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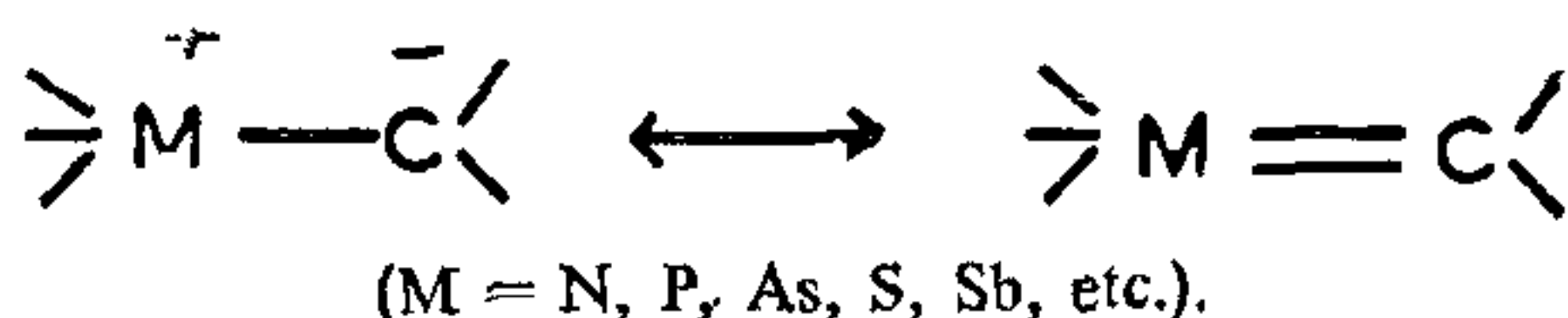
1. Irasay, R. D., *Ger. Offen.*, 1, 928, 027; *Chem. Abstr.*, 1970, 72, 55261 c.
2. Du Pont de Nemours, E. I. and Co., *Brit.*, 1,265,212; *Chem. Abstr.*, 1972, 76, 140531 t.
3. Moon, M. W., Sharp, J. C., *Ger. Offen.*, 2, 513, 652; *Chem. Abstr.*, 1976, 84, 30890 s.

EFFECT OF PHENACYL PYRIDINIUM BROMIDE ON GERMINATION AND SEEDLING EMERGENCE IN *CAJANUS CAJAN*

PHENACYL pyridinium bromides which are used as precursors for azomethine ylides*, have been utilized in the synthesis of a wide variety of cyclic and heterocyclic systems¹⁻³; but their biological studies have not been reported so far.

For a better crop, a good knowledge of the seed germination behaviour is needed to devise suitable control measures. *Cajanus cajan* Sprang. is extremely

* The ylides are the reactive intermediates in which a carbanion is directly linked to a heteroatom carrying a high degree of positive charge.



nutritious and is consumed as a dal or flour. The leaves afford excellent fodder. Apart from these, the seeds and the leaves are of medicinal importance. The present investigation has been undertaken to ascertain whether the germination in this species is stimulated or retarded by the application of phenacyl pyridinium bromide.

The seeds were hand picked in May, 1979 from the field and were stored in glass stoppered bottles. Phenacyl pyridinium bromide was prepared by refluxing phenacyl bromide (40 m mole) with pyridine (40 m mole) in 100 ml of anhydrous benzene for 6 hrs and keeping overnight. The solid was filtered, washed with benzene and dried at room temperature. The white crystals of pyridinium salt was further recrystallized from CHCl_3 -pet.ether (1:2), m.p. 190-92° C (Lit⁴ m.p. 194-96° C).

Germination studies were carried out with 20 seeds by the wet filter paper method under laboratory conditions (23-37° C) in September, 1979. Seeds were treated with 10, 100, 200, 500, and 1000 ppm solutions of pyridinium salt. Three replicates of each treatment and three distilled water controls were maintained. A twelve hourly record of the number of seeds germinated in each petridish was made. The observations were continued upto 72 hours until the germination was constant in two sets of experiments. The length of the radicles was measured after complete germination.

The percentage of germination increases with increasing duration, but it decreases gradually as the concentration of pyridinium salt increases. In the beginning (in 36 hours) the changes in percentage germination are sharp, then gradual till the germination is completed^{5,6}. The results are given in Table I.

