

Comparative Laundry Utility of Ponds in and Around Varanasi City

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Abstract

The most important character of water responsible for washing is its hardness. Hard water is less fit for washing clothes as it is unable to produce sufficient froth. In addition to this the wash water should be free from bacterial and colour contaminants. In the present dissertation some selected ponds within and around Varanasi city have been selected for investigation regarding the colour and hardness of water. The study reveals that the order of fitness in suitability of water of different ponds in and around Varanasi has been following ascending order—Bhabhniaw pond, Asahpurpond, Ramnagarpond, Kapildhara pond, Control pond. The colour of water of different ponds has slight variations but free from colouring matter. Thus the control pond is the most and the bhabhniaw pond is the least suitable for laundry purposes.

Keywords: Hardness, pond water , laundering.

INTRODUCTION

When toxic substances enter lakes, stream ,ocean, ponds, and other water bodies they get dissolved or lie suspended in water or get deposited on the bed .this result in the pollution of water deteriorates affecting ecosystem. The pollution affects the environments in many ways.

Water pollution has many source, the most polluting of them are the city sewage and agricultural waste discharged into the ponds. The facilities to treat waste water are not adequate in any city in India. Presently only about 10 % of the waste water generated is treated, the rest is discharged as it into our water bodies. The hydrological significance of water reservoirs had been attracting the attention of the investigators since past.

Laundering is a complex process. it is not uncommon to try detergents after detergents until the one that functions the best under the differents conditions of water used or soils to be removed (Spirit of Research , 1996) .the formulation of laundry detergents are varied , with ingredients designed to perform broad cleaning functions

and to provide properties specific to a product (American cleaning Institutes (ACI) , 2010 a) .Detergents are considered to be either general purpose (suitable for all fabric types) or light duty (suitable for lightly soiled and delicate fabrics) (ACI,2010). No matter the detergents, water conditions have the potential to affect the cleaning process.

Laundry detergents may contain any number of ingredients designed to enhance the laundry process. However, there are typically two major ingredients, a surfactant and a builder. The surfactants (surface active agents) loosen and removed soil, emulsify, or suspended soils in the east, and improve the wetting ability of water (Ainsworth 1994).

Builder reduce water hardness (Kirschne,1998) by combining with divalent calcium and magnesium ions ,making them less available and thus prohibit their interference with the surfactants action (Rutkowski ,1981),example of builder used in laundry powder include sodium tripolyphosphate, sodium carbonate, sodium citrate and zeolites (Kirschner,1998)

Detergents builds with phosphates performed better than detergents build with other compounds (Cameron6 &Brown,1995) .However phosphate builders are rarely used in the U.S (Mc Coy,2000) ,because they have been blamed for causing eutrophication (high concentration of nitrates and phosphates) which causes excessive algae growth) of lakes and other bodies of water.

Water quality is often overlooked in the laundering process. From a laundering perspectives the most important factor is the presence of calcium and magnesium compounds. These minerals make the water “hard water” (Heide Kamp & Lamely, 2005). Depending on the concentration of calcium and magnesium present in the water, hard water can be classified as moderately hard, hard or very hard. water hardness is measured in grains per gallon(gpy) or parts per million (ppm). The American society of Agricultural Engineers (ASAE) is shown in table 1 (Manikowsks, 1994)

Table 1: ASAE Water Hardness Classification

	Grains Per Gallon	Parts Per Million
Soft	0 to 3.5	0 to 60
Moderate	3.6 to 7	62 to 120
Hard	7.7 to 10.5	121 to 120
Very Hard	more than 10.5	more than 180

Water hardness causes mineral build up on a appliances (washing machine), decreasing the life of these appliances (Wilson, 2009) and reduces the efficiency of detergents (Stone 2009). These minerals deposits can cause cloths to appear dingy and become harsh and scratchy to touch (Heide Kamp & Lemly, 2005 , Vanderpoorten 10,1999 , Hairston &La Prade11 1995) continuous washing in hard water can cause significant damage to fibre due to edge abrasion (Munson , 1991)

EXPERIMENTAL MATERIALS AND METHOD:

The water samples were collected from five ponds of Varanasi city. The selected ponds containing different dischargeable effluents. The samples were collected in three year from 2008 – 2010. Polythene, double stoppered containers were used for collection of water samples. All the containers were thoroughly cleaned and rinsed before the collection of water samples. The physiochemical analysis was carried out by using standards methods for the examination of water and waste water (APHA) Clesceri et al). The sample were analysis for PH & Hardness parameters shown in Table 2 & Graph 1.

