

PESTSTOP B FORMULATIONS WITH BETA-CYPERMETHRIN ACTIVE INGREDIENT CONTENT FOR PROFESSIONAL PEST CONTROL IN PUBLIC HEALTH

J. TOMCSIK, D. BAJOMI & L. PAP

Bábolna, Bioenvironmental Centre Ltd., H-1107 Budapest X, Szállás u. 6. Hungary

One of the most crucial preconditions of successful protection against insects of public health importance (cockroaches, flies, mosquitoes) is the application of an effective insecticide. At the present time, phosphorous acid esters and synthetic pyrethroids are used the most widely, but the application of IGRs is continually increasing, too.

As a result of the developments in recent years, a considerable progress has been realized in the field of synthetic pyrethroid active ingredients. This fact is proved by the appearance of the so-called third generation synthetic pyrethroid active ingredients that contain more effective isomer compositions.

CHINOIN CORP. (Hungary) has developed and patented the beta-cypermethrin synthetic pyrethroid active ingredient containing 4 isomers of the possible 8 isomers. Numerous comparative tests were carried out with both susceptible laboratory and field strains of insects for proving the efficacy of beta-cypermethrin. In the laboratory, the German cockroach (*Blattella germanica*), house fly (*Musca domestica*) and yellow fever mosquito (*Aedes aegypti*) were used to compare the inherent arthropocide activity of beta-cypermethrin. Results indicated that knockdown activity of beta-cypermethrin was higher than for permethrin or cypermethrin. Even greater differences were detected in killing activity among substances. For example beta-cypermethrin showed 6.7 and 3.5 higher inherent activity on flies compared to permethrin and cypermethrin, respectively.

However products are in practice used against field populations having very different sensitivity to insecticide. Suitability of a product for pest control in practical conditions will depend on its performance measured on different field populations. On the basis of comparison tests carried out with house fly (*Musca domestica*) strains collected from 24 different biotopes in Hungary, it could be stated that the efficacy of beta-cypermethrin is, respectively, at least 6 and 3 times higher than that of permethrin and cypermethrin active ingredients. These values are practically identical with the corresponding laboratory data.

It was also found that pyrethroid resistance to beta-cypermethrin containing four isomers was lower than for synthetic pyrethroids containing only one active isomer (bioresmethrin, deltamethrin). For example, the number of populations which showed >40 resistance factors to beta-cypermethrin (four isomers), deltamethrin (one isomer) and bioresmethrin (one isomer) were 6, 12, 17, respectively, out of the 24 investigated populations. The less active isomers which were simply regarded as undesirable isomer ballast earlier could be advantageous in delaying resistance in the case of metabolic origin resistances. In beta-cypermethrin, the 1ScisR and 1StransR isomers are unexpectedly active on resistant populations alone and showed significant synergistic activity in mixtures of their corresponding diastereoisomers (1RcisS and 1RtransS).

PESTSTOP B 5 SC is a water-based suspension concentrate for the residual control of crawling and flying insects, containing 50 g/l active ingredient. When comparing the biological efficacy of PESTSTOP B 5 SC formulation to that of other pyrethroid formulations currently marketed (Cypermethrin 10 WP and Permethrin 25 WP), it can be stated that against mosquitoes, houseflies and cockroaches the lethal concentration of the formulation with beta-cypermethrin is lower. In the case of tests on residual effect we found that 100% mortality could be obtained for 6, 12 and 18 weeks with the application of Permethrin 25 WP (200 mg/m²), Cypermethrin 10 WP (50 mg/m²) or PESTSTOP B 5 SC (50 mg/m²), respectively, which demonstrated the latter's good residual efficacy compared to the traditional pyrethroid formulations.

As part of the lure and kill concept and for control in so-called 'hard areas' we developed a gel formulation and a cockroach killing station, both containing a beta-cypermethrin and hydroprone (IGR) active ingredient combination. The repellent effect of synthetic pyrethroids was compensated by a very strong cockroach attractant. Due to the synthetic pyrethroid active ingredient, a quicker than average killing effect was obtained. The product line is completed by a dust formulation. All three formulations were examined by comparison against hydramethylnon containing products, in free-choice tests. In these tests the beta-cypermethrin containing formulations produced 100% mortality during the 7 days test period in all cases, and they killed cockroaches 1-2 days earlier than the compared materials.

On the basis of the above advantageous properties, insecticide products using the beta-cypermethrin active ingredient can be recommended for pest control in public health (cockroach, fly, mosquito).