

DECONTAMINATION OF BHINDI (*ABELMOSCHUS ESCULENTUS* MOENCH) TREATED WITH QUINALPHOS*

Sosamma Jacob and Shashi Verma
Post Graduate School, IARI, New Delhi

The bhindi crop (*Abelmoschus esculentus* Moench) is prone to infestation by numerous pests at all stages of growth and hence the insecticidal application in a scheduled manner has become indispensable for the protection of the crop. Some workers (Nair *et al.*, 1977; Sangappa *et al.*, 1978; Patil and Pokharkar, 1977) have reported quinalphos as an effective insecticide against the major pests of bhindi. Harvesting and consuming of fruits from insecticide treated crops without paying attention to the prescribed waiting periods often lead to hazards due to terminal residues. The decontamination of the harvested fruit will reduce the residues to a greater extent. Very little work has been carried out on the decontamination of insecticide treated plant products. The present study was, therefore, taken up with a view to study the effect of different methods to decontaminate bhindi fruit treated with quinalphos.

Materials and Methods

A field experiment on bhindi was laid out in RBD with three replications at the IARI Estate, New Delhi using the variety Pusa Sawani, during the year 1981-82. Quinalphos was applied at two concentrations, namely, 0.03% and 0.05% using 1100 litre of spray fluid per hectare at the time when there was moderate population of pests. The leaf and fruit samples were collected and pooled and a representative sample was taken from each treatment at 0, 3, 7, and 14 days after spraying.

Three processes namely, washing with water, salt water washing and partial cooking were carried out to examine their relative effectiveness in reducing the level of insecticide residues. For washing, 30 g samples of fruit were taken in a small tray containing tap water. The material was gently rubbed by hand for about one minute and the wash water was discarded. Washing was repeated twice in fresh water and samples were analysed for the residues. Another 30 g sample of chopped fruit was put in a beaker containing 5% sodium chloride solution. After 15 minutes, it was gently rubbed by hand in salt solution and the salt water was discarded. The material was then analysed for the residues. Another 30 g sample of chopped fruit was boiled with 30 ml tap water in a beaker till water was completely evaporated. The sample was allowed to cool and was then assayed the residues. A sample without any process was also analysed for the residues along

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with the processed samples. The residues were estimated by bioassay employing the dry film method of Kavadia and Lal (1967) and by chemical assay adopting Getz and Watts (1964) method as modified by Jain *et al.* (1974). The residue data was subjected to simple regression analysis and regression equation was fitted. T_{MRL} and RL_{50} values were worked out according to Hoskins (1961).

Results and Discussion

Effect of washing with water on the reduction of quinalphos residues

It was observed that washing of fruit with water brought about residues below MRL on the zero day itself for both concentration of spray (Table 1). The extent of reduction of residues in fruit was 61.86 and 64.35 per cent on the zero day with 0.03 and 0.03 per cent spray. The residues on washed fruit estimated by both bioassay and chemical assay were found to be below the maximum residue limit (MRL) after two and zero days of treatment rendering them completely safe for consumption.

Effect of salt water washing

It is evident from Table 2 that salt water washing of fruit has reduced the initial deposits from 3.33 and 4.04 ppm to 1.88 and 1.86 ppm at 0.03 and 0.05% of quinalphos respectively. The reduced terminal residue levels were below the maximum residue limit of 2 ppm. The initial deposits were thus reduced to the extent of 43.54 and 53.96%. The zero-day residues on fruit after washing with salt water according to chemical estimations were comparatively less than those by bioassay method. It was found that salt water washing reduced the terminal residues in bhindi fruit.

