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TOXICITY OF FIPRONIL TO SUSCEPTIBLE AND PERMETHRIN RESISTANT STRAIN OF GERMAN COCKROACHES (DICTYOPTERA: BLATTELLIDAE)

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Abstract The current study, in three methods, topical application, surface contact (WHO glass jar) method and toxic baits, was designed to investigate the relationship between permethrin German cockroach (*Blattella germanica* (L.)) resistant strains and fipronil. Twelve German cockroach strains used in this study: a standard susceptible (SS) strain was maintained since 1975 in the School of Public Health, without exposure to insecticide; nine German cockroach strains were collected from infested student dormitories and two strains collected from infested hospital in Tehran and colonized in the insectarium at the School of Public Health.

Mortality data from the replicates were pooled and the dose-response was assessed by probit analysis, with an SPSS package on an IBM computer. Resistance ratios were calculated as the 50% response value (LD_{50}) of RR strain divided by the 50% response value of the SS strain.

All strains collected from field are resistant to permethrin compared to susceptible strain (in resistance ratios between 8.6 to 17.8 fold), while to fipronil completely susceptible except Bustab-10 (2.6-fold), Zanjan dormitory (2.6-fold), Habitable Convened Saman (2.4-fold) and fatemieyeh (2- fold) was tolerant in topical application method.

All strains collected from field in surface contact method to permethrin for time 400 minutes (6 hours) contact, was not observed mortality, while the susceptible strain for 25 minutes was observed 100% mortality, that will showed this strains have had under pressure sprays to pyrethroid insecticides and very high level resistance to permethrin.

All strains collected from field susceptible to fipronil except Bustab-10 (1.7-fold) and Zanjan dormitory (1.7-fold), was tolerant in surface contact method. In all strains collected from field after feed on toxic bait fipronil in time 144 hours (6 days) were observed 100% mortality.

Application of insecticidal baits is one of the most common and effective strategies for controlling German cockroaches. Toxic baits are often used to control German cockroaches and they can easily be integrated in urban pests management programs. Use of baits results in less environmental contamination and greater ease of application than spray insecticides. Management of cockroach population in urban environments has recently shifted from the predominant use of insecticide sprays to the inclusion of baits in management programs. This change has been facilitated by the general perception that baits are safer and therefore they appeal to the public's concern about risks associated with pesticides in the domestic environment. Attentive to this research and infestation of human habitations to German cockroach, fipronil (especially toxic bait formulation) is the proper candidate to control this pest in Iran.