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Investigation of Rhizosphere Mycoflora of *Hibiscus sabdariffa* L. from various fields near by Akola city

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Abstract

Soil fungi including mycoflora play and important role in nutrient cycling, plant health and development. In present study rhizosphere mycoflora of *Hibiscus sabdariffa from* three different sites of nearby Akola city area namely Kanheri Sarap, Mhaispur and Kapsi were isolated. In this study diversity large of mycoflora was observed. The commonly observed genera of fungi were Alternaria, Aspergillus, Chaetomium, Cunninghamella, Curvularia,Penicillium, Phoma, Rhizopus, Syncephalastrum, Trichoderma etc.

Keywords: rhizosphere mycoflora, *Hibiscus sabdariffa,* Soil fungi

Introduction

The role of fungi in soil is extremely complex and is fundamental to the soil ecosystem (Bridge and Sponer, 2001). Soil fungi play and important role in nutrient cycling, plant health and development (Thorn, 1997). The term rhizosphere was introduced in 1904 by the scientist Hiltner to denote the region of soil is under the influence of plant root. His research expanded from studying the relationship between symbiotic N2- fixing bacteria and the legume root. According to the him rhizosphere is a portion of soil which is adjacent to the root system of a plant and is influenced by the root system of a plant.

The rhizosphere is an area of soil showing microbiological activity, which is slightly away from root system of the growing plant. The width of this zone of soil varies with the type, age of plant and with soil environmental conditions. Rhizosphere mycoflora differs from plant to plant. This zone is about 1mm wide, but has no distinct edge. Rather, it is an area of intense biological and chemical activity influenced by compound exuded by the root, and by microorganism feeding on the compounds. As plant roots grow through soil they release water soluble compound such as amino acids sugars and organic acids that

supply food for the microorganisms. The food supply means microbiological activity in the rhizosphere is much greater than in soil aways from plant roots. In return the microorganisms provide nutrient for the plants (Curl & Truelove, 2012).

According to Suresh and Bagyaraj (2002), the rhizosphere soil has a higher carbon dioxide content, a lower pH, and lower water and oxygen pressure. The rhizosphere has a variety of interaction areas, ranging from advantageous symbiotic partnerships to harmful pathogenic associations (Sylvia et al., 2005). A wide variety of saprophytic bacteria are abundant in the rhizosphere soil of mild plants. This might be because rhizodeposition adds a lot of organic carbon compounds to the soil (Rovira, 1956; Merckx et al., 1987). Considering above aspects, the present investigation on rhizosphere mycoflora of *Hibiscus sabdariffa* L. was carried out from different sites of Akola city.

Materials and Methods

Material

The roselle (*Hibiscus sabdariffa* L.), is an annual shrub that is a member of the Malvaceae family. It is grown in tropical and subtropical areas for its delicious calyxes, popular stem fibres, and 3 to 5 inch (7.5 to 12.5 cm) long, green leaves that can reach a height of 8 feet (2.4 meters). Known by several names, including Roselle, Sorrel, Mesta, and Karkade, it is a widely used plant (Abu-Tarboush and Ahmed, 1996). Because it contains a large variety of phenolic compounds, it is regarded as one of the most widely used medicinal herbs for its antibacterial and antioxidant properties (Anokwuru et al., 2011).

Collection of Plants

For the present study, samples were collected in the month of the January to March. The temperature during these month ranges from 22-30^{0}C. The sampling was done during morning at 7am-10am. The samples of fresh and healthy plants were collected in well sterilized polythene bags. The roots of roselle (*Hibiscus sabdariffa* L.) were collected from deferent fields of nearby Akola city. Samples were kept until isolation and identification were made. The roots of collected samples were inoculated directly on potato dextrose agar media (PDA) for germination of fungal spores. PAD was prepared by following method-

Preparation of fungal media

Potato - 250gm
Dextrose - 20gm
Agar Agar - 20gm
Distil water - 1000ml

After germination of spores, fungal identification is carried out based largely on the morphological character of spores and spore bearing structure by using direct microscopy and again by colour, size and shape of fugal colonies. Standard cotton blue was used for slide preparation. Microphotography of identified fungi was done by Zeiss Axio StarPlus Trinocular Microscope using Canon Power Shot G12 digital Camera.

Results and Discussion

For the present study three different sites of nearby Akola city area namely KanheriSarap, Mhaispur and Kapsi were selected. Total18 different species of fungi were isolated from all these three sites in rhizosphere of *H. sabdariffa*. The genera of fungi isolated are: *Alternaria, Aspergillus, Chaetomium, Cunninghamella, Curvularia, Penicillium, Phoma, Rhizopus, Syncephalastrum, Trichoderma* etc. Apart from these some unknown fungal species were also reported. The reported fungi sp. are arranged in table.

Sr. No.	Locality / Name of Fungi	Kanheri Sarap	Mhaispur	Kapsi
1.	*Alterneria alternata*	+	+	+
2.	*Aspergillus niger*	+	+	+
3.	*Aspergillus flavus*	+	+	+
4.	*Aspergillus fumigatus*	+	+	+
5.	*Aspergillus* sp. 1	+	+	-
6.	*Aspergillus* sp. 2	-	+	+
7.	*Chaetomium* sp.	+	+	+
8.	*Cunninghamella* sp.	+	-	-
9.	*Curvularia* sp.	+	+	+
10.	*Fusarium* sp.	+	+	+
11.	*Penicillium* sp.	+	+	+
12.	*Phoma* sp.	+	+	+
13.	*Rhizopus* sp.	+	+	+
14.	*Mucor sp.*	+	+	+
15.	*Syncephalastrum* sp.	+	-	+
16.	*Trichoderma sp.*	+	-	-
17.	*Unknown – sp.* 1	-	-	+
18.	*Unknown – sp.* 2	+	-	-

(+) - Present, (-) – Absent

From the above observation the diversity of rhizosphere mycoflora in H. sabdariffa was found highest in KanheriSarap site with 16 species followed by Kapsi and Mhaispur with 14 and 13 species respectively. *Aspergillus flavus, Aspergillus niger, Alternaria alternata, Rhizopus* sp., *Penicillium* sp., *Trichoderma* sp. *and Curvularia* sp were among the fungi isolated from the rhizosphere soils in this study. These fungi supported the findings of several researchers, including Arotupin and Akinyosoye (2006), Oyeyiola (2009), Sule and Oyeyiola (2012), and Olahan et al. (2015).

Conclusion

The study's findings demonstrated that a variety of fungal species, populations, and diversity inhabit the rhizosphere soil.Rhizosphere fungal hyphae extend into the soil, penetrating into nutrient depletion zone and increases the effectiveness of immobile elements by as much as sixty times (Wenzel et al., 1999).This work is significant because it establishes a baseline of the fungi that may be present in the rhizosphere.

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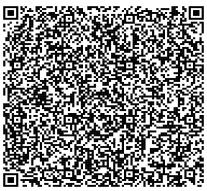	Website: www.ijarbs.com
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