

PESTICIDE RESIDUES IN VEGETABLE PLANTS GUAR AND ONION

Shirashyad V. S* and Kanade M. B.**

*Department of Botany, Walchand College of Arts and Science, Solapur - 413 006 (MS).

**Department of Botany, Tuljaram Chaturchand College, Baramati, Dist. Pune - 413 102.

**E-mail: mahadevkanade@yahoo.com

ABSTRACT

Present investigation is focused on effect of organophosphorus pesticides methylparathion and phosphamidon on residual analysis in vegetables guar and onion. The results showed that, the dissipation of both was faster in guar than in onion. The residue in onion was more but in guar it may slightly higher than the maximum residue limit (MRL).

KEY WORDS: guar, onion Methylparathion, phosphamidon, residual analysis

INTRODUCTION

The world population is exploding and agricultural land is shrinking by human encroachment for industrial and domestic purposes. Now it is essential to boost the food production by using high yielding varieties. These many a times are susceptible for pests. Farmers are using chemical pesticides indiscriminately to control the pests without knowing the danger. Due to illiteracy, they use concentrations which are several times higher than the recommended doses. Even though the use of pesticides is low in developing countries, the residue problems have become quite alarming in agriculture and public health programmes (Dhaliwal *et al.*, 2000)..

Pesticide residues or their toxic metabolites certainly affect human health. These have been reported to cause cancer, epilepsy, liver and kidney dysfunctions, somatic growth depression (Aulakh, 2002). In 1990, WHO reported that, the population developing countries carry heavy pesticides in their bodies. The principle source of these residues is believed to be the diet which contains significant quantities of the persistent chemicals. Generally farmers do not observe the recommended doses and waiting periods. Therefore the persistence of pesticidal residue in vegetables is likely to be very high. Consumption of such food contaminated with pesticide may pose health hazards to the human beings. In order to know the extent of residual contamination and the magnitude of exposure to human being, there is a need of analysis and estimation of pesticide residues (Beena Kumari, 2001).. Keeping this view in mind, the effect of widely used organophosphorus pesticides *viz.* methylparathion and phosphamidon on their persistence in guar (*Cyamopsis tetragonoloba* L.) and onion (*Allium cepa* L.) have been studied in the present investigation.

MATERIALS AND METHODS

For the study of persistence of methylparathion and phosphamidon in vegetables guar and onion crops were selected. 0.2 % methylparathion and 0.06 % phosphamidon were thoroughly sprayed on crops in the morning hours in the field. After 7 days of the spray the fruits of guar, leaves and bulbs of onion (1kg/sample) were harvested. Pesticide residual analysis was done by using GLC-ECD (Gas Liquid Chromatography - Electron Capture Detector) for methylparathion and LC-MS (Liquid Chromatography - Mass Spectrometer) for phosphamidon at Insecticide Testing Laboratory, Shivajinagar, Pune.

RESULTS AND DISCUSSION

Many organophosphorus compounds despite their low persistence exhibit higher mammalian toxicity and their presence in food supply have raised issues related to consumer safety (Caulibaly and Smith, 1994).

Suresh and Raghupathy (1998) have studied the residual toxicity of systemic insecticides in banana plants. They noticed the presence of residues from 1.29 to 11.31 $\mu\text{g.g}^{-1}$ in different parts (Kaur *et al.* 2001), analyzed twenty market samples of muskmelon for the presence of organophosphorus insecticide residues. They observed very low residue level. Reddy *et al.*, (2000), reported the monocrotophos residues above MRL (0.2mg/kg) in the market samples of grapes. Residues ranged from 0.6748 to 1.3648mg/kg chloropyriphos and quinolphos also recorded residues more than permissible limits in Thomson seedless grapes.

A number of vegetables have been found contaminated with insecticides and fungicides. Shah *et al.* (2000) have detected the pesticide residues in cauliflower, cabbage, bean, tomato, okra, pigeon pea, chilli, potato, cluster bean, bottle gourd, cow pea, bitter gourd, pointed gourd, etc. from Gujarat. From the above vast list it is clear that, almost all the vegetables contained pesticide residues. An attempt was made to study the persistence of methylparathion and phosphamidon in the vegetables, particularly guar fruits and onion bulbs with leaves (Table-1). Analysis was made after 7 days of sprays of Methylparathion 0.2% and Phosphamidon 0.06% on guar and onion plants. The reports of analysis show the presence of 0.22 mg kg⁻¹ phosphamidon and 0.27 mg kg⁻¹ methylparathion in guar and 0.51 mg kg⁻¹ phosphamidon and 1.70 mg kg⁻¹ methylparathion in onion.

Table 1. Dissipation of organophosphorus pesticides in vegetables after 7 days of spray.

Name of plant	Parts	Treatment	Method of analysis	Result of analysis mg Kg ⁻¹	MRL mg Kg ⁻¹
Guar	Fruits	Methylparathion 0.2%	GLC-ECD	0.27	0.2
		Phosphamidon 0.06%	LC-MS	0.22	0.2
Onion	Bulb and leaves	Methylparathion 0.2%	GLC-ECD	1.70	0.2
		Phosphamidon 0.06%	LC-MS	0.51	0.2

MRL : Maximum Residual Limit

GLC-ECD : Gas Liquid Chromatography - Electron Capture Detector

LC-MS : Liquid Chromatography - Mass Spectrometer

This result showed that, their dissipation was faster in guar as compared to onion. Their residues were found very high in onion after 7 days of spray. In guar it was slightly higher than MRL. According to WHO³ the MRL for phosphamidon and methylparathion is 0.2 mg kg⁻¹.

Thus, there is a faster rate of degradation of residues in the fruits of guar. This may be attributed to the growth dilution factor, i.e. faster rate of increase in size of the guar fruits in the initial period (Chinniah, 2000). Hence, a waiting period of 7 days is not sufficient for guar and onion. To safeguard the