



Studies on Rhizosphere Microflora of *Ocimum Sanctum* L, *Adhatoda Vasica* Nees and *Aloe Vera* L.

KEYWORDS

Ocimum sanctum L, *Adhatoda vasica* Nees, *Aloe vera* L. antifungal activity, *Aspergillus* spp., *Penicillium* spp.

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ABSTRACT *Rhizosphere is the site of interface between soil, plant roots and soil microorganism which can influence the environment and processes (Lynch 1990). In present studies Ocimum sanctum L (Amit kumar, et al., 2013, Gupta, S. K; et al., 2002), Adhatoda vasica Nees (Arbind kumar, et.al, 2013) and Aloe vera L. were selected for Rhizosphere study. Ocimum sanctum L, Adhatoda vasica Nees and Aloe vera L. showed antifungal activity. Indian soil contain Aspergillus spp., Rhizopus spp., Fusarium spp., Cephalosporium spp., Alternaria spp., Penicillium spp., Trichoderma spp., Curvularia spp., Cladosporium spp., Phoma spp., Botrytis spp., Rhizoctonia spp., Colletotrichum spp., Absidia corymbifera, Verticillium spp., Phytophthora spp., Chaetomium spp., Nigrospora saccha, Helminthosporium spp. (Alexopoulos, C. J; Mims, C. W; 1960). We have found that the soil selected shows antifungal quality.*

INTRODUCTION

The term Rhizosphere was introduced by Hiltner in 1904 to describe soil zone Surroundings roots with intensive fungal and bacterial activity. The "Rhizosphere effect" is the stimulation of soil microbial population in the Rhizosphere soil owing to release of root exudates by plants (Lynch 1990). In the Rhizosphere, some microbial activities are critical for plant growth (Kennedy and de Luna 2004). Some beneficial microorganisms have important plant growth promoting functions (e.g. biocontrol, hormone production, bioremediation) (Dobbelaere 2003). However, interactions between roots and microorganisms can also be negative, as is the case of plants by pathogenic bacteria or fungi and plant growth-inhibiting microorganism (Bais et al. 2006; Gregory 2006; Rajimakers et al. 2009).

The nutritionally rich base encourages mold sporulation and pigment production in some dermatophytes. *Saccharomyces* grows as creamy to white colonies. Molds grow as filamentous colonies of various colors. *Aspergillus* spp., *Curvularia* spp., *Trichoderma* spp., *Penicillium* spp., *Fusarium* spp., *Colletotrichum* spp., *Trichoderma* spp., *Cladosporium* spp., *Saccharomyces*, found during the work.

MATERIALS AND METHODS

Medicinal plants (Akhilesh Sharma, et al., 2011) *Ocimum sanctum* L., *Adhatoda vasica* Nees and *Aloe vera* L. were collected from Garden. The plants were authenticated by Botany Department of Patkar-Varde College, (Almeida, M. R; 1996 Flora of Maharashtra). The plants root removed from soil. Soil was analysed (Mishra, R. R; 1996, Rai, M. M; 2002). Rajan, S. V. Govinda; Rao, H. G; Gopala, 1978. The roots were washed thoroughly 2-3 times with running water and once with sterile distilled water, then air-dried on sterile blotter under shade.

Preparation of Root Extract:

The root of *Ocimum sanctum* L., *Adhatoda vasica* Nees and *Aloe vera* L. were air dried in oven at 60°C at 6-8 hours for 2-3 days. The dried materials crushed in Mortar and Pestle and powdered in an electric grinder. Twenty grams of powdered root material mixed with 100 ml of solvents (1:1) methanol and ethanol. The extracts were prepared by using Clevenger apparatus collected and stored in a vial for further studies.

Culture plates:

Potato Dextrose Agar (PDA) which is rich and basic medium fungal culture. Potato Dextrose Agar is used for cultivation of

fungi. PDA is general purpose culture medium for *Saccharomyces* and molds that can be supplemented with acid or antibiotics to inhibit the bacteria growth. PDA can be used for growing clinically significant *Saccharomyces* and molds. The nutritionally rich base encourages mold sporulation and pigment production in some dermatophytes. *Saccharomyces* grows as creamy to white colonies. Molds grow as filamentous colonies of various colors. Count the number of colonies and consider the dilution factor (if the test sample was diluted) in determining the *Saccharomyces* and/or mold counts per gram or milliliter of material. (Shengjing Shi -2009)

RESULTS AND DISCUSSION

Soil mycoflora is the fungal flora of soil. There were different fungi present in this flora. i.e. *Aspergillus fumigatus*, *Aspergillus nigar*, *Penicillium chrysogenum*, *Penicillium citrinum*, *Trichoderma viride*, *Trichoderma herzinaum*, *Fusarium oxysporum*, *Colletotrichum gloeosporioides*, *Curvularia lunata*, *Cladosporium herbarum* and *Saccharomyces*.

SOIL MYCOFLORA



1 *Ocimum* soil fungal culture (December)



2 Ocimum soil fungal culture (January)



5 Aloe soil fungal culture (December)



3 Adhathoda soil fungal culture (December)



6 Aloe soil fungal culture (January)



4 Adhathoda soil fungal culture (January)



Ocimum sanctum L.

Effect of root extraction on soil culture of medicinal plant



Adhatoda vasica Nees.



Aloe vera L.

OBSERVATION TABLE

Fungus found in PDA culture (Table 1)

Sr. No	Appearance	Name of Fungus	Ocimum sanctum (I)	Ocimum sanctum (II)	Adhatoda Vasica (I)	Adhatoda Vasica (II)	Aloe Vera (I)	Aloe Vera (II)
1	Green Colour	<i>Aspergillus fumigatus</i>	+	+	-	-	-	-
2	Green Colour	<i>Aspergillus Niger</i>	-	-	-	-	+	-
3	White Colour	<i>Fusarium oxysporum</i>	+	+	-	-	-	-
4	White Colour	<i>Colletotrichum Gloeosporioids</i>	-	+	-	-	-	-
5	Green Colour	<i>Penicillium Chrysogenum</i>	-	-	-	-	-	+
6	Green Colour	<i>Penicillium Citrinum</i>	-	-	-	-	+	-
6	Green Colour	<i>Trichoderma Viride</i>	+	-	-	-	-	-
7	Green Colour	<i>Trichoderma herzianum</i>	-	-	-	-	-	+
8	Black Colour	<i>Curvularia Lunata</i>	-	-	+	-	-	-
9	Black Colour	<i>Cladosporium herbarum.</i>	-	-	+	-	-	-
10	Creamish Spots	<i>Saccharomyces Yeast</i>	-	-	+	+	-	-

(I) December 2013

(II) January 2014

OBSERVATION TABLE

Effect of root extraction on soil mycoflora (Table no. 2) January 2014

Sr. no.	Appearance	Name of fungus	Ocimum sanctum L.	Adhatoda vasica Nees	Aloe vera L.
1.	Green colour	<i>Aspergillus fumigatus</i>	+	-	-
2.	Black colour	<i>Aspergillus niger</i>	-	-	+
3.	White colour	<i>Fusarium oxysporum</i>	+	-	-
4.	Green	<i>Penicillium spp.</i>	-	-	+
5.	Creamish spot	<i>Sacchacromyces- yeast</i>	-	+	-

- Sign shows the inhibition of fungal colony.

In soil mycoflora study, the soil culture of the medicinal plants shows various colonies which contain *Aspergillus fumigatus*, *Aspergillus niger*, *Fusarium oxysporum*, *Collectotrichum gloeosporioides*, *Trichoderma viride*, *Trichoderma herzianum*, *Penicillium chrysogenum*, *Penicillium citrinum*, *Curvularia lunata*, *Cladosporium herbarum* etc. Soil culture *Ocimum sanctum* L. During December shows fungal colonies are -*Aspergillus fumigatus*, *Fusarium oxysporum* and *Trichoderma viride* were found. In January Soil culture of *Ocimum sanctum* L. culture shows *Aspergillus fumigatus*, *Fusarium oxysporum*, *Collectotrichum gloeosporioides* were found.

The soil culture of *Adhatoda vasica* Nees shows fungal colonies are *Curvularia lunata*, *Cladosporium herberum* and Yeast *Saccharomyces* found during December. Soil culture of *Adhatoda vasica* Nees during January shows only Yeast *Saccharomyces*.

The soil culture of *Aloe vera* L. shows fungal colonies are *Penicillium citrinum* and *Aspergillus niger* during December which infect the plants. During January soil culture of *Aloe vera* L. shows fungal colonies of *Penicillium chrysogenum* and *Trichoderma herzianum*. It shows seasonal variation.

Root extraction on soil culture of *Ocimum sanctum* L. plants were show fungal colonies are *Aspergillus fumigatus* and *Fusarium oxysporum*. Root extraction on soil culture of *Adhatoda vasica* Nees was shown only yeast colonies. It shows antifungal and antibacterial activity.

Root extraction on soil culture of *Aloe vera* L. were show fungal colonies are *Aspergillus niger* and *Penicillium* spp.

Recommendations

1. *Ocimum sanctum* L. should be cultivated for medicinal importance. It has been observed that *Tulsi* has antioxidant, antibiotic, immunomodulatory, anti-inflammatory, analgesic, antiulcer, chemopreventive and antipyretic properties and antifungal activity. (G. Devendran and U. Balasubramanian, et al.,2011)
2. *Adhatoda vasica* Nees should be cultivated for medicinal importance. It is also anti-inflammatory, analgesic, diarrhoea, dysentery, antioxidant, sedative, antimicrobial activity, anti-diabetic activity, wound healing effect, anti-ulcer, antibacterial and antifungal activity (Akhilesh Sharma et al.,2011).
3. *Aloe vera* L. should be cultivated for medicinal importance. It is used in jaundice due to viral hepatitis, spleen disorders. It is emollient, anti-inflammatory, antimicrobial used for wound healing sunburn and antifungal activity. (Akhilesh Sharma et al.,2011)

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