Evaluation of warfarin against *Tatera indica* and *Meriones hurrianae*

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Abstract. Warfarin was evaluated in laboratory against Indian gerbil, *Tatera indica* and desert gerbil, *Meriones hurrianae*. Chronic LD50 for the two species was found to be 4 x 19.1 and 4 x 15.9 mg/kg respectively. Feeding for 14 days on 0.025% warfarin treated bait provided complete kill in the gerbils but the poisoned bait was less palatable than the plain bait. A period of 18 and 19 days feeding on 0.025% warfarin bait was found suitable to detect resistance to warfarin among *T. indica* and *M. hurrianae* respectively.

Keywords. *T. indica*; *M. hurrianae*; oral toxicity; no-choice tests; base-line susceptibility; palatability; warfarin.

1. Introduction

The Indian gerbil, *Tatera indica* Hardwicke and the desert gerbil, *Meriones hurrianae* (Jerdon) are dominant rodent species in the Indian desert and inflict severe damage to crops and grasslands (Barnett and Prakash 1975). Since they induce bait shyness after a single exposure of zinc phosphide (Prakash and Jain 1971) the need to evaluate other rodenticides as alternative poisons for their control has arisen. The present study was, therefore, undertaken to evaluate warfarin [3-[(1-phenylethyl-2 acetyl) 4-hydroxy-coumarin] against *T. indica* and *M. hurrianae*.

2. Material and methods

The gerbils were captured from fields around Jodhpur (Lat. 26° 18’ N; Long. 73° 1’ E). They were sexed, weighed and caged individually for 3 weeks for acclimatization and were fed on bajra (*Pennisetum typhoides*) and jowar (*Sorghum vulgare*). Average body weights of *T. indica* and *M. hurrianae* (g; mean ± SE) were 124.16 ± 5.73 and 62.44 ± 3.62 respectively. Each of the four doses (5.0, 15.0, 25.0 and 50.0 mg/kg) of technical warfarin of 98% purity was administered by oral tube for four consecutive days to calculate the chronic LD50. No-choice and choice feeding trials were conducted using 0.0125% and 0.025% warfarin-
treated bajra grains. The former trials were conducted for different lengths of feeding periods. In choice tests an alternative unpoisoned bait was also provided to the gerbils. The trials were conducted as recommended by WHO (1976) and the LD₅₀, lethal feeding periods (LFP₅₀ and LFP₉₀) and their 95% confidence limits were calculated by probit analysis (Finney 1971).

3. Results

Sex difference in the mortality was not observed in any of the trials and hence combined sex mortality data were analysed.

3.1. Oral toxicity

Chronic LD₅₀ and 95% confidence limits for T. indica and M. hurrianae are 4 x 19'1 (13'8-27'61) and 4 x 15'9 (11'0-24'0) mg/kg respectively. Slopes of the probit regression line with respect to two species are 1'48 ± S.E. 0'12 and 1'61 ± 0'12 respectively.

3.2. No-choice tests

In no-choice feeding tests complete kill was observed with 14 days feeding on 0'0125 and 0'025% warfarin treated bait in both the species (table 1) except that with the former concentration one T. indica survived. In both the gerbils, T. indica and M. hurrianae, mortality started from day 4 and 5 and lasted up to days 18 and 16 respectively and maximum kill occurred between 5 to 10 days (table 1). Bait intake in no-choice test was fairly high up to 6-7 days after which it declined possibly due to the development of the symptoms of anticoagulant poisoning.

3.3. Base-line susceptibility

Table 2 gives the lethal feeding periods (LFP₅₀ and LFP₉₀), their 95% confidence limits and slopes of the probit regression lines. The slope of the probit regression line and LFP₅₀ does not differ significantly between the sexes and concentration but significant difference was found between species (P < 0'02) with respect to 0'025% concentration (table 2) which indicates that M. hurrianae is more susceptible to warfarin than T. indica.

3.4. Acceptability of poisoned bait

Poisoned bait was less palatable than the plain bait (table 3). The difference was not significant between the two concentrations in both the species. However, with both the concentrations the intake of poisoned bait by M. hurrianae was significantly more (P < 0'01) than T. indica (table 3) and hence the mortality was higher in the former species.