SHORT COMMUNICATIONS

Antimicrobial Activities of *Ocimum americanum* L. Essential Oil

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Antimicrobial effects of essential oil of *Ocimum americanum* L. were studied by disk diffusion method. The essential oil was active against all tested microorganisms, that included, *Bacillus subtilis, B. megaterium, Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Aspergillus niger, Rhizopus stolonifer, R. oryzae, Candida albicans and Colletotrichum musae.* High toxicity against the mycelial growth of *C. musae* was found.

Ocimum americanum (Hoary basil) is an ethnomedicinal plant used in folk medicine as a carminative, diaphoretic, stimulative, to cure respiratory and hepatic infections, for renal disorders and migraine[1]. The seeds are used to treat influenza, chest and lung complaints[2]. Leaves are used to treat parasitical skin diseases[3,4] in hair care treatments, to arrest greying processes[5], for treating dysentery[6], to cure abdominal pains[7], to alleviate insect bites[8], as a diuretic, tonic[9] and to treat cold and respiratory troubles[10]. Leaves of the plant are also used against malarial fever along with black pepper[11]. *O. americanum* is used in folk medicine for ailments of the eye, viz., night blindness, cataract, conjunctivitis, eye sores and for the improvement of eye sight[12]. The essential oil of the plant forms a part of several drugs and pharmaceuticals[13,14]. Several studies have reported the chemical composition of the essential oil of *O. americanum*[15-17]. In the present investigation, antimicrobial activities of the essential oil of *O. americanum* were tested against ten economically important microorganisms.

Leaves and flowers of *O. americanum* used in this investigation were collected from Calicut University Campus. Voucher specimens (CU 52974) were herberized at the Botany Department of Calicut University.

Mature leaves and inflorescences were collected, cleaned and shade dried at room temperature. Calcium carbonate crystals were added before distillation over the dried, flaked and powdered plant material to prevent isomerisation of unstable compounds. Hydrodistillation of the raw material was done on a Clevanger apparatus for 4 h at 100°. The isolated oil was dried over anhydrous sodium sulphate and stored in a small amber coloured bottle at 4-6°.

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Bacteria and fungi used in the present investigation were obtained from the collection of gene bank, Institute of Microbial technology, Chandigarh 160 036, India. All bacteria were maintained in nutrient agar medium under aerobic conditions and incubated at 35° for 48 h. *A. niger, R. stolonifer* and *R. oryzae* were cultured in potato dextrose agar medium, *C. musae* in corn agar medium and *C. albicans* in yeast extract dextrose medium. All fungi were incubated at 30° for 72 h under aerobic conditions.

For the evaluation of antimicrobial activity filter paper disk diffusion method was used[18]. Activity of the pure essential oil as well as its dilution in acetone was evaluated. After the incubation period, diameter of the inhibition zone was measured. The zone of inhibition with pure camphor was also recorded for the various microorganisms under study.

The essential oil of *O. americanum* showed remarkable antimicrobial properties against both bacteria and fungi (Table 1). The essential oil showed promising activity against *E. coli, B. megaterium* and *S. aureus*. The maximum activity was exhibited by the pure oil against *B. megaterium*. The oil also showed a wide range of activities against all the tested fungi. Antifungal activity was found to be superior in all the cases except *A. niger*, where pure essential oil is less active as compared to pure sample of camphor.

The essential oil showed a wide spectrum of activities against all the tested organisms which may be at-

TABLE 1 - ANTIMICROBIAL ACTIVITY OF *OCIMUM AMERICANUM* ESSENTIAL OIL

Essential oil and standards	Zone of inhibition in mm*									
	Bacillus subtilis	*B. megaterium*	*E. coli*	*P. aeruginosa*	*S. aureus*	*A. niger*	*C. musae*	*C. albicans*	*R. stolonifer*	*R. oryzae*
Pure oil	29	37	33	24	32	23	45	18	25	18
Oil: acetone										
1:1	20	30	22	18	29	18	35	16	24	16
1:2	16	18	16	16	26	16	30	16	16	16
Camphor	26	25	22	18	23	35	27	18	23	33

All values are mean of three determinations, Asterisk indicates that the diameter includes the filter paper disk diameter which is 16 mm.

tributed to the presence of camphor together with the minor components[15]. The cytotoxicity of camphor present in the essential oil of several plants have been reported[19]. Antimicrobial activity of the essential oil of *O. americanum* has been reported earlier[20] on *Pythium debarianum* and *P. aphanidermatum*. The antimicrobial activity of *O. americanum* essential oil seem to be correlated with its cytotoxicity[21].

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