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Accumulation of slimy substances in large storage tanks for drinking and household water in Kanpur region

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Abstract
The study is basically based on the most common storage water problem In industrialized area which is slimy substance accumulation in the bottom of the storage tank and reservoirs. Which over the time result in the foul smell and odorous water. The present water samples were taken from the various areas where the water is stored in various large tanks to use for various house hold woks like washing cooking bathing sometimes drinking. It was found that all the areas have the alteration in the drinking water quality after 3 days due to increase slimy substance accumulation which results in growth of many harmful bacteria and fungi.
Keywords: slimy substances, moulds, drinking water, health hazards.

I. Introduction

Fungi are relatively common in water distribution systems. Species of pathogenic, allergenic, and toxigenic concern are isolated from water, sometimes in high concentrations. Fungi in water may be aerosolized into air, and introduced to immune-compromised patients, and sensoric changes have been associated with the occurrence of fungi in drinking water systems. The main limitations of fungal water studies lie within the methodology. The differences in methodology limit the consistency in the studies preformed, and make direct comparisons almost impossible. Culturing methods may limit the accuracy of the results and are time-consuming, thus better and more standardized methods for analyses should be designed. Identification of fungi to the species level is difficult, and may require a polyphasic approach, implementing morphology and molecular techniques, as well as metabolite analyses. In future, new molecular and spectral methods may prove to be usable tools for analyses of fungi in water.

The possible health impacts of fungi in water are still contradictory, although precautionary recommendations and measures implemented in the case of high-risk patients now include the elimination of waterborne fungi. In future, monitoring of water systems for the present of fungi may be required, especially in hospital water systems. Adequate water treatment could be a solution, and further studies are required, both with respect to establishing accurate methodologies and to investigate the effects of water treatment against fungi in water. In addition, the water suppliers need to be informed about the different aspects of fungi in water. Epidemiological studies should also be conducted to determine the health significance of fungal-contaminated drinking water.

Until knowledge about the significance of fungi in water is obtained, controversy will most certainly remain. In the meantime, we should be concerned about fungi in drinking water for the same reasons as for air-borne fungi, because increased levels may reduce the quality of drinking water, and constitute a potential health risk.

If the microbiological quality of drinking water is to include fungi, implementing fungal parameters in the water regulations may be required. Fungi are a difficult group to examine, and fungal water studies require experience and caution. However, that should not mean that fungal contamination of drinking water can be ignored. As fungi may influence the water quality in several ways, the mycobiota of drinking water should be considered when the microbiological safety and quality of drinking water is assessed.

As the Kanpur is continuously reported as most polluted city due to rapid industrialization, and drinking water pollution is common problem in many areas as many unauthentic chemical factories dump their effluents directly in river Ganga and increase its BOD and COD up to alarming standards. Being a industrialized area the Kanpur city is most crowded with a below standard population which represent the labor cast and usually drinking the ground water and often store the ground water in lager tanks for daily uses.

II. Method :

As we already depicted that the storage of drinking water causes the fungal mould accumulation on surface and bottom of the larger storage tanks. For The accessing the mould development in the household water in Kanpur region, We collect sample from 5 different localities where the common lives mostly used the ground water to store and the use for their daily activities.

The simple procedure include the collection of sampling water from different sites and then put them in fresh and clean flasks for 24 hrs for observation as the mould develops. The water quantity in watch flask were carefully measures and recorded every 24 hrs for next 7 days . We also put a keen observation on the color change and odor change in the observed water samples of different localities.

III. Result And Observation

As the mould develop the weight of the flask were increased due to accumulations of biomass in the mould film. The slimy mould biomass were also collected by the help of spatula in a dried Petri dish and weigh, the remaining water is carefully observed for the color changes against a very calculative color gradient. Ordor checking is by smelling the liquid.