TABLE I

Changes in percentage germination of the seeds of *Cajanus cajan* Sprang at different concentrations of phenacyl pyridinium bromide

Time (hours)	Concentration (ppm)					
	0 (Control)	10	100	200	500	1000
0
12	17.0 ± 4.4	7.5 ± 2.0	6.6 ± 3.3	6.0 ± 2.2	5.7 ± 2.0	5.0 ± 2.2
24	62.3 ± 14.2	55.0 ± 4.1	38.3 ± 1.7	33.3 ± 1.9	30.5 ± 2.1	27.5 ± 3.2
36	80.4 ± 8.6	78.0 ± 4.1	74.0 ± 3.9	67.0 ± 2.9	65.0 ± 3.1	63.0 ± 4.5
48	82.5 ± 6.3	80.0 ± 2.9	78.5 ± 4.4	70.5 ± 2.4	68.5 ± 2.6	66.0 ± 4.2
60	85.0 ± 5.1	82.0 ± 2.7	80.0 ± 5.0	73.0 ± 2.7	69.0 ± 2.9	66.5 ± 4.3
72	85.0 ± 5.1	82.0 ± 2.7	80.0 ± 5.0	73.0 ± 2.7	69.0 ± 2.9	66.5 ± 4.3

It is interesting to note that the percentage germination continuously decreases with an increase in the concentrations of pyridinium salt (obvious from Table I). Similarly from Table II, it is evident that the extent of the emergence of the radicle is reduced by the addition of the reagent.

TABLE II

Variation in the length (cm) of radicle emergence of *Cajanus cajan* Spring. seeds at different concentrations of phenacyl pyridinium bromide

Con. of py. br. (ppm)	0	10	100	200	500	1000
Length of radicle (cm)	2.9 ± 0.2	2.0 ± 0.2	1.8 ± 0.3	1.5 ± 0.3	1.1 ± 0.2	0.9 ± 0.2

The relationship between concentration and the length of radicle can be expressed by the equation $y = 2.16 - 0.001x$, where x is the concentration in ppm and y is the length of the radicle.

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1. Krohnk, F., *Synthesis*, 1976, p. 1.
2. Tewari, R. S. and Gupta, K. C., *Indian J. Chem.*, 1976, 14B, 829.
3. Zugravescu, I. and Petrovanu, M., *N-ylide Chemistry*, Editura Academiei Republicii Socialiste, Romania, 1976.
4. Phillips, W. G. and Ratts, K. W., *J. Org. Chem.*, 1970, 35, 3155.
5. Pandeya, S. C., Puri, G. S. and Singh, J. S., *Research Methods in Plant Ecology*, Asia Publishing House, New Delhi, 1968.
6. Misra, R., *Ecology Work Book*, Oxford and IBH, India, 1968.

ULTRASONIC INVESTIGATION OF MOLECULAR INTERACTION OF CARBONTETRACHLORIDE WITH *p*-XYLENE AND *n*-PENTANOL

LIQUID-LIQUID interaction between associated and non-associated liquids, employing ultrasonic and viscosity techniques have been reported earlier¹⁻⁴. The present work deals with the study of systems carbontetrachloride + *p*-xylene and carbontetrachloride + *n*-pentanol. Here carbontetrachloride is non-polar and miscible with *p*-xylene and *n*-pentanol in all proportions.

The technique employed for velocity, density, and viscosity measurements have been presented in earlier communications⁴⁻⁵. Carbontetrachloride (Merck), *p*-xylene (Pefizer), and *n*-pentanol (Merck) were used after purification⁶.

The results have been presented graphically in Figs. 1 and 2. Ultrasonic velocity (v) decreases with increasing molar concentration of carbon tetrachloride in both systems. Isentropic compressibility (β_s) increases gradually in both the systems but in carbon tetrachloride + *n*-pentanol it decreases after reaching a maximum at $x = 0.72$. Viscosity (η) increases in CCl_4 + *p*-xylene and decreases in the system CCl_4 + *n*-pentanol with increasing molefraction of carbontetrachloride; both carbontetrachloride and *p*-xylene have zero dipole moment and should show linear behaviour in their mixture. However, the plots have significant curvatures demonstrating non-linearity. This suggests π -electron interaction⁶ between carbontetrachloride and *p*-xylene. *n*-pentanol is polar and highly associated and this results in the induced dipole-dipole interaction in system II.

