

# Invitro Antimicrobial Activity of Queen of Oils (*Seasamum indicum* L.) against Seed Microflora of Groundnut

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**Abstract:** *The indiscriminate use of pesticides all over the world in general and in India particular has badly damaged our environment for the last forty years. The increased use of pesticides in the field of agriculture has become major source of environmental pollution affecting the ecosystem, Consumption of organomurcurial fungicides which are primarily used for seed treatment is gradually increasing. A wide variety of fungicides used for seed treatment are being produced in India. These include organomurcurial, thiram, mancozeb etc. These fungicides applied to crop are long lived and residues persist in soil causing pollution. To solve this problem in the present studies evaluation of queen of oil (Seasamum indicum L.) is used for seed treatment which shows maximum efficacy against seed mycoflora. 3% Extract was found to be significantly effective at all concentrations against various fungi.*

**Keywords:** Invitro, Antimicrobial, Essential oil, Seed Mycoflora

## I. INTRODUCTION

The indiscriminate use of pesticides all over the world in general and India particular has badly damaged our environment for the last forty years. Use of non-target pesticides has caused severe damage to our biodiversity and damage to soil microflora. This ultimately affected the fertility of soil, moreover the use of bulk pesticides and chemical fertilizers have polluted our Environment beyond repair.

Time has come to avoid the use of fungicides and opt for control of diseases by biological control and by the use of biopesticides, which are target oriented and biodegradable. Hence, in view of the alarming present situation we need to embrace alternative natural therapy for controlling the cop diseases. Use of essential oils from plants would be an alternative therefore studies focused on evaluation of oil from (*Seasamum indicum* L.) (Teel) showing inhibitory effect against (fungi) seed mycoflora is undertaken. The Nuts contains a variety of phenols like, anacardic acid, cardol, catechol, anacardol, semecarpol and a fixed oil.

## II. MATERIALS AND METHODS

The seeds of plant were subjected to Soxhlet extraction separately and successfully with methanol (50° -85° C). The fractions obtained were evaporated and essential oil was obtained, which are preserved in suitable glass vials at room temperature.

In order to study the seed mycoflora the cultivator seed samples were obtained from authentic soures like oil seed research station, Latur. Surface and internal mycoflora of different groundnut varieties was worked out. The pathogenic fungi after isolation were cultured for their sensitivity tests towards essential oil of (*Seasamum indicum* L.) (Plate-I).

100 seeds were taken randomly in a plastic pouch and the essential oil was added. In this case of seed treatment the concentration of oil was adjusted to 1% (w/w). During the process of seed treatment seed were thoroughly agitated with oil taken in plastic pouch. Such treated seeds were then plated equidistantly on three layers of wet blotters in petri-dishes and then the plates were incubated for a period of 1 week as per the standard condition of ISTA.

For evaluating antifungal efficacy of essential oil under study, disc diffusion method was adopted. For this sterilized blank whatman filter paper discs were used. The discs were impregnated with essential oil and kept in slanted position so as to drain off excess oil.

For sensitivity testing PDA plates were seeded with each isolated plant pathogenic fungi and oil impregnated paper disc was placed on it in the center aseptically. All the plates were then incubated at 37°C for 5 days. After incubation results were noted by measuring zone of growth inhibition in mm and average value was calculated for each fungus.

### III. RESULT AND DISCUSSION

Essential oil used in general inhibited the seed mycoflora to a greater extent with respect to Fungi like *Alternaria Sps.*, *Curvularia Sps.*, *Fusarium Sps.*, *Rhizopus Sps.* Storage fungi like *Aspergilli* and *Penicillia* also were inhibited to greater extent. The biopesticide in the form of essential oil obtained from (*Seasamum indicum L.*) shows its exceptional efficacy as an effective inhibitor against the pathogenic agents like *Alternaria Sps.*, *Curvularia Sps.*, *Fusarium Sps.*, *Rhizopus Sps.*, *Aspergilli* and *Penicillia*.