Weight of biofilm accumulation = (weight of flask on the time of observation - initial weight of flask)

Table: Weight of biofilm accumulated over 7 days

SNo	Sample	1 day	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day
1	Area 1	0.122	0.125	0.129	0.131	0.137	0.142	0.151
2	Area 2	0.125	0.127	0.129	0.132	0.139	0.148	0.156
3	Area 3	0.126	0.129	0.132	0.138	0.142	0.149	0.158
4	Area 4	0.129	0.134	0.139	0.142	0.148	0.152	0.159
5	Area 5	0.127	0.135	0.140	0.146	0.148	0.156	0.159

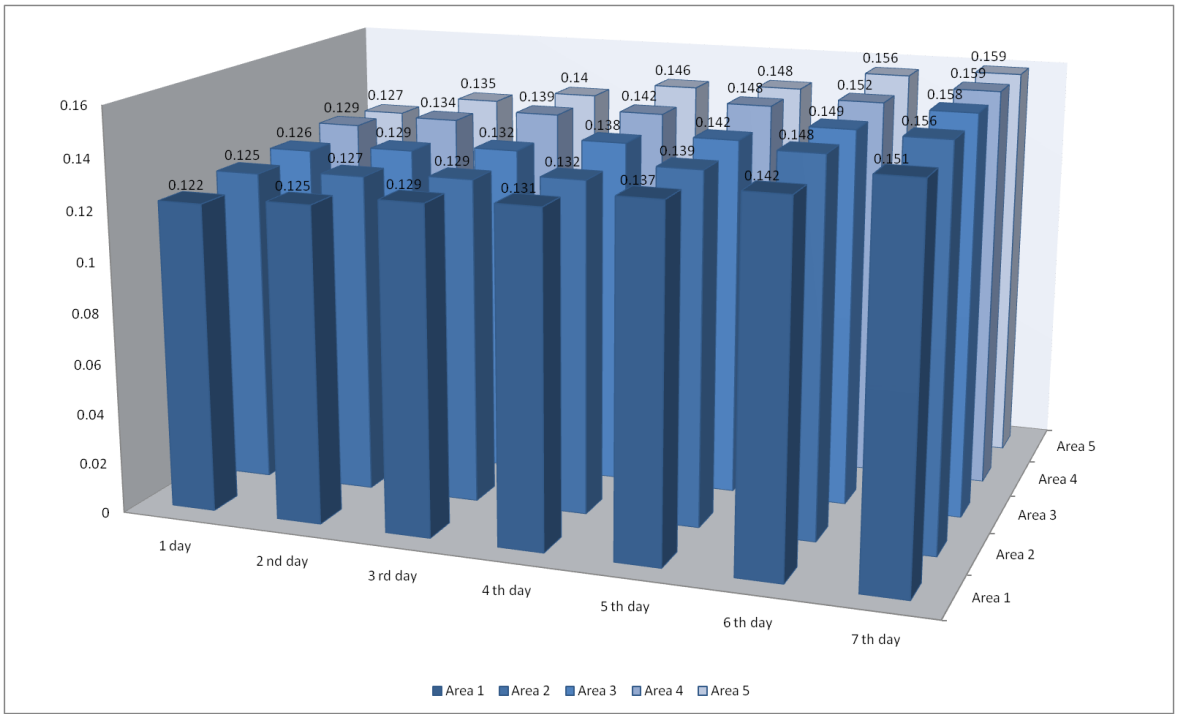

Figure : Weight of biofilm accumulated over 7 days

Table: Weight of biomass accumulated over 7 days

SNo	Sample	1 day	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day
1	Area 1	0.0124	0.0126	0.0129	0.0131	0.0137	0.0142	0.0151
2	Area 2	0.0125	0.0127	0.0129	0.0132	0.0139	0.0148	0.0156
3	Area 3	0.0126	0.0129	0.0132	0.0138	0.0142	0.0149	0.0158
4	Area 4	0.0129	0.0134	0.0139	0.0142	0.0148	0.0152	0.0159
5	Area 5	0.0127	0.0135	0.0140	0.0146	0.0148	0.0156	0.0159

