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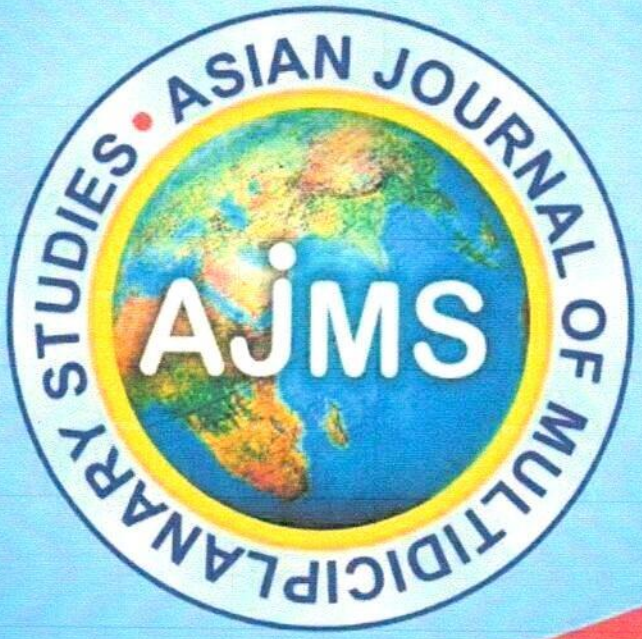

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'Applications of Nanotechnology for Purification of Water and its Comparison with Traditional methods, Green Nanotechnology'

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Abstract: *Nanotechnology is the branch of science that makes use of materials whose structures have characteristics features on the nano scale i.e. on the scale 10^9 meter. Water is purified by various methods such as physical, chemical, and biological treatments. Treatement methods mainly depend on the purpose and use which water is input to. With each method different types of pollutants are removed to some degree. However, none of mentioned methods guarantee the absolute purity because of various technical flaws associated with the methods. Some of the methods incur huge financial inputs and some are time consuming. Green nanotechnology offers solution to many of these problems and is considered an an important technological improvements.*

The main objective of this study was focused on Water purification using nanotechnology.Ten water samples were taken and analyzed for various parameter like temperature, pH, electrical conductivity, Total Hardness, calcium, magnesium, chloride, Alkalinity, D.O. etc. and then same water samples were purified by using nanomaterial such as carbon nano tubes and alumina fibers for nanofilteration.The purified water is again analyzed for same parameters as mentioned above and the data is compared with the data prescribed by W.H.O. Through different studied have shown that improvement of the quality of drinking water is possible with this advanced method over traditional method which can ensure quality, are energy efficient, cost effective. An effort is therefore made in the paper to compare the results obtained by this advanced method with the results obtained by traditional methods.

Key Words: Nanotechnology, pollutants, nanofilteration, Alumina fibers.advanced methods.

INTRODUCTION: Ground water is one of the nation's most important natural resource. It is mainly important for drinking purpose. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and the accelerated pace of industrialization. Human health is threatened by most of the developments in agricultural activities particularly in relation to excessive application of fertilizers and insanitary conditions. Water is generally supplied by municipal/gram panchayat water supply scheme or department and Private Company or people. How nanotechnology intervenes and can provide solutions to water problems is an interesting area of research.

Water is purified by various methods such as physical, chemical, and biological treatments. Treatment method mainly depends on the purpose and use which water is put to. With each method, different types of pollutants are removed to some degrees. However, none of mentioned methods guarantee the absolute purity because of various technical flaws' associated with the methods. Some of the methods require hug financial inputs and some are time consuming. Green nanotechnology offers solutions to many of these problems and is considered as an important technological improvement. Water purification using nanotechnology exploits nanomaterials such as carbon nanotubes and alumina fibres for nanofiltration.

MATERIAL AND METHODS: Collection of samples: Water samples were collected from 10 different fields in plastic containers and brought to the laboratory for further analysis.

Analysis of physico-chemical parameters: Standard methods were followed for the analysis of water[2,10] . Some parameters like temperature, pH and electrical conductivity, Total Hardness, calcium, magnesium, chloride, Alkalinity, D.O. were analyzed and the results are predicted in Table.1 The samples for dissolved oxygen were fixed in the BOD bottles at the site and brought to the laboratory for analysis by Winkler method. All the physico-chemical parameters were analyzed within 24 hours.