These days an alternative to synthetic fungicides products of Botanical origin are being used to prevent fungal diseases in crop plants. Large number of plants contained essential oils which are known to be antifungal in nature. In the present study while evaluating the efficiency of essential oil from *Seasamum indicum L.* against seed mycoflora, in general it was observed that the antifungal efficacy of essential oil was effective against *Curvularia*, *Fusarium*, *Alternaria*, *Aspergillus niger*, *Aspergillus flavous*, *Penicillium* etc. (Table I)

The inhibitory effect of essential oil from *Seasamum indicum* against fungi isolated were studied individually (Table-II)

**Table-I:** Effect of essential oil on seed mycoflora of groundnut

Mycoflora	% Occurrence of Fungi due to essential oil Treatment on Groundnut	
	C	T
<i>Aspergillus niger</i>	50	02
<i>Aspergillus flavous</i>	20	05
<i>Alternaria Sps.</i>	27	—
<i>Curvularia Sps.</i>	10	—
<i>Fusarium Sps.</i>	30	—
<i>Penicillium Sps.</i>	40	10
<i>Rhizopus Sps.</i>	60	—

C - Control T - Treated

**Table - II:** Antifungal effect of essential oil against plant pathogenic fungi

Essential oil	Average value of zone of inhibition in mm against fungi				
	<i>Aspergillus</i>	<i>Penicillium</i>	<i>Rhizopus</i>	<i>Fusarium</i>	<i>Alternaria</i>
<i>Semecarpus anacardium</i> oil	29	36	34	28	40

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**REFERENCES**

- [1]. Ahmed, M., M. Hossain, K. Hassan and C.K. Dash: Efficacy of different plant extract on reducing seed borne infection and increasing germination of collected rice seed sample. *Universal J. Pl. Sci.*, 66- 73 (2013).
- [2]. Ana, M.D., M.D. Sokovic, M.S. Ristic, S.M. Grujic, K.S. Mileski and P.D. Marin: Chemical composition, antifungal and antioxidant activity of *Pelargonium graveolens* essential oil. *J. Appl. Pharmac. Sci.*, 4, 1-5 (2014).
- [3]. Anjali, P., H. Pauline, G. Robert, Veness and S.E. Christine: Antimicrobial action of palmarosa oil (*Cymbopogon martinii*)
- [4]. Archana, B. and H.S. Prakash: Survey of seed-borne fungi associated with rice seeds in India. *Int. J. Res. Pure Appl. Microbiol.*, 3, 25-29 (2013).
- [5]. Booth, C.: The genus *Fusarium*. CMI, Kew, Surrey, England, pp. 238 (1971).
- [6]. Cook, R.J.: Making greater use of introduced microorganisms for biological control of plant pathogens. *Annu. Rev. Phytopathol.*, 31, 53-80 (1993).
- [7]. Deans, S.G. and Ritchie, G. 1987. Antibacterial properties of plant essential oils, *IJFM*. 5:165-180
- [8]. Farhang, V., J. Amini, T. Javadi, J. Nazemi and A. Ebadollahi: Chemical composition and antifungal activity of essential oil of *Cymbopogon citratus* (DC.) Stapf. against three *Phytophthora* species. *Greener J. Biol. Sci.*, 3, 292- 298 (2013).
- [9]. Gangopadhyay, S. and K.S. Kapoor: Control of *Fusarium* wilt of okra with seed treatment. *Indian J. Mycol. Plant Pathol.*, 7, 147-149 (1977).
- [10]. Gomez, K.A. and A.A Gomez: *Statistical Procedure for Agricultural Research*. John Wiley and Sons, New York, USA (1984).
- [11]. Gopalakrishnan, C., A. Kamalakannan and V. Valluvaparidasan: Survey of seed-borne fungi associated with rice seeds in Tamil Nadu, India. *Libyan Agri. Res. Center J. Int.*, 1, 307-309 (2010).
- [12]. Ibiam, O.F.A., C.I. Umechuruba and A.E. Arinze: A survey of seed borne fungi associated with seeds of rice (*Oryza sativa* L. FARO 12, 15 and 29) in storage and the field in Afikpo North local Government area of Ebonyi State. *Scientia Africana*, 7, 1-4 (2008).
- [13]. IRRI: International Rice Research Institute, IRRI, World Rice Statistics (WRS), Facts and Figures, pp. 1960-2010. (2008).
- [14]. ISTA: International Seed Testing Association. 3 Edn. ISTA, Handbook on Seedling Evaluation, (2003). Joseph, B., M.A. Das and V. Kumar: Bio efficacy of plant extracts to control *Fusarium solani* f. sp. *melangenae* incident of brinjal wilt. *Global. J. Biotechnol. Biochem.*, 3, 56-59 (2008).
- [15]. Kakoly, M.K.J., M.M. Rashid, M. Shamim Hasan and M.Nurealam Siddiqui: Study of seed-borne fungal pathogens of kataribhog aromatic rice and comparison of field intensity with laboratory counts. *Int. J. Biosciences*, 4, 66-74 (2014).
- [16]. Khazada, K.A., M.A. Rajput, G.S. Shah, A.M. Lodhi and F. Mehboob: Effect of seed dressing fungicides for the control of seed borne mycoflora of wheat. *Asian J. Plant Sci.*, 1, 441-444 (2002). Kishore, K., G. Pande and S. Harsha: Evaluation of essential oils and their components for broad-spectrum antifungal activity and control of late leaf spot and crown rot diseases in peanut. *Plant Dis.*, 91, 375- 379 (2007).
- [17]. Mathur, S.B. and O. Kongsdal: Common laboratory seed health testing st method for detecting fungi, 1 Edn., International Seed Testing Association, Zurich, pp. 425 (2003).
- [18]. Moleyar, V. and Narasimhan, P. 1987. Mode of antifungal action of essential oil components citral and camphor, *Indian Journal of Expt. Bio.* 31 (4) : 322 - 334.
- [19]. Naqvi, S.D.Y., T. Shiden, W. Merhawi and S. Mehret: Identification of seed borne fungi on farmer saved sorghum (*Sorghum bicolor* L.), pearl millet (*Pennisetum glaucum* L.) and groundnut (*Arachis hypogaea* L.) seeds. *Agric. Sci. Res. J.*, 3, 107-114 (2013).
- [20]. Nehal, S. and EI-Mougy: Effect of some essential oils for limiting early blight (*Alternaria solani*) development in potato field. *J. Plant Prot. Res.*, 49, 57-61 (2009).
- [21]. Neergaard, P: *Seed Pathology*. MacMillan Press Ltd., London and Basinstoke, p.1187 (1977).

