TABLE I

Temp. °C.	Monomer	k_t/k_p^2	C_M	C_{cat}	$R_i'[Cat]$
65	Methylmethacrylate	122·7	$2·0\times10^{-5}$	$7·46\times10^{-3}$	$2·083\times10^{-6}$
70	do	103·3	$3·0\times10^{-5}$	$9·2\times10^{-3}$	$2·440\times10^{-6}$
70	do. in benzene soln. (M = 4·6)	84·67	$2·0\times10^{-5}$	2×10^{-3}	$5·31\times10^{-7}$
70	Styrene	1085	$1·2\times10^{-4}$	0·2174	$10·68\times10^{-6}$
70	Methyl acrylate	7·563	$1·8\times10^{-5}$	$7·69\times10^{-2}$	$5·733\times10^{-5}$

us a few results in the case of styrene and methyl acrylate.

University Physical Chem. Lab., Madras-25, *March* 2, 1956

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CHEMISTRY AND ANTIBACTERIAL ACTIVITY OF NUT GRASS

NUT GRASS [*Cyperus rotundus* (Linn.)] is a common weed plant belonging to the family Cyperacæ represented by more than 60 species in India.[1] Dry tubers are commercial articles. The main use of the essential oil of *C. rotundus* is in medicine and perfumery. The tubers are useful in infusion or as soup in fever, diarrhœa, dysentery and other disorders of the bowel.[2] Romans used it as an emmanogogue in uterine complaints.[3] It is not known whether these properties are due to the oil or the non-volatile constituents.[4]

The medicinal properties of the essential oil obtained from the tubers of *C. rotundus* have been subjected to a pharmacological study. A short note on the chemistry and antibacterial activity of the essential oil and its fractions is presented below.

The tubers of different origin were steam-distilled or extracted with alcohol. The physical properties of the different types of oils obtained are given in Table I. Yield of oil varied from 0·3-0·5%.

TABLE I

Physical properties of the oils obtained from C. rotundus

Type of oil		Colour	Distillation range (10 mm.)	$n_D^{21°}$	$[\alpha]_D^{21°}$	d_{23}^{23}
Madras variety steam distilled	..	Yellow green	112°–164°	1·5104	±0·00	1·0101
Madras variety alcohol extraction	..	Green	110°–135°	1·5098	+1·40	0·9990
Madras variety steam distilled residue of alcoholic extraction		Brown green	110°–164°	1·5180	..	1·0207
Bangalore variety	..	Dark brown	..	1·4934		0·9533

C. rotundus oil (Madras) was fractionally distilled, when components with the following properties were obtained (Table II).

TABLE II

Physical properties of the fractional distillates of C. rotundus *oil (Madras variety)*

Fraction No.	Nature of the compound	B.P.	n_D	$[\alpha]_D^{30}$	d_4^{30}	% Yield
1	Hydrocarbon I (Cyperene I)	113°/10 mm.	1·500 at 30°	−16	0·9303	6 of the oil
2 A.	do. II (Cyperene II)	129°/10 mm.	1·5072 at 30°	+13·8	0·9289	14
2 B.	Hydrocarbon II was hydrogenated for one double bond and a substitution compound obtained	95°/3 mm.	1·4520 at 25°	+12	..	..
3	Alcoholic fraction (Cyperol)	148°/10 mm.	1·5105 at 26°	−16·2	..	..
4	Ketonic fraction (Cyperon)	168°/10 mm.	1·5242 at 30°	+66·4	..	..

The antibacterial activity was evaluated by the filter-paper disc method in which 8 mm. filter-paper discs are placed in an agar plate previously seeded with the test organism, 0·1 ml. of the oil put on the discs and the zone of inhibition measured after 24 and 48 hours incubation. A significant zone of inhibition maintained over a period of 72 hours was the criterion used in assessing bacteriostasis.

The essential oil of C. *rotundus* (Madras variety) and its various components obtained after fractional distillation were tested against *Staphylococcus aureus*, *E. coli*, *E. typhosum*, *Vibrio choloræ*, and *Shiga*, *Schmitz* and *Sonne* strains of *Shigella*. The oil inhibited the growth of only *Staphylo aureus* and was ineffective against the other organisms. Amongst the fractions, cyperone was completely inert, while the hydrocarbon fractions, cyperene I and II were more potent than the oil and cyperol. Qualitatively, they differ in that the cyperenes also inhibit the growth of *Shigella sonne*. Hydrogenation of cyperene II did not adversely affect the antibacterial activity.

Detailed pharmacological investigations will be reported elsewhere.

Our thanks are due to Prof. D. K. Banerjee for making available the compounds for pharmacological investigations.

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A PRELIMINARY NOTE ON THE PHARMACOLOGY OF EVOLVINE

EVOLVINE is a liquid alkaloid from *Evolvulus alsinoides*, an indigenous plant of India (vernacular name—*Vishnugrandhi*) (B.P. 160° C. at 0·05 mm. Hg). It was prepared by one of us (T. S. V.) and made available for pharmacological tests. With the amount available, a few preliminary pharmacological tests were carried out on dogs.