The same water samples were purified by using nanotechnology. Water purification using nanotechnology exploits nanomaterials such as carbon nanotubes and alumina fibers for nanofiltration[5]. The existence of nanoscopic pores in zeolite filtration membranes, as well as nanocataysts and magnetic nanoparticles. Nanosensors, such as those based on titanium oxide nanowieres and palladium nanoparticles are used for analytical detection of contaminants in water samples. These sensors are used as monitoring agents for determining water quality. Nano

absorbents with high capacity and selectivity removes cations, anions, and organic solutes from highly contaminated water from water bodies like lakes and ponds. They used for removal of sediments, chemical effluents, charged particles, bacteria and other pathogens from river water as well. Toxic trace elements such as arsenic, lead, and cadmium, and viscous liquid impurities such as oil are also removed by using nanotechnology. A carbon nanotube membrane act as molecular sieves and removes almost all kinds of water contaminants' including turbidity, oil, bacteria, viruses, and organic contaminants.

Results and discussion: The results obtained from analysis of the water samples of ten different fields before purification are given in Table.1 and after purification are given in Table.2 and the drinking water standards[3,11] in Table 3. The physico-chemical data for the groundwater samples show different types of waters in the study area according to their hydrochemistry. All the drinking water samples were clear, colorless and odorless. The air temperature ranged from 24°C to 29°C and water temperature from 19°C to 21°C in all the samples.

Table:1 Physico-Chemical Characteristics of water samples before Purification

Sample No	Temperature		pH	EC	Alka-linity	Hardness		Mg	Chloride	D.O
	Air	Water				Total	Ca			
S_1	28	21	7.12	0.54	50	266	80.02	45.19	73.84	6
S_2	26	21	7.78	0.51	52	180	56.14	30.09	65.32	4
S_3	27	21	7.58	0.82	74	400	112.2	69.91	90.88	4
S_4	27	21	8.06	0.50	54	270	76.19	47.09	56.8	6
S_5	26	20	7.36	0.44	40	200	59.34	34.18	48.28	6
S_6	25	20	7.80	.039	30	116	33.68	20	28.40	4
S_7	25	20	7.80	0.28	26	80	20.05	14.56	42.6	5
S_8	28	21	8.17	0.41	34	150	45.51	25.14	39.76	4
S_9	25	20	8.05	0.32	26	128	14.43	27.5	36.92	3
S_{10}	25	20	7.25	0.29	28	100	21.65	19.03	22.72	8

Table.2: Physico-chemical characteristics of water samples of after Purification

Sample No	Temperature		pH	EC	Alkalinity	Hardness		Mg	Chloride	D.O
	Air	Water				Total	Calcium			
S_1	28	21	7.20	0.19	25	090	40.02	25.19	33.84	3
S_2	26	21	7.40	0.21	26	085	26.14	15.09	35.32	2
S_3	27	21	7.60	0.32	29	120	52.2	29.91	40.88	2
S_4	27	21	8.20	0.40	27	122	31.19	27.09	26.8	3
S_5	26	20	7.50	0.24	21	87	29.34	17.18	28.28	3
S_6	25	20	7.10	019	26	61	2668	19.08	18.40	2
S_7	25	20	7.40	0.22	19	43	20.05	07.16	22.6	3
S_8	28	21	7.40	0.23	18	73	25.51	15.14	19.76	2
S_9	25	20	7.05	0.12	18	128	14.43	17.5	16.92	2
S_{10}	25	20	7.25	0.20	20	100	21.65	09.03	12.72	3

Table.3: Drinking Water Standards of WHO (1963) and BIS (1991).

Sr. No	Parameters	WHO		BIS Requirement	
		Limit of general acceptability	Allowable limit	Desirable limit	Permissible limit in the absence of alternate source
1	pH	7 to 8	6.5 to 9.2	6.5 to 8.5	No relaxation
2	E.C.	300	-	-	-
3	Total Hardness	500	-	300	600
4	Calcium	75	200	75	200
5	Magnesium	50	150	30	100
6	Chloride	200	600	250	1000
7	Alkalinity	-	-	200	600
8	D.O	4 to 6 (ppm)	3 (ppm)	-	-

The pH values ranged from 7.12 to 8.06. pH was alkaline in all samples. However, higher values of pH hasten the scale formation in water heater and reduce the germicidal potential of chlorine. Electrical conductivity ranged from 0.28 to.44 mmho indicating that the values were within the permissible limit.

Total alkalinity of water samples ranged from 26 to 74 mg/L which was within the permissible limit. Most of the alkalinity in natural

water is found due to dissolution of CO_2 .Alkalinity itself is not harmful to human beings yet the water samples with less than 100 mg/L are desirable for domestic use[7].