Table 1

Effect of washing with water on the reduction of quinalphos residues on bhindi fruit

Dosage (% of ai)	Days after application	Residue (ppm)			Per cent reduction (bioassay)
		Unwashed Bioassay	Washed		
			Bioassay	Colorimetric	
0.03	0	3.33	1.27	1.09	61.86
	3	0.28	0.25	0.50	10.11
	7	0.20	0.20	0.20	0
0.05	0	4.04	1.44	1.20	64.35
	3	1.00	0.20	0.20	80.00
	7	0.28	0.20	0.20	28.57

Table 2

Effect of salt water washing and cooking on the reduction of quinalphos residues on bhindi fruit

Dosage (% of ai)	Days after appli- cation	Salt water washing, residue ppm			Per cent reduction	Cooking, residue ppm			Per cent reduction
		Unwashed (Bioassay)	Salt water washed			Uncooked (Bioassay)	Cooked		
			Bioassay	Colori- metric			Bioassay	Colori- metric	
0.03	0	3.33	1.88	0.80	43.54	3.33	0.58	0.60	82.58
	3	0.28	0.22	0.37	21.43	0.28	ND	0.40	—
	7	0.20	ND	ND	—	—	—	—	—
0.05	0	4.04	1.86	1.02	53.96	4.04	0.86	1.00	78.71
	3	1.00	0.52	0.25	48.00	1.00	0.20	0.25	80.00
	7	0.28	ND	ND	—	0.28	ND	ND	—

ND — Not detectable

Effect of cooking

As a result of cooking, the residues in fruit became non-detectable on the third day (Table 2) at the lower dose of 0.03% and on 7th day at the higher dose of 0.05% quinalphos. The estimates of bioassay and chemical assay were closely related. The extent of reduction due to cooking was found to be 82.58 and 78.71 % at the zero day of the treatment at 0.03 and 0.05% sprays of quinalphos.

No work has been reported on the decontamination of bhindi fruit Treated with quinalphos. Talekar *et al.* (1977) reported a reduction of 40% quinalphos deposits after washing cabbage with water. Singh (1979) based on his studies suggested that washing cabbage and trimming of outer portions would reduce the residues below the MRL in about half the recommended waiting period.

Summary

In an experiment to study the effect of different decontamination processes on the reduction of quinalphos residues on bhindi, it was found that water washing of the fruit resulted in the reduction of initial residues to the extent of 61.86 and 64.35% in the case of fruit treated with spray application of quinalphos at 0.03 and 0.05% respectively on the same day. The residues on washed fruit was below the maximum residue limit at the zero day of the treatment making it safe for consumption on the same day of harvest. Salt water washing and cooking also helped to bring down the residues below the MRL at the zero day itself. Out of the three processes of decontamination, cooking was found to bring out the maximum reduction of residues.

സംഗ്രഹം

ക്യുനാൽഫോസ് എന്ന കീടനാശിനി തളിച്ച ഖബയ്ക്കുകളിലെ അവശിഷ്ട വിഷാംശം കുറയ്ക്കുന്നതിന് വേണ്ടി ചില മാർഗ്ഗങ്ങൾ പരീക്ഷിച്ചു നോക്കിയതിൽ വെറും വെള്ളം കൊണ്ട് നന്നായി ഉലച്ചു കഴുകിയപ്പോൾ 61.9 മുതൽ 64.4% വിഷാംശം കുറഞ്ഞതായി കണ്ടു. *carotol* ഗതമാനം വിര്യമുള്ള ഉപ്പുവെള്ളം കൊണ്ട് കഴുകിയപ്പോൾ വിഷാംശം 43.5 മുതൽ 55% വരെ കുറഞ്ഞു. കായ്കൾ പാകം ചെയ്തപ്പോൾ വിഷാംശത്തിന്റെ 78.7—82.6% അപത്യക്ഷമായി കണ്ടു. മരുന്ന് തളിച്ച കായ്കൾ ഉപയോഗിക്കുന്നതിന് മുമ്പ് വെള്ളത്തിൽ നന്നായി ഉലച്ച് കഴുകുന്നത് കൊണ്ട് ഇവയിലെ ക്യുനാൽഫോസ് എന്ന കീടനാശിനിയുടെ അവശിഷ്ടം ഭൂരിഭാഗവും ഒഴിവാക്കാമെന്ന് ഈ പഠനങ്ങൾ തെളിയിച്ചു.

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