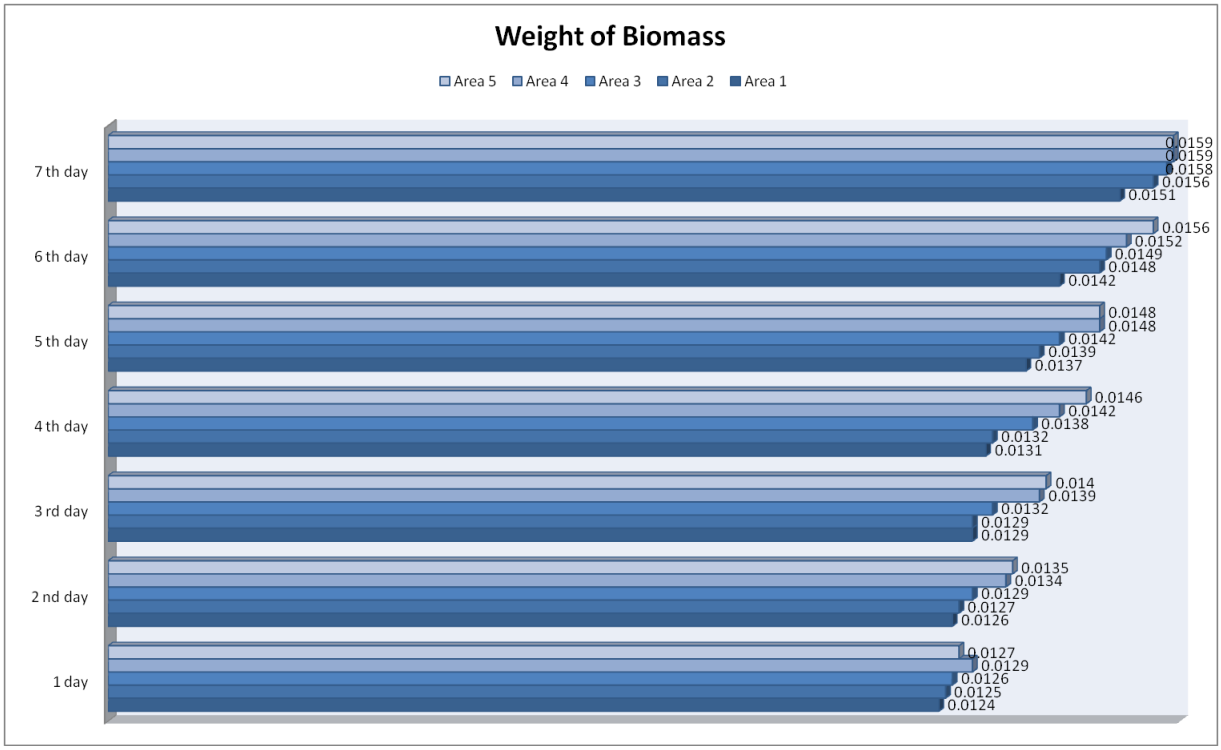

Figure : Weight of biomass accumulated over 7 days

Table: visibility of water changes over gradient 0-7

SNo	Sample	1 day	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day
1	Area 1	Transparent	Transparent	Translucent	Translucent	Turbid	Turbid	Turbid
2	Area 2	Transparent	Transparent	Translucent	Translucent	Turbid	Turbid	Turbid
3	Area 3	Transparent	Transparent	Translucent	Translucent	Turbid	Turbid	Turbid
4	Area 4	Transparent	Transparent	Translucent	Translucent	Turbid	Turbid	Turbid
5	Area 5	Transparent	Transparent	Translucent	Translucent	Turbid	Turbid	Turbid

Table: color of water changes over gradient 0-7

SNo	Sample	1 day	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day
1	Area 1	0	0.5	0.8	1.1	1.5	1.9	2.1
2	Area 2	0	1.0	1.2	1.5	2.0	2.5	2.7
3	Area 3	0	0.9	1.2	1.6	1.9	2.2	2.8
4	Area 4	0	1.1	1.9	2.6	2.9	3.1	3.2
5	Area 5	0	0.8	1.5	1.9	2.1	2.5	2.9