The total hardness is due to the presence of divalent cations, of which Ca and Mg are the most abundant in groundwater. The waters of the study area are classified according to hardness as suggested by Sawyer and McCarty[9]. In the present study the total hardness of water sample ranged from 80 to 266 mg/L. This indicates that out of 10 samples, all samples have total hardness content within Who and BIS permissible limit .Calcium hardness values ranged from 14.43 to 112.2 mg/L, which were within the permissible limit. Magnesium hardness ranged from 14.56 to 69.91 mg/L and was within the permissible limit of 50 to 150 mg/l of WHO (1998). Jain (1998) reported that high concentration of hardness (150 to 300 ml/L and above) may cause kidney problems.

Chloride occurs in all natural water in widely varying concentration. Chlorides in excess of 250 mg/L impart a salty taste to water and people who are not accustomed to high chlorides may be subjected to laxative effects. Chloride values ranged from 22.72 to 90.84 mg/L. Out of 10samples one sample showed higher value of 90.84 mg/L but within the permissible limit.

Dissolved oxygen is an important parameter of water quality. Low dissolved oxygen gives bad odour to water due to anaerobic decomposition of organic matter[8]. In the present study, dissolved oxygen values of water samples ranged from 3 to 8 mg/L. Out of 10 samples, all samples were within the permissible limit of WHO.

The results obtained after the purification of same sample of water as shown in Table. no 2 and compared with the Drinking water standards of WHO (1963) and BIS (1991) are found to be very good within desirable limit.

Conclusion: This technology is seen as a new hope when water gets contaminated. Although their pores are significantly smaller, carbon nanotubes have shown to have an equal or a faster flow rate as compared to larger pores, possibly because of the smooth interior of the nanotubes. Nanofibrous alumina filters and other nanofibre materials also remove negatively charged contaminants, and organic and inorganic colloids at a faster rate than conventional filters. This technology should be used in most of the countries across the globe for water purification.

Nanobiocide such as MgO- and AgO-based nanoparticles deactivates bacteria in contaminated water without generating harmful byproducts. Harmful pathogenic bacteria and viruses that cause various human ailments are also eradicated from water using this novel technology. A polymerised nanofibrous membrane was used for enhanced purity of water. The application of the nanotechnology absorbs toxins. filters out and kills bacteria, and cleans the water which is used ideally for drinking purposes. Green nanotechnology offers solutions to problems faced in conventional methods and is considered as an important technological improvement for Water purification.

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REFERENCES:

1. Agarkar, V. S. and Thomber, B. S. 2005 Status of drinking water quality in schools in Buldhana district in Maharashtra. Nature Environment and Pollution Technology, 4(1): 119-121.

2. APHA 2005 Standard Methods for the Examination of Water and Wastewater. 21st Edn. American Public Health Association, Washing ton DC.

3. BIS 1991. Is: 10400, Indian Standard for Drinking Water, 1-9, 179-182

4. Bureau of Indian Standards, New Delhi, India.

5. DREAM2047-May2013/Vol.15/No-8

6. Jain, C.K. Bhatia, K.K.S. and Vijay, T. 1998 Groundwater quality in a coastal region of Andhra Pradesh. Ind. J. Envi. 11th., 39(3): 182-192

7. Loganayagi, A., Damodarkumar, S. and Murugesan, S. 2008 Quality of drinking water in and around Thiruvalur district. Tamil Nadu. Nat. Envi. & Poll. Tech., 7(1): 133-138.

8. Sallae, A.J. 1974. Waterborne diseases. In: Fundamental Principles of Bacteriology, 7th edition, Tata McGraw, Hill Publishing Company Ltd. New Delhi.

9. Sawyer, C.N. and McCarty, D.L. 1967. Chemistry of Sanitary Engineers. 2nd edition, McGraw Hill, New York.

10. Trivedy, R.K. and Goel. P.K. 1984 Chemical and Biological Methods for Water Pollution Studies. Environmental Publications. Karad, India.

11. Veera Bhadram, K., Ravindra, M. and Pradhanthi, M. 2004. Evaluation of water quality index at Vishakhapatnam city, Andhra Pradesh. Nat. Envi. & Poll. Tech., 3(1): 65-68.

12..WHO 1963. Guidelines for Drinking Water Quality. 2nd edn, Geneva, pp. 56.