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LABORATORY EVALUATION OF FLOCOUMAFEN BAIT AGAINST *RATTUS RATTUS*

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ABSTRACT

Flocoumafen was evaluated in the laboratory against *Rattus rattus rufescens*. One to two days feeding on baits treated with 0.0025%, 0.005% and 0.01% concentration of rodenticide, resulted into 80 to 100% mortality of experimental rodents in no choice as well as in choice tests. The consumption of poison bait revealed that at a given feeding period, the bait with low concentration of poison was consumed more than that of the bait at higher concentration.

INTRODUCTION

There has been an increasing threat of environmental pollution by constant use of various pesticides. The use of chronic or multiple dose rodenticides might be adding to the problem. But with the discovery of single dose anticoagulants, chances of hazards are minimsed to a great extent (Hadler et al. 1975; Redfern et al. 1976; Marsh 1977). A new chemical flocoumafen {3-[3-(4-trifluoromethylbenzyloxyphenyl-4-yl) -1, 2, 3, 4-tetrahydro-1-naphthyl]-4-hydroxy coumarin} in this series of single dose anticoagulants was, therefore, evaluated against most common commensal rodent *Rattus rattus rufescens* (Barnett and Prakash 1975).

MATERIAL AND METHODS

The house rats, *R. rattus rufescens* were trapped from houses and were sexed, weighed and lodged individually in the laboratory cages. They were fed on pearl millet grains *(Pennisetum typhoides)* for 10 days for acclimatization. Usually equal number of adult and healthy males and nonpregnant females were taken for each test. Average body weight of the *R. rattus* was 109.98±6.78(S.E.)g. Water was always available *ad libitum*. After acclimatizing, animals were weighed and fed upon 20 g anticoagulant treated bait in no choice tests and with equal amount of non-poisoned food in choice tests. The observations were made upto one month and the symptoms and time to death were recordcd simultaneously.

Feeding trials : Flocoumafen (0.5% conc. mastermix) was mixed with bajra grains to get 0.0025, 0.005 and 0.01 per cent concentrations. The baits were exposed in no choice and choice tests following Mathys (1975) procedures.

RESULTS AND DISCUSSION

Sex difference in the mortality was not observed in any of the trials and hence mortality data have been pooled for both the sexes. In no choice feeding tests using 0.0025%, 0.005% and 0.01% flocoumafen treated baits, complete kill was achieved in 2, 1 and 1 days feeding period, respectively. The rats started dying after 3 days, lasting upto 19 days (Table 1).

Table 1. Evaluation of flocoumafen against *Rattus rattus* in no choice tests

Conc. used (%)	Feeding period (days)	Poison bait consumed (g) (Mean±SE)	Poison ingested mg/kg (Mean±SE)	Mortality (%)	Days to death	
					Mean±SE	Range (days)
0.0025	1	4.81±0.69	1.14±0.17	80	12.37±1.49	7-19
	2	11.45±0.80	2.46±0.01	100	7.60±0.90	3-13
0.005	1	5.25±0.81	2.69±0.43	100	8.40±1.40	3-17
0.01	1	5.95±0.73	5.83±0.50	100	8.66±1.13	5-17
	2	11.70±1.00	10.37±1.25	100	7.18±1.13	3-14

The poison bait was consumed in more quantity than the plain bait in as much as that the difference attained statistical level of significance ($P < 0.05$) in 0.005 per cent concentration (Table 2). But also in the case of poison bait having low concentration (0.0025%), the plain bait was consumed more, although the difference was non significant than the poison bait when exposed for two days (Table 2). Results further indicated that even in the presence of an unpoisoned food, 100% kill was observed at the lowest concentration, i. e., at 0.0025% (Table 2). A single day feeding at all concentrations provided 80 to 100 per cent kill, which indicated a high potentiality of flocoumafen against this species.

Table 2. Bait acceptability and mortality in choice tests between plain and flocoumafen treated bait.

Conc. used (%)	Feeding period (days)	Poison bait consumed (g) Mean±SE (1)	Plain bait consumed (g) Mean±SE (2)	Significance of student's 't' between 1 & 2	Flocoumafen ingested mg/kg Mean±SE	Mortality (%)	Days to death	
							Mean ±SE	Range
0.0025	2	7.2±1.0	11.5±1.1	t=2.59	1.87±0.29	100	11.7±1.7	(3-21)
0.005	1	4.6±0.4	1.4±0.3	t=6.40*	2.28±0.20	80	7.7±1.9	(5-16)
0.01	1	2.6±0.5	1.4±0.6	t=1.60	3.04±0.51	80	9.2±2.0	(5-23)

