

Isolation of Fungi Present in Ground Water and Surface Water from Different Localities of Kolhapur District of Maharashtra, India.

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Abstract: Water body provides a large amount of easily accessible fresh water which is important for the stable commodity for any population. Fresh water available for human consumption represents only 0.6% of global water. Depending on geological features of the area, either groundwater or surface water is used as a primary source to produce tap water. In other regions of the world, rainwater is also a relevant source. In such fresh water reservoirs fungi cause contamination and human health problems. Hence, the present study was carried out for to understand the water fungal diversity.

Keywords: *Water, fungi, Isolation, Identification.*

Introduction

In relation to ecological aspects, the biogeochemical cycling of carbon in nature would not be possible without the participation of fungi acting as primary decomposers of organic material. Furthermore, in agricultural operations, fungi play important roles as mutualistic symbionts, pathogens and saprophytes, where they mobilize nutrients and affect the physico-chemical environment. Fungal metabolism is also responsible for the detoxification of organic pollutants and for bioremediating heavy metals in the environment. Water fungi play a crucial role in the freshwater ecosystem in nutrient cycling by breaking down leaves and woody substrates and also as symbionts (Barlocher and Kendrick, 1981). Because of broad enzymatic capabilities fungi can degrade actively most compounds therefore they are present in and have been revered from, diverse, remote and extreme aquatic habitats including lakes, steam distribution systems, drinking water and also on the surface of water and distribution pipes as well as in hemodialysis units.

Water body provides a large amount of easily accessible fresh water which is important for the stable commodity for any population. Fresh water available for human consumption represents only 0.6% of global water (Wurzbacher *et. al.*, 2011). Depending on geological features of the area, either groundwater or surface water is used as a primary source to produce tap water (DEFRA, 2011 and Gray, 2014). In other regions of the world, rainwater is also a relevant source. In such fresh water reservoirs fungi cause contamination and human health problems.

Hence, the present study was carried out to understand the water fungal diversity. For the study of fungal community present in water, we have collected ground water (Boar water) and surface water samples (well water, lake water and river water) from Kolhapur district.

Material and Method

Sample collection:

Ground water (Boar water) and surface water samples (well water, lake water and river water) were aseptically collected from one to two meters away from the bank, in pre-sterilized bottles from different water bodies of district Kolhapur (Kerle, Kapshi, Karnur), during March 2018. 1 ml of the collected sample were inoculated on to agar medium supplemented with antibiotics (Streptomycin) to inhibit bacterial growth and incubated for 24-96 h at 28±2°C. (Hageskal *et al.*, 2006).

Isolation of fungi from water:

Serial dilution agar plating (Apinis, 1963) were employed for the isolation of water fungi. Representative samples of water were taken in known quantities of sterile water and diluted serially to obtain different concentrations of the organisms distributed in the suspensions. 1 ml portions of the suspension was added to petri dishes to which suitably melted and cooled agar (45°C) medium (Czapek Dox Agar- NaNO₃ 2.0 g, KCl 0.5 g, K₂HPO₄ 1.0 g, MgSO₄·7H₂O 0.5 g, FeSO₄·7H₂O 0.01 g,) was added to mixed, thoroughly with suspension and allowed to set. Three plates from each water samples were incubated for 24-96 h at 28±2°C, and each morphologically unique fungal colony was sub-cultured and purified using standard techniques. Macroscopic characters such as colony form, structure, size and colour are also important. On the basis of morphological, microscopic characters and following relevant mycological literature the fungal isolate was identified.

Result and discussion

Ground water (boar water) showed presence of mostly organic waste degrading fungi i. e. *Mucor*, *Penicillium*. Surface water showed presence of *Mucor*, *Aspergillus flavus*, *Fusarium*, *Aspergillus niger*, *Penicillium*, *Alternaria* and *Trichoderma*.

In US work was done on filamentous fungi. According to Kelley *et al.* (2003) *Alternaria alternata*, *Aspergillus niger*, *Cladosporium* sp., *Epicoccum nigrum* and many *Penicillium* sp. were prevalent in water.

The presence, colonization and growth of fungi in tap water depends on several factors, such as location of primary water source, sun irradiation, temperature, ion composition and pH, presence of organic material, dissolved oxygen concentration, water treatment, use of materials for water distribution systems. According to some workers, the concentration of organic matter in water depends on the location and the surface area of water bodies (Wurzbacher, *et al.*, 2011; Baldy, *et al.*, 2002; Barlocher, *et al.*, 2007 and Medeiros, *et al.*, 2008). Small surface water bodies or water with low flow receive the most of organic matter due to the plant vegetation, and larger water bodies and streams on high altitude are mainly supplied with organic matter due to the algal primary producers (Wurzbacher *et al.*, 2011). Besides these, also human habitation may contribute to the water pollution with organic substances via fertilizers or industrial and household waste (Weber, *et al.*, 2009 and Wurzbacher, *et al.*, 2010). According to Tsui, *et al.* 2016, surface water contains high biomass and rich diversity of plant degrading filamentous fungi. Rudenko, *et al.* 2011, revealed that, in Europe, the majority of the isolated fungal species from surface-, ground- and tap water belong to the ascomycetous genera *Alternaria*, *Aspergillus*, *Cladosporium*, *Fusarium*, *Gibberella*, *Penicillium*, *Phoma*, *Sarocladium*, *Scopulariopsis*, *Sporothrix*, *Talaromyces* and *Trichoderma*, but also fungi from subphylum Mucormycotina, such as *Absidia*, *Mortierella*, *Mucor*, *Rhizopus* and *Umbelopsis* were regularly isolated.

Table 1: The fungi isolated from different localities of Kolhapur district of Maharashtra

Sr. No.	Place of collected samples	Isolation method	Type of water	Name of Isolated fungi
1.	Kerle	Serial dilution	Well water	<i>Mucor, Aspergillus flavus</i>
			River water	<i>Mucor, Aspergillus flavus, Aspergillus niger</i>
			Lake water	<i>Mucor, Aspergillus flavus</i>
			Boar water	<i>Mucor</i>
2	Kapshi	Serial dilution	Well water	<i>Mucor, Alternaria</i>
			River water	<i>Alternaria</i>
			Lake water	<i>Fusarium, Aspergillus niger</i>
			Boar water	<i>Penicillium</i>
3	Karnur	Serial dilution	Well water	<i>Trichoderma, Mucor</i>
			River water	<i>Aspergillus flavus, Aspergillus niger</i>
			Lake water	<i>Penicillium, Aspergillus flavus</i>
			Boar water	-

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