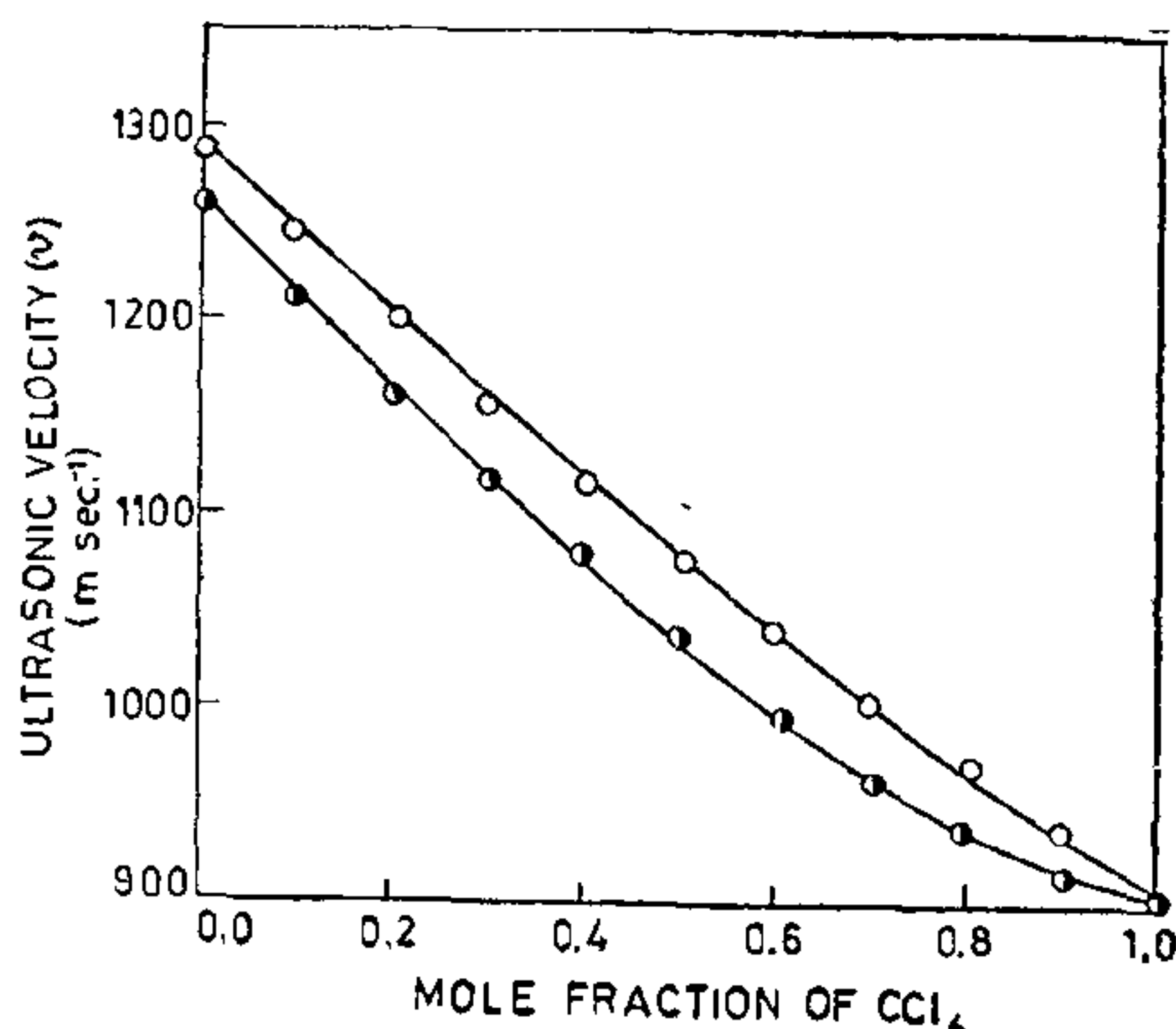


FIG. 1. Ultrasonic velocity (v) vs. molefraction of CCl_4 in (I) CCl_4 + *p*-xylenes, (—O—O) and (II) CCl_4 + *n*-pentanol(—●—●) and at 30°C.