

RESIDUES OF FENTHION, QUINALPHOS AND MALATHION IN PADDY GRAINS FOLLOWING SURFACE TREATMENT OF GUNNY BAGS*

The only method permitted under the existing laws in India for protecting grains stored in gunny bags is the spraying of the outside surface of the gunnies with suitable pesticides. Srivastava (1980) has given a detailed account of residues of some common pesticides in food grains. In the present studies, residues of fenthion, quinalphos and malathion in grains as a result of spraying the gunny bag surfaces with these insecticides were assessed by chemical and bioassay methods.

One kg each of paddy grains of variety Triveni with moisture percentage of 10–12% was weighed to 30x20 cm gunny bags. The quantity of insecticide solution just sufficient to wet the bag surface (1200 cm²) completely was fixed by trial and error using different quantities of spray fluid and it was fixed as 24 ml/bag. The relative efficacy of some insecticides as prophylactic sprays on gunny bags against *Sitotroga cerealella* and *Rhizopertha dominica* had been assessed earlier (Varghese, 1965; Ambikadevi and Das, 1981). The effective doses of fenthion, quinalphos and malathion reported in the above references were applied in the present experiment. The insecticide emulsions prepared in various doses (Table 1) were sprayed on both sides of bag surface giving uniform coverage using 24 ml of spray fluid for all replications. The spraying was done with an atomiser. Twenty five gram samples of grains were taken from each treatment one, fifteen and thirty days after treatment and storage. The residues of fenthion and quinalphos were estimated by following the procedure of Getz and Watts (1964) and that of malathion by adopting the method recommended by the Malathion Residue Panel (Anon., 1960). Bioassay studies were conducted using adults of *Drosophila melanogaster* as the test insect and the residues were estimated from the regression equations $y = 1.534x + 2.213$ for fenthion, $y = 1.663x + 1.774$ for quinalphos and $y = 3.935x + 4.228$ for malathion respectively.

From the data, it could be observed that the initial quantity of insecticide was highest in bages treated with fenthion, the residues varying from 0.560 ppm in the lowest dose to 0.826 ppm in the highest. In the case of quinalphos, the residues ranged from 0.230 to 0.614 ppm. For malathion, only the highest two doses gave detectable residues (0.610 and 0.919 ppm). Fifteen days after application of the insecticide, the residues were found to have dissipated rapidly and it varied from 0.344 to 0.543 ppm for fenthion, 0.114 to 0.292 ppm for quinalphos and in the case of malathion it degraded to non-detectable levels. Thirty days after application, the residues could be detected in the case of malathion only (0.132 to 0.255 ppm).

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The bioassay values were found to be slightly lower than chemical assay values. In the case of malathion applied at 200 and 400 mg ai/m², though the residues could not be detected using chemical assay methods, bioassay revealed the presence of the toxicant in minute quantities (0.092 and 0.205 ppm) at the end of twenty four hours after treatment.

In the case of quinalphos and fenthion all doses gave residues above the tolerance limit of 0.2 ppm in samples collected 24 hours after application and in the case of malathion only the highest two doses gave residues above the tolerance limit of 0.5 ppm. Fifteen days after application in all doses of fenthion and highest dose of quinalphos the residues were above tolerance limit and for malathion in all doses it came to non-detectable levels. After 30 days, only the highest two doses of fenthion gave residues above the tolerance limit.

It is indicated that the contamination of paddy grains caused by the spraying of gunnies with insecticides is very low. Hence this method of treatment can be adopted as a prophylaxis against pests infesting stored paddy without significant residue hazards.

Table 1

Residues of fenthion, quinalphos and malathion on paddy grains collected at different intervals after storing in gunny bags sprayed with the insecticides

Treatments	Residues (ppm) in samples drawn at the end of					
	24 hours		15 days		30 days	
	Colorimetry	Bioassay	Colorimetry	Bioassay	Colorimetry	Bioassay
<i>Fenthion</i>						
100 mg ai/m ²	0.560	0.431	0.344	0.122	0.132	Nd
200 "	0.632	0.457	0.433	0.266	0.150	0.004
300 "	0.731	0.635	0.503	0.442	0.232	0.053
400 "	0.826	0.735	0.543	0.448	0.255	0.115
<i>Quinalphos</i>						
100 mg ai/m ²	0.230	0.209	0.114	0.113	Nd	Nd
200 "	0.275	0.237	0.185	0.139	Nd	Nd
300 "	0.434	0.286	0.162	0.121	Nd	Nd
400 "	0.614	0.430	0.292	0.196	Nd	Nd
<i>Malathion</i>						
200 mg ai/m ²	Nd	0.092	Nd	Nd	Nd	Nd
400 "	Nd	0.205	Nd	Nd	Nd	Nd
600 "	0.610	0.391	Nd	Nd	Nd	Nd
800 "	0.919	0.563	Nd	Nd	Nd	Nd

Nd : Non-detectable level

സംഗ്രഹം

ധാന്യങ്ങൾ സൂക്ഷിക്കുന്ന ചാക്കുകളുടെ പുറത്ത് മാലത്തയോൺ, ഫെൻതയോൺ, ക്യൂനാൽഫോസ് മുതലായവ സ്പ്രേ ചെയ്ത ശേഷം അവയിലുള്ള അവശിഷ്ട പ്രഭാവം കണക്കിലെടുത്തപ്പോൾ മൂപ്പന്റ് ദിവസത്തിനു ശേഷം ഫെൻതയോണിന്റെ ഉയർന്ന രണ്ടു മാത്രകളിൽ മാത്രം അവശിഷ്ട പ്രഭാവം സഹന സീമയേക്കാൾ (ടോളറൻസ് ലിമിറ്റ്) കൂടുതലായി കണ്ടു.

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