RESULT & DISCUSSION

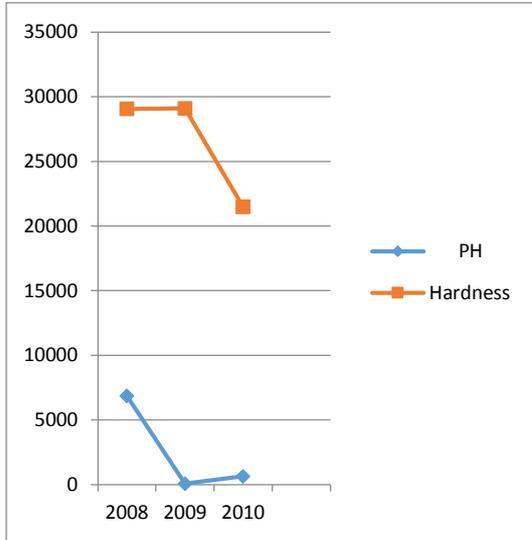
The physical parameters such as PH Hardness decides the overall quality standard of water for laundry purpose. The result obtained envisaged that PH value of water samples ranged from 532 to 6867. When organic materials decompose carbon di oxide, which combines with water to form weak carbonic acid, large amounts of it lower the PH. Water is actually a chemical brew and can affect the PH along with other chemical parameters of water. These value are the maximum permissible limit set by WHO (i.e .9.0) .The total hardness of water sample under study ranges between 21476 mg/L and 30327mg/L. the value are within the tolerance limit of 500mg/L set by WHO .These hardness value higher in the sample WA5 and lower value in sample WA4 hard water can even shorten the life of fabrics and clothes. Hard water can cause mineral build up in plumbing, fictures and water heater, and poor performance of soap and detergents.

Table 2: Physicochemical parameter of various ponds at Varanasi as studied in the present investigation.

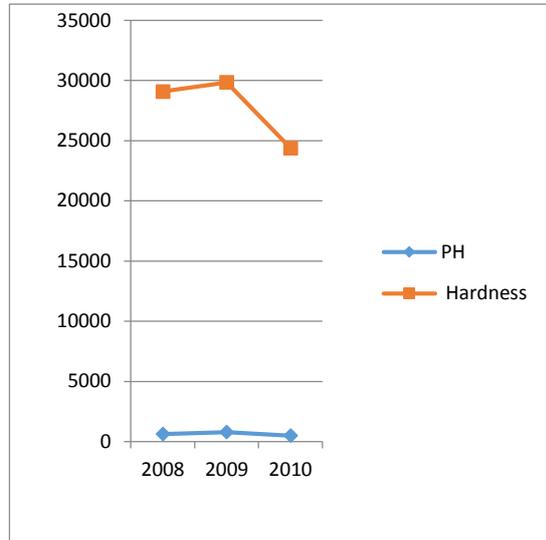
Sampling Sites	Year 2008-2010	PH	Hardness mg/L
WA1	2008	6867	29052
	2009	80.64	29090
	2010	645	21476
WA2	2008	637	29090
	2009	787	29840
	2010	495	24396
WA3	2008	678	29091
	2009	778	29090
	2010	532	24234
WA4	2008	736	28985
	2009	936	4510
	2010	1045	3153
WA5	2008	727	30327
	2009	776	30281
	2010	881	24851

Sampling Sites – WA1-Ramnagar Pond, WA2-Ashapur Pond, WA3-Kapildhara Pond, WA4-Control Pond, WA5-Bhabhniaw Pond