*Significant

Results revealed that 100 per cent mortality in rats is achieved when 0.0025%, 0.005% and 0.01% concentration of flocoumafen baits are exposed in no choice tests (Table 1). However, exposure of same concentration of poison for same number of days indicated 100, 80 and 80 per cent respective mortality of rats in choice tests (Table 2). A comparison of similar studies with other anticoagulants of second generation elicit that single exposure of brodifacoum (0.005 per cent concentration) knocked 100 per cent rats in no choice tests (Parshad et al. 1985) and required 2 days exposure to get this mortality in choice tests (Chopra and Parshad 1985). Bromadiolone, however, killed all the experimental rodents when exposed for 2 days in no choice test (Chopra and Parshad 1985) but 90 per cent rats succumbed to this poison in choice test. Interestingly, coumatetralyl (0.0375%) and warfarin (0.025%) required 10 days exposure to achieve 100 per cent mortality of rats in no choice trials, whereas, these toxicants could knock only 50 per cent experimental rodents in choice tests (Chopra and Parshad 1985). However, Mathur and Prakash (1981) recorded 91-100 per cent mortality in *Rattus rattus* when warfarin (0.025%), fumarin (0.025%) and chlorophacinone (0.0075%) were fed for 7 days in no choice tests. Thus, flocoumafen

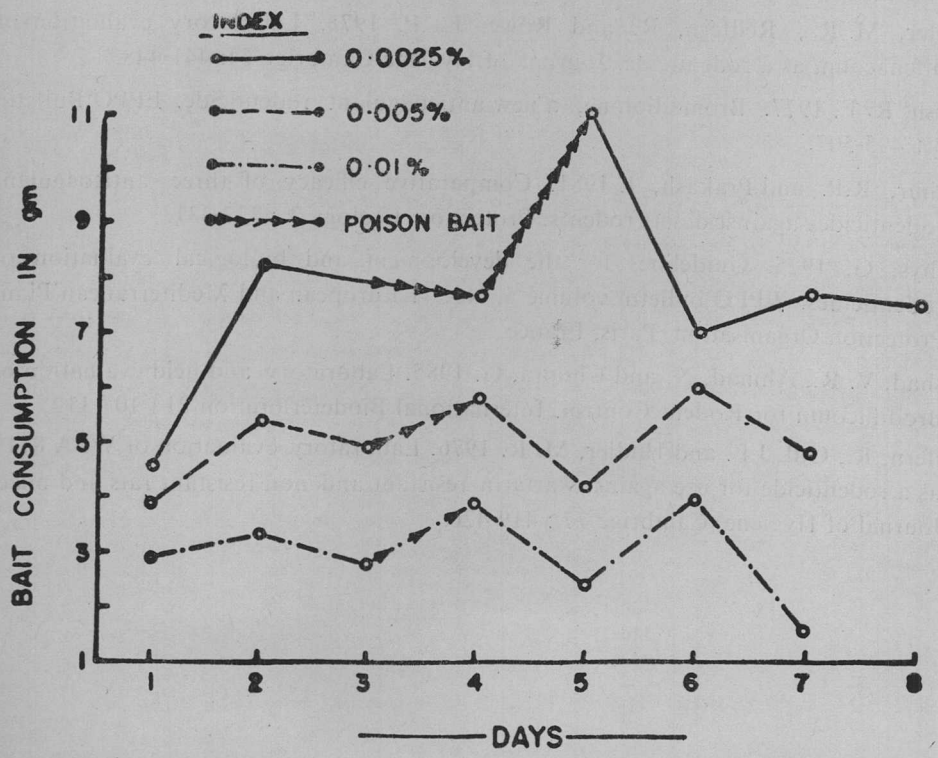

Fig.-1-EXPOSURE OF FLOCOUMAFEN TO RATTUS-RATTUS IN CHOICE TEST.

is more effective than many of first generation anticoagulants like warfarin and coumatetralyl but is at par with those like brodifacoum and bromadiolone rodenticides of second generation in tackling *Rattus rattus* population.

The behaviour of *R. rattus* towards bait also reflected that the poison is fairly well acceptable as its consumption was more than the plain bait in two out of three choice tests conducted (Table 2). Further, the consumption of poison bait was more on the second day in the cases where the poison bait was exposed for more than one day, which catagorically reveal the inability of these rats to detect it in the bait in all the concentrations tested (Fig. 1).

REFERENCES

Barnett, S.A. and Prakash, I. 1975. Rodents of economic importance in India, Arnold Heinemann, New Delhi and London, 1-175.

Chopra, G. and Parshad, V. R. 1985. Efficacy of four anticoagulants in controlling the House rat. Indian Journal of Agricultural Sciences 55 : 125-128.

Hadler, M. R., Redfern, R. and Rowe, F. P. 1975. Laboratory evaluation of difenacoum as a rodenticide. Journal of Hygiene Cambrige 74: 441-448.

Marsh, R. E. 1977. Bromadiolone, a new anticoagulant rodenticide. EPPO Bulletin 7 : 495-502.

Mathur, R.P. and Prakash, I. 1981. Comparative efficacy of three anticoagulant rodenticides against desert rodents. Protection Ecology 3 : 327-331.

Mathys, G. 1975. Guidelines for the development and biological evaluation of rodenticides. EPPO bulletin volume 5, No. 1 European and Mediterranean Plant Protection Organisation, Paris, France.

Parshad, V. R., Ahmad, N. and Chopra, G. 1985. Laboratory and field evaluation of Brodifacoum for Rodent Control. International Biodeterioration 21 : 107-112.

Redfern, R., Gill. J.E. and Hadler, M. R. 1976. Laboratory evaluation of WBA 8119 as a rodenticide for use against warfarin resistant and non-resistant rats and mice. Journal of Hygiene, Cambrige 77 : 419-426.