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CHEMISTRY AND ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL FROM ANISOMELES INDICA (L).

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ABSTRACT*: The percentage composition and antimicrobial activity of the essential oil obtained from the flowers of anisomeles indica (L) are described in this paper.*

INTRODUCTION

Anisomeles indica (Linn) [1-2] belongs to family labiatae. It is found throughout India ascending to 6000 feets in the Himalayas. It is useful as astringent and carminative. Earlier workers [3,4] have reported the presence of stigmasterol, β-sitosterol tetra cosine, tetra coranel β – amyrin from the seed along with macrocylic diterpenes, ovato – diolide and anisomlic acid form the flowers of this plant, the present paper deals with the percentage composition and antimicrobial activity of the essential oil obtained from the flowers of this plant .

MATERIALS AND METHODS

The plant *Anisomeles – indica* was procured by M/s United chemical and alied products, Calcutta and was identified by the botany department of this university.

The essential oil 0.07% was obtained from the flowers of this plant by steam distillation using clevenger's apparatus[5, 6.] The physico-chemical contents of the essential oil have been given in Table -1.

Table I
Physico- Chemical properties of the essential oil from flowers

S.No	Characteristic	Value
1.	Refractive index at 14.5^{o}C	1.5205
2.	Sp. Gravity at 33^{o}C	0.911
3.	Ester value	36
4.	Ester value after acetylation	42.25
5.	Acid value	5.2
6.	Phenolic content	46.0
7.	Optical rotation	5 to 10o

GLC Analysis of essential Oil

GLC analysis of the volatile oil was carried out b subjecting to ANILNUCON GAS CHROMATOGRAPH with stainless steel column (5'X ½). SE 30 and 36% OV – 17 on chromosorb 'W' (60-80 mesh) was used as stationary phase.

The following conditions were given as below

1. Detector	FID
2. Detector temperature	230^{o}C
3. Injection temperature	160^{o}C
4. Column temperature (Program, 2.0oC/min)	40-200^{o}C
5. Carrier gas and flow	Nitrogen, 35ml/min
6. Chart speed	10mm/min
7. Sampline	0.3-0.5 ul of 0.1% solution of the oil and authentic chloroform.

The percentage composition of constituents of the oil was determined by gas liquid chromatography. The constituents were identified by comparing the retention data with those of reference samples of the constituents by running under similar condition s (Table – II).

Microbial Activity of essential Oil

The essential oil was tested for their antibacterial activity against *proteus vulgaris, bacillus subtilis, bacillus anthracis, salmonella Stanley, salmonella Newport, salmonella pullorum, streptococcus agalactiae, staphylococcus qureus, klesbsiella pneumoniae and antifungal activity against Aspergillus flavus, aspergillus niger, aspergillus fumigatus, penicillium digitatum and fusarium oxysporum.* The "Oxide nutrient broth" and "sabaraud broth[8] agar media were used for checking antibacterial and antifungal activities respectively.

The paper discs (6mm in diameter) were prepared by adding 2% agar in the inoculum and dipped in the solution of essential oil and excess quantity drained and placed on the seeded agar plates, each plate carried four samples bearing cross wise along the margin and one at the centre as control for comparison on inhibitory zones. The activity was measured in terms of inhibitory ones appearing around the filter paper discus, control were run with solutions of streptomycin and acromycin in 400 PPM per positive and negative bacteria

The zones of inhibition were measured after incubating the plates for 60 to 80 hours depending upon the growth rte of different bacteria at 35^{o}C in case of bacteria and till complete growth at room temperature (26^{o}C) for fungi and measured as average maximum dimension of inhibition in four different dimensions, the results are given (Table III and IV)

RESULTS AND DISCUSSION

The data from table III and IV revealed that the essential oil was found to be more active against: Bacillus anthracis, salmonella Stanley, streptococcus agalacties, staphylococcus aureus, aspergillus niger, aspergillus fumigatus, fusarium Oxysporum. Therefore this oil may prove therapeutically useful against diseases caused by these microbes.

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Table II
Constituents of the essential oils of Anisomels indica

Peak No.	Constituents	R_t in Min	Temp. in ^oC	Percentage %
1.	D-Limonene	0.5	52	4.2
2.	D- α- thujone	1.5	56	4.8
3.	Citral	2.5	59	10.7
4.	Borneol	3.6	63	3.9
5.	α – terpineol	4.5	68	3.4
6.	1-8, cineole	5.2	74	11.7
7.	Azulene	6.8	79	7.4
8.	Caryophyllene	7.5	86	7.2
9.	α – Pinene	9.8	95	8.2
10	β – pinene	10.2	105	9.5
11	Myrcene	10.9	109	6.5
12	Bornyl acetate	11.3	113	7.2
13	Nerol	11.8	119	6.2
14	P- cymene	12.5	124	4.2
15	Camphene	13.1	129	3.6

Table III
Antibacterial activity of the essential oil

S.No	Organism	Antibacterial activity zone of imhibition (mm)	
		Essential Oil	Control*
1.	*Proteus vulgaris(+)*	13.0	25.0
2.	*Bacillus subtils (+)*	14.0	15.0
3.	*Bacillus anthracis(-)*	29.0	36.0
4.	*Salmonella(+)*	20.0	19.0
5.	*Salmonella Newport(-)*	15.0	17.0
6.	*Salmonella pullorum (-)*	10.0	22.0
7.	*Streptococcus agalacties(-)*	16.0	20.0
8.	*Staphylococcus qureus (+)*	19.0	16.0
9.	*Klebsiella pneumoniae (+)*	11.0	21.0

* Streptomycin & Acromycin in 400 ppm against gram positive and negative bacteria.

Table IV
Antifungal activity of the essential oil

S.No	Micro Organism	Diameter of zone imhibition (mm)	
		Essential Oil	b- naphthal
1.	*Aspergillus flavus*	12.0	19.0
2.	*Aspergillus niger*	23.0	18.0
3.	*Asperillus fumigatus*	27.0	30.0
4.	*Penicillium digatatum*	IN	10.0
5.	*Fusarium oxysporum*	19.0	17.0

Includes the diameter of paper disc (6mm). IN – inactive

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