Executive Summary of Minor Research Project

Sanctioned to S.V.Madhamshettiwar

Title of the Project:

WATER QUALITY ASSESSMENT OF ORGANISED WATER SUPPLY IN CHANDRAPUR CITY AND BALLARPUR TAHSIL IN MAHARASHTRA STATE

The quality of water is the major concern for mankind since it is directly related with human health and welfare. Nearly 47% of diseases are water born in nature. Thus polluted water is the main culprit. The numbers of patients suffering from water born diseases are increasing alarmingly since few years. The major reasons behind water pollution being industrialisation, construction, erection of power plants for requirement of energy sources etc. These activities are desirable for human development but lead to the production of objectionable material into the environment. The project has the interdisciplinary relevance. The objectives sets were observed to be fulfilled. The collected water samples were analysed for Nitrate ions, Chloride ions, Iron, Fluoride and Arsenic contents. The methodology adopted in such a way to minimise the error. Statistical treatment on the software was carried out in order to get more accurate conclusion. It can be concluded from the analysis of nitrate ion, the concentration was found to be 0.030mg/L, 0.064mg/L, 0.203mg/L, 0.168mg/L, 0.192mg/L, 0.178mg/L at various locations indicated in the chart respectively. These values are well below the internationally accepted value of 45mg/L indicator for nitrate ion contamination and thus this water samples are not polluted with Nitrate beyond the threshold value. However, other water systems must be monitored in different parts of Chandrapur District of Maharashtra state. The concentration of the chloride was lowest in Junona ,Ballarpur (218mg/l) and highest in Kalamandir,Ballarpur (331.6mg/l). The values were within the WHO (200mg/l) limit for chloride but higher than the FEPA (2.5mg/l) set limit. Chlorides occur in natural water at varying concentrations depending on the geographical condition. It may also get into surface water from several sources including: rocks containing chlorides, agricultural run-off, waste water from industries, oil well wastes, and effluent waste water from waste water treatment plants. Small amounts of chlorides are required for normal cell functions in plant and animal life. All samples were found to contain

chloride well below permissible limit, making it suitable for drinking purpose. The concentration of iron in the water samples did not vary widely. In all the water samples, iron content lower than (0.3mg/l) recommended by WHO was reported, with Junona, Ballarpur having the lowest value of 0.04mg/l and Kalamandir, Ballarpur the highest of 0.216mg/l. Dependence on these supplied water as a source of iron can result in anemia. Iron in ground water is normally present in the ferrous or bivalent form (Fe^{++}). It is a rare element required by both plants and animal. Iron in water may be present in varying qualities depending upon the geological area and other chemical component of the water way. Iron is an essential element in human nutrition. The minimum daily requirement of iron is ranged from about 10 to 50 mg/day. It is vital in oxygen transport in the blood of all vertebrate and some invertebrate animals. The main drinking water source is the Irai river in Chandrapur municipality. Usually water is boiled before drinking in many homes. Eighteen water samples from different places in Chandrapur city and Ballarpur Tahsil of Maharashtra state were examined for fluoride content. Out of eighteen samples seven samples found fluoride content more than the permissible limit i.e. 4 mg/L. The highest concentration found was 6.08 mg/L in the water from Kalamandir, Ballarpur. The lowest level of fluoride was found in two places Civil lines, Chandrapur and Junona, Ballarpur Tahsil, it was 2.61 mg/L and 2.59 mg/L. Remaining water samples contain ion fluoride level in between 1.59 mg/L to 4 mg/L well under permissible limit. One of the most important sources of water consumption in babies and children is the ground water and water from Municipal Corporation and the level of fluoride to both preventing of dental caries and fluorosis is an important factor. Lack of fluoride in children nutrition can lead to failing of healthy teeth and bones production, whereas fluorosis is a chronic disease that due to excess fluoride uptake and exhibit with mottling and yellowish or brownish teeth. The WHO in 1994 has recommended fluoride levels of 0.5-1.0 mg/l in the drinking water for optimal cariostatic effect, the lower limits for hot climate (as people drink more water) and upper limit for cold climates. The concentrations of fluorides in the drinking water observed in this study are above this optimal level in all cases. It was observed that the highest arsenic concentration in water sample from Visapur, Ballarpur and Civil lines , Chandrapur was found to contain 9.35 μ g/L and 8.35 respectively and lowest arsenic contents in water sample from Bengali camp, $\mu g/L$ Chandrapur. The arsenic contents in sample from Visapur, Ballarpur are nearer to permissible limit set by WHO, which could be directly detrimental to the health of the aquatic ecosystem and indirectly to man. Continuous consumption of metal from water could lead to their accumulation and eventually death, hence continual assessment and enlightment

is highly essential. Water quality index obtained for Nitrate, Chloride and Iron in all water samples from all locations studied indicated that the water samples are suitable for drinking purpose while water quality index for Fluorine indicate alarming situation at all location and water supplied is not suitable for drinking purpose as per WHO recommendation. However the values are in accordance with standard prescribed Indian agency. Water quality index for Arsenic is nearer to one indicating to take appropriate care before drinking. The water therefore needs to be treated before use. However, the results of the other parameters studied were considered low when compared with the WHO (1983) and FEPA (1991) for drinking water hence did not indicate pollution because their levels are below the limits for potable water.

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