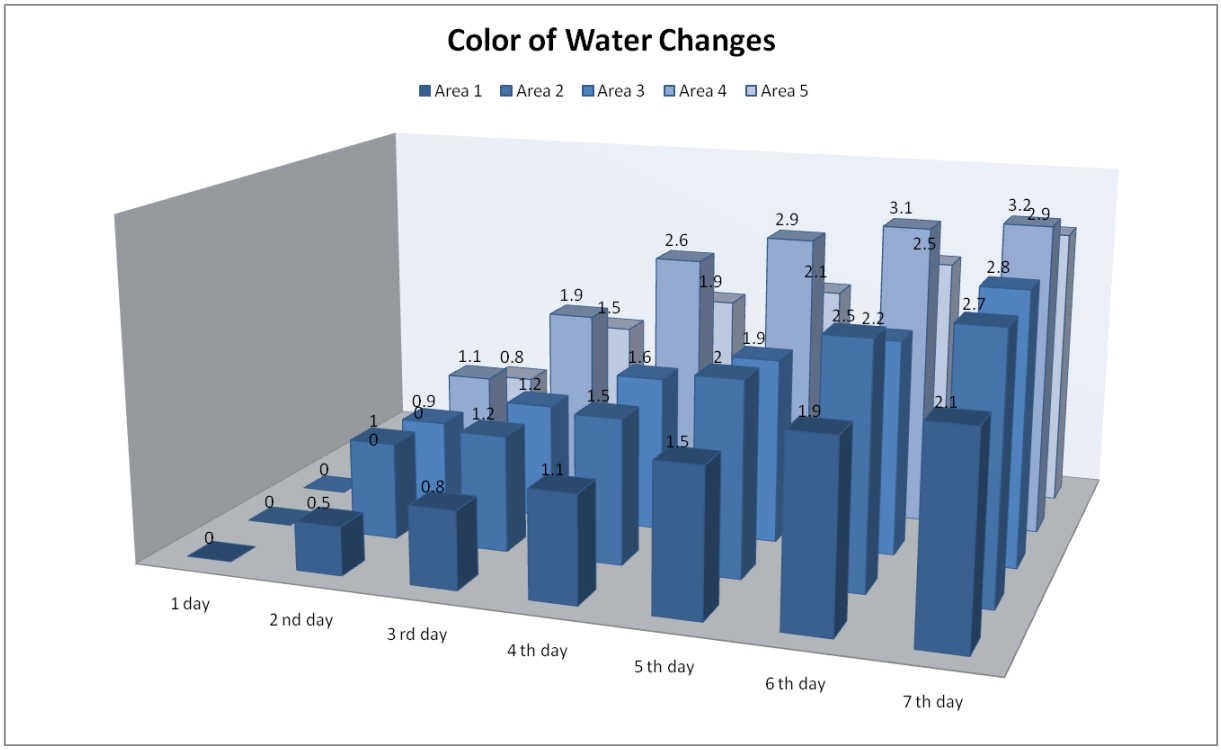

Figure : color of water changed over 7 days

Table: Odor of water changes over

SNo	Sample	1 day	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day
1	Area 1	No odor	No odor	Slight odor	Slight odor	Foul	Pungent	Pungent
2	Area 2	No odor	No odor	Slight odor	Foul	Foul	Pungent	Pungent
3	Area 3	No odor	No odor	Slight odor	Foul	Foul	Pungent	Pungent
4	Area 4	No odor	No odor	Slight odor	Foul	Pungent	Pungent	Pungent
5	Area 5	No odor	No odor	Slight odor	Foul	Pungent	Pungent	Pungent

IV. Conclusion:

It should be recommended that the storage water after 4 days were not suitable to drinking or even household work as there is too much biomass accumulation of fungi and other harmful bacteria's which made the water turbulent slimy and odorous which were certainly harmful for skin and if consummated by mistake it will be even cause harmful diseased like diarrhea and cholera and other water bourn diseased.

References:

[1]. J. L. Liang, E. J. Dziuban, G. F. Craun, V. Hill, M. R. Moore, R. J. Gelting, R. L. Calderon, M. J. Beach and S. L. Roy, MMWR Surveill. Summ., 2006, 55, 31–58.
[2]. WHO Europe, in Outbreaks of waterborne diseases, European Environment and Health Information System, 2009 (www.euro.who.int/ENHIS).
[3]. C. L. Pankhurst, N. W. Johnson and R. G. Woods, Int. Dent. J., 1998, 48, 359–368.
[4]. J. T. Walker, D. J. Bradshaw, M. R. Fulford, M. V. Martin and P. D. Marsh, in Chance or Necessity?, ed. P. Gilbert, D. Allison, M. Brading, J. Verran and J. Walker, BioLine, Cardiff, 2001, pp. 333–340.
[5]. F. F. S. Franco, D. Spratt, J. C. Leao and S. R. Porter, Biofilms, 2005, 2, 9–17.
[6]. G. C. du Moulin, E. C. Coleman Jr and J. Hedley-Whyte, Appl. Environ. Microbiol., 1987, 53, 1322–1326.
[7]. G. Pontoriero, P. Pozzoni, S. Andrulli and F. Locatelli, Nephrol., Dial., Transplant., 2003, 18, 21–25.
[8]. G. A. McFeters, S. C. Broadaway, B. H. Pyle and Y. Egozy, Appl. Environ. Microbiol., 1993, 59, 1410–1415.
[9]. H.-C. Flemming, Exp. Therm. Fluid Sci., 1997, 14, 382–391.
[10]. F. Riedewald, Pharmaceutical Engineering, 1997, 17, 1–7.
[11]. W. Harned, J. Environ. Sci., 1986, 29, 32–34.
[12]. S. Kim, S. E. Kim and J. S. Hwang, J. Microbiol. Biotechnol., 1997, 7, 200–203.
[13]. M. C. Roman and S. Minton-Summers, Life Support Biosph. Sci., 1998, 5, 45–51.
[14]. M. Regan, G. W. Harrington, H. Baribeau, R. D. Leon and D. R. Noguera, Water Res., 2003, 37, 197–205.
[15]. B. Beech and J. Sunner, Curr. Opin. Biotechnol., 2004, 15, 181–186.
[16]. K. Camper, Int. J. Food Microbiol., 2004, 92, 355–364.
[17]. F. Teng, Y. T. Guan and W. P. Zhu, Corros. Sci., 2008, 50, 2816–2823.
[18]. M. W. LeChevallier, T. M. Babcock and R. G. Lee, Appl. Environ. Microbiol., 1987, 53, 2714–2724.
[19]. J. Wingender and H.-C. Flemming, Int. J. Hyg. Environ. Health, 2011, 214, 417–423.
[20]. H.-C. Flemming, S. Percival and J. Walker, Water Sci. Technol.: Water Supply, 2002, 2, 271–280.
[21]. M. J. Vieira and L. F. Melo, Water Sci. Technol., 1995, 32, 45–52.

[22]. M. Simo˜es, L. C. Simo˜es and M. J. Vieira, LWT–Food Sci. Technol., 2010, 43, 573–583.
[23]. W. G. Characklis and K. C. Marshall, in Biofilms, ed. W.G. Characklis and K. C. Marshall, John Wiley & Sons, Inc., New York, 1990.
[24]. F. Codony, A. M. Miranda and J. Mas, Water SA, 2003, 29, 113–116.
[25]. W. J. Snelling, J. E. Moore, J. P. McKenna, D. M. Lecky and J. S. G. Dooley, Microbes Infect., 2006, 8, 578–587.
[26]. W. M. Dunne Jr., Clin. Microbiol. Rev., 2002, 15, 155–166.
[27]. L. C. Simo˜es, N. Azevedo, A. Pacheco, C. W. Keevil and M. J. Vieira, Biofouling, 2006, 22, 91–99.
[28]. H.-C. Flemming and J. Wingender, Nat. Rev. Microbiol., 2010, 8, 623–633.
[29]. T.-F. C. Mah and G. A. O'Toole, Trends Microbiol., 2001, 9, 34–39.
[30]. M. Simo˜es, M. O. Pereira and M. J. Vieira, Water Res., 2005, 39, 5142–5152.
[31]. M. Simo˜es, M. O. Pereira and M. J. Vieira, Water Res., 2005, 39, 478–486.
[32]. A. Bridier, R. Briandet, V. Thomas and F. Dubois- Brissonnet, Biofouling, 2011, 27, 1017–1032.
[33]. G. A. Gagnon, J. L. Rand, K. C. O'Leary, A. C. Rygel, C. Chauret and R. C. Andrews, Water Res., 2005, 39, 1809–1817.
[34]. L. C. Simo˜es, M. Simo˜es and M. J. Vieira, Appl. Environ. Microbiol., 2010, 76, 6673–6679.
[35]. P. S. Stewart and J. W. Costerton, Lancet, 2001, 358, 135–38.
[36]. P. S. Stewart, J. Bacteriol., 2003, 185, 1485–1491.
[37]. M. Simo˜es, M. O. Pereira, S. Sillankorva, J. Azeredo and M. J. Vieira, Biofouling, 2007, 23, 249–258.
[38]. P. S. Stewart and M. J. Franklin, Nat. Rev. Microbiol., 2008, 6, 199–210.