Six dogs, of varying weights (5 to 10 kilos), were used. Chloralose (100 mg./kg.) was used as anæsthetic, a 1% solution being given intravenously. Trachea was cannulated and respiration recorded by a Marey's tambour. Blood pressure was recorded from a femoral artery. A femoral vein was cannulated for injection of drugs. The drug was administered as a 1% aqueous solution. Varying doses were tried, 0·5 mg/kg; 1·5 mg./kg.; 2·0 mg./kg. (Fig. *1*, 4) and 4·0 mg/kg. The last two doses

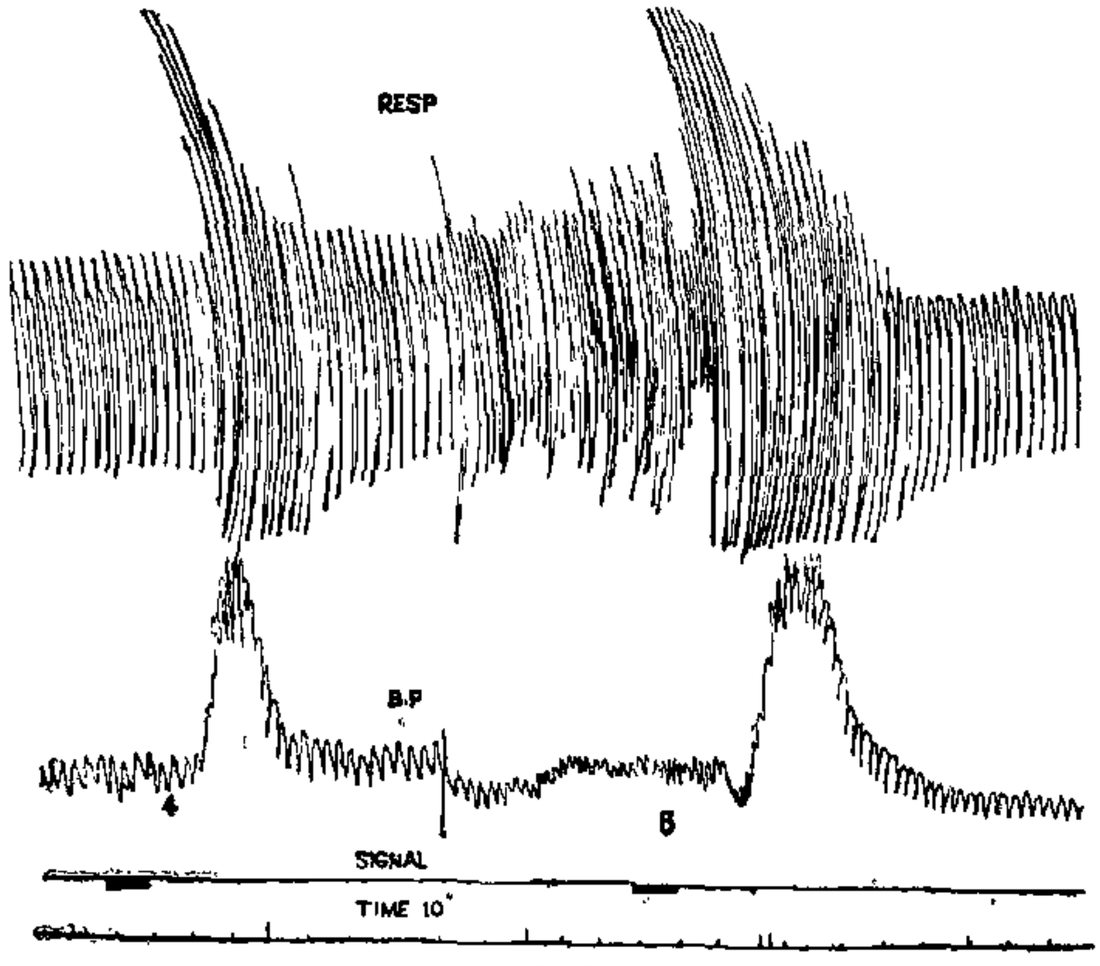

FIG. 1.
Dog. 9 Kilos, chloralose anæsthesia.
Blood Pressure and Respiration recorded.
Time signal and Time marking (10") recorded.

* At 4, 2·0 mg./kg. of evolvine was injected into the femoral vein.
At 5, 0·1 c.c. of lobeline solution (0·3 mg.) was injected into the femoral vein.
Note the similarity of time of onset and type of blood pressure and respiratory responses.

produced marked effects on the blood pressure and respiration. There was a marked rise of blood pressure while respiration was accelerated with an increase in amplitude. There was a time-lag between the intravenous administration of the drug and the onset of the effects. The interval was much shortened when the drug was given directly into one of the carotid arteries (Fig. *2*, 6). With proportionate increase in dosage there was graded response. The response was not abolished by atropine (2 mg./kg.). Tetraethylammonium (T.E.A.), a potent ganglionic blocking agent, blocks the effect of the compound (Fig. *3*, 8). The aqueous solution is fairly alkaline with a pH of about 9·0. Administration of solutions of sodium bicarbonate or potassium hydroxide, with the same pH, *i.e.*, 9·0, did not produce similar effects (Fig. *3*, 7). Lobeline administered similar to drug produced identical results (Fig. *1*, 5).