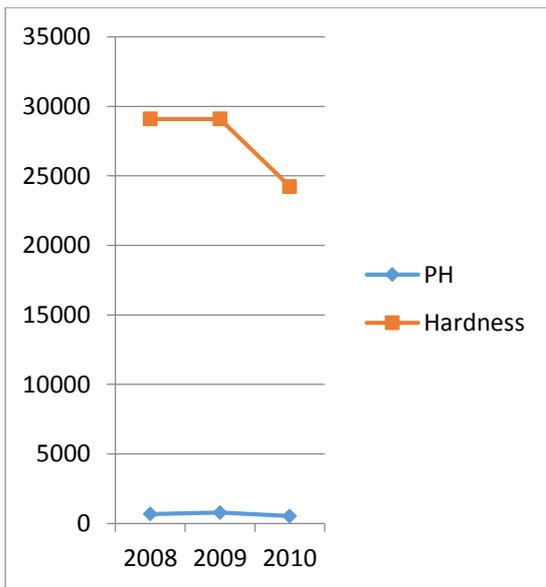
Graphs:



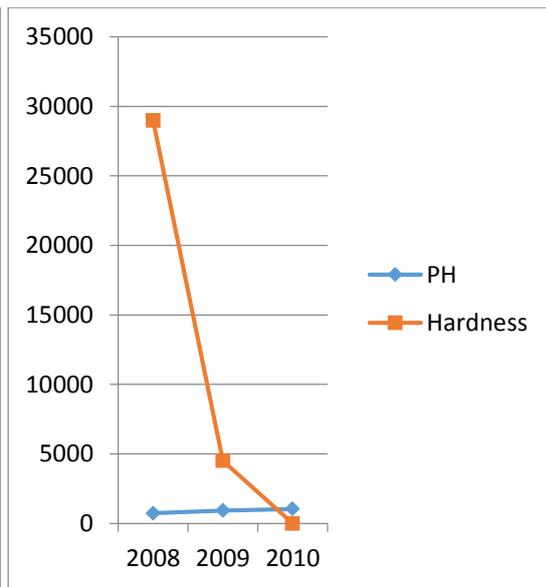
WA-1



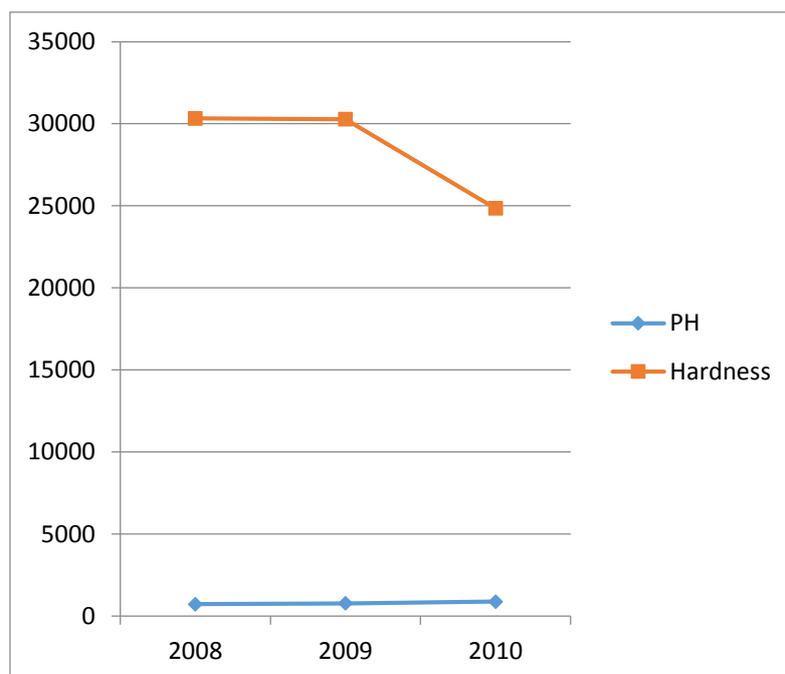
WA-2



WA-3



WA-4



WA-5

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