.2013).The poultry production system can provide an alternate source to the farmers in the region reeling under repeated drought spell. Maharashtra is amongst the leading states for commercial layer and broiler farming. The government has taken decision to promote poultry farming in tribal and backward regions of north Maharashtra and Marathwada. (Shubhangi Khapre, 2015) Poultry birds are efficient converters of feed to egg and meat within a short period of time. Poultry provide source of income and employment to people compared to other domestic animals (Avila, 1985; Demeke, 2004). The aim of the present work was to observations and studies on indoor environmental facilities among the poultry production systems from the district Aurangabad in Marathwada region of the state Maharashtra. The main objective of the study includes to maintain the facilities of indoor environment among the poultry production system and to minimize the occurrence of poultry diseases for the quality of meat and eggs production and it also helpful to improve for the economic status of poultry production systems.

## II. MATERIALS AND METHODS

The study was conducted in the district Aurangabad in Marathwada region of the state Maharashtra. Most of the people in the study area are the land farmers as India is the agricultural country. The environmental condition in the study area is favorable for certain agricultural activities and rearing of domestic animals, such as poultry, dairy and fish production systems. The poultry production systems were randomly selected as sample for this observations and study. To collect the relevant information according to the present study, a semi-structured questionnaire was prepared. The information about indoor environmental facilities of poultry production systems is also collected from all the selected poultry production systems through personal interview and visit at the farm sites during the study period at different intervals. Information was obtained about the facilities of indoor environment, to evaluate the knowledge level about the indoor environment in the poultry production systems and among the associated peoples in the study area. The detailed studies were undertaken with a view to find out the indoor environmental facilities among the poultry production systems and awareness among its associated people.





### III. RESULTS AND DISCUSSION

During the study period it was observed and found that majority of the poultry production systems and associated people have ability to adequate knowledge about to maintain the indoor environment by using various facilities in the poultry production systems. Peoples associated with poultry production systems, those are having good educational background and more experience in this field they are most likely to have better ability to maintain the indoor environment by using various facilities than the less educational background and experience in this field according to the standard poultry production systems. Majority of the associated people of poultry production system they have more years of poultry production experience and this may influence their level of performance and observation about the indoor environment. This indicates that the majority of the poultry production systems and associated peoples in the study area they are aware about the indoor environment and facilities so far in the poultry production systems and have maintain the indoor environment by using various facilities according to the commercial poultry production. It will be helpful to maintain the quality of meat and eggs also helpful to minimize the disease occurrence among the birds. From the above information it was also observed that majority of the poultry production systems and its associated peoples reported that very less occurrence of poultry diseases only due to the proper facilities of indoor environment in the poultry production systems.

From the study it also reveals that some of the poultry production systems and its associated peoples agreed that improper indoor environment due to lack of facilities use by them and encouraged the distribution and development of diseases it become ultimately affect the quality of meat and reduced the eggs production as well as total poultry production. The environmental conditions affecting the performance and health productivity of chicken include temperature, relative humidity, light, sunshine prevailing at a given time, housing system and ventilation (Elijah and Adedapo, 2006). They also reported in their study that high rainfall and relative humidity provides a conducive environment for breeding of parasites that causes outbreak of diseases which invariably reduces egg production. They further reported that temperature reduces the feed intake of poultry birds because more energy is needed to conserve the heat caused by high temperature, hence, a decreased in the rate of feed intake. Changes in the environment alters global disease distribution, affects poultry feed intake, encourage outbreak of diseases which invariably affects poultry output (egg and meat) and also cost of production (Guis et al., 2011). Temperature fluctuation and increased sunshine intensity has negative consequence on poultry production resulting in high mortality of the chickens, low egg production and low feed in take with low production (ICAR, 2010). Environmental climatic changes influence the emergence of new poultry diseases and increased its distribution reported by (P. Ravichandran, et. al. 2015).

### IV. CONCLUSION

From the above observations and studies it can be concluded that majority of the poultry production systems and its associated peoples are aware about the indoor environmental facilities and hence it will be helpful for the total poultry production system. The study further revealed that improper facilities of indoor environment influence the emergence of new poultry diseases and increased its distribution. There is need to intensify awareness among the poultry production systems and its associated peoples about the proper indoor environmental facilities for better poultry production. So it is necessary to create the awareness among the poultry production systems and related peoples by the livestock development agencies. So that it also helpful to improve the poultry production in the study area.

### V. ACKNOWLEDGEMENT

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**BIOSENSORS AND FOOD TECHNOLOGY****S. G. Badhe<sup>1</sup>, S.T. Naphade<sup>2</sup>**<sup>1</sup>R. B. Attal Arts, Commerce and Science College, Tq. Georai, Beed (MS), India<sup>2</sup>Yeshwantrao Chavan College, Sillod, Dist-Aurangabad (MS), India

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**Abstract:** Food industry is an important and growing industry in the world. Food safety is also an important part of the industry. This demand of society can be overcome with the help of application of Biosensors in food industry. Biosensors are used for various purposes like processing, preserving, and packaging. Biosensors are safe and fast to use in the food industry. Biosensors are small, safe and easy to handle. It is a sensitive device and works in a cost-effective manner. Present review paper includes the applications of biosensors in food Technology.

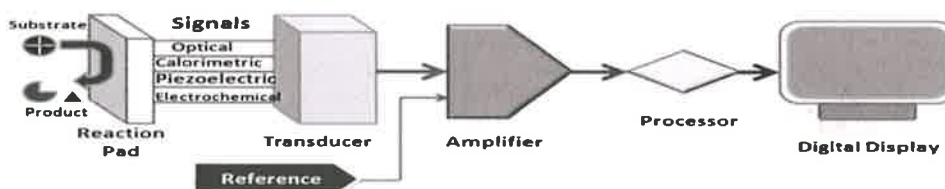
**Key words:** Biosensors, Food Safety, Food Technology, Applications.

**Introduction**

Food is a basic need of living animals. Food provides nutritional support to the body. As the population is going on increasing rapidly the need of food also increasing. Fast life of human requires the packed and safe food. There is a global importance of food safety. This is due to sub equality foods being linked to increased morbidity, mortality, human suffering, and economic burden [1]. This demand of society can be overcome with the help of biosensors. Biosensors are examples of new, innovative methods. It became a powerful instrument in clinical, environmental and food analysis by tackling old but important problems [2]. Biosensors are used for various purposes in food industries. It is widely used in food processing, food production, food safety, security food packaging food supply. It is fast and safe process in food technology. Extensive development of biosensors for food safety and quality control were stimulated by acquiring several new food safety and key quality concepts during the last decade, such as Hazard Analysis Critical Control Points (HACCP), [3]. Total Quality Management (TQM), and ISO 9000 Certifications. The wave of terrorist acts and foodborne disease outbreaks has raised the importance of the food traceability and authentication [4, 5]. There are specific safety problems (pathogenic micro-organisms, BSE, GMF, pollutants, etc.) that require intensive control, data logging, and data treatments, which can be controlled effectively only with the new generations of bio detection systems [6]. All these tasks require rapid response sensors for new integrated data analysis systems and is an indispensable part of the modern supply chain operation paradigm

**Biosensors**

Biosensors are the short of 'Biological Sensors'. The concept of biosensor was first introduced in 1960 and in 1962 Leland C. Clark presented the model of biosensor with the help of enzyme electrodes. It consists of two main parts: Bioreceptor and Transducer. Transducer is main key component of Biosensor. It makes use of a physical change accompanying the reaction. Biosensors utilize biological molecules or living organism to identify chemicals. General working principle of a biosensor is shown in the fig. 1





Several newly developed techniques ranging from electrochemical, optical including fluorescence-based, and electromechanical are modern transducing methods, which are widely utilized in the development of biosensors [7]. It is easily available and with low cost.

### **Biosensors and Food Industry**

The food industry has a general need for methods which are simple, rapid, inexpensive, readily available, stable reagents and are ideally automated [8]. Biosensor Technology in Food Industry offers a new and rapid type of monitoring and measuring device. Electrochemical biosensors allow for the measurement of at least 90 substances like Amino Acid, Gases, Cofactors, Carboxylic Acid, Antibiotics, Sugar, Starch, Alcohol, Phenols, and Vitamins etc. [9]. Biosensors can be used in Wine, Beer, Yogurt and soft drink producer Industries. Immune-sensors have important potential in ensuring food safety by detecting pathogenic organism in fresh meat, poultry or fish. [10].

### **Food Packaging**

Biosensors and its potential applications are an emerging technology in food packaging. This Technology may be used to enhance the safety and quality of food product in packaging system. The main functioning of sensors in packaging is to maintain the hygiene of the surrounding, product status, data exchange with the external database providing information for decision making of the food stuff [11]. Biosensors are used in the direct and indirect detection of pathogens of food stuffs [12].

### **The Heavy Metals**

Biosensors are used for detecting heavy metals such as: lead, mercury and cadmium down to the EPA limit for these metals in drinking water, food packaging samples such as rice bags and other food products. [13].

### **Agrochemicals of Food**

Numerous pesticides are used in the field to protect the crop and to increase the yield. These pesticides and chemicals can be detected by the biosensors and food quality [14].

### **Unpermitted Chemicals and Nutrients in Food**

Unpermitted chemicals are often added in milk or milk products. This contaminated milk can be studied with the help of biosensors [15, 16]. Nutrients of food and chemicals in food products can be detected with the help of biosensors. [17].

### **Food processing**

Process control in the food industry is more difficult than in other industries due to the utilization of more complex and variable raw materials having measured parameters which are often difficult to define [18].

### **Conclusion**

Several different types of biosensor are used in food industry. Food hygiene, processing, safety, purity can be easy and cheaper with the use of biosensors. This article focused on different types of biosensors in food industry. Each biosensor has its own applications, characteristics, advantages and disadvantages in terms of the equipment required, sensitivity, simplicity and cost-effectiveness. Use Biosensors in food industry in a simple effective technique.

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