- [22]. Nene, Y.L. and P.N Thapliyal: Fungicides in plant diseases control. Oxford and IPH. Publishing Co. Pvt. Ltd., New Delhi, pp. 531 (1993).
- [23]. Nguefack, G.J., G.E. Wulff, J.B.L. Dongmo, F.R. Fouelefack, F. Daniel, M.B.O. Joseph and J. Torp: Effect of plant extracts and an essential oil on the control brown spot disease, tillering, number of panicles and yield increase in rice. *Eur. J. Plant Pathol.*, 137, 871-882 (2013).
- [24]. Nguefack, J., V. Leth, J.B. Lekagne, J. Dongmo, P.H. Torp, S. Amvam Zollo and Nyasse: Use of three essential oils as seed treatments against seed borne fungi of rice (*Orza sativa* L.) *American Eurasian J. Agric. Environ. Sci.*, 4, 5-554 (2008).
- [25]. Nguefack, J., S.K. Nguikwie and D. Fotio: Fungicidal potential of essential oils and fractions from *Cymbopogon citratus*, *Ocimum gratissimum* and *Thymus vulgaris* to control *Alternaria padwickii* and *Bipolaris oryzae*, two seed-borne fungi of rice (*Oryza sativa* L.). *J. Essential Oil Res.*, 17, 581-587 (2007).
- [26]. Prasad, M.S., D.Ladhalaxmi, V. Prakasam, G.S. Latha, D. Krishnaveni and B.C. Viraktamath: Disease management in rice: A ready reckoner. Technical Bulletin No. 60. Directorate of Rice Research, Rajendranagar, Hyderabad, Andhra Pradesh, India, pp. 1-34 (2012).
- [27]. Raj, M.H., S.R. Niranjana, S.C. Nayaka and H.S. Shetty: Health status of farmers saved paddy, sorghum, sunflower and cowpea seeds in Karnataka, India. *World J. Agric. Sci.*, 3, 167-177 (2007). Reddy, C.S., K.R.N. Reddy, R.N. Kumar, G.S. Laha and K. Muralidharan: Exploration of aflatoxin contamination and its management in rice. *J. Mycol. Plant Pathol.*, 34, 816-820 (2004).
- [28]. Schwinn, F.J.: Seed treatment-A panacea for plant protection. In: Seed treatment Proceedings of a symposium of the British Crop Protection Council and Pesticides (Ed.: Trevor). Group of the Society of Chemical Industry, Canterbury, pp.3-13 (1994).
- [29]. Singh, A.K. Diekshit, A; Sharma, M.L. and Dixit, S.N. 1980. Fungitoxic activity of some essential oils. *Economic Botany* 34: 186-190.
- [30]. Somda, I., J. Sanou and P Sanon: Seed-borne infection of farmer-saved maize seeds by pathogenic fungi and their transmission to seedlings. *Plant Pathol. J.*, 7, 98-103 (2008).
- [31]. Uma, V. and E.G. Wesely: Seed borne fungi of rice from South Tamil Nadu. *J. Acad. Indus.Res.*, 1, 612-614 (2013).
- [32]. Valiathan, M.S. Healing plants, *current science*, 75: 1122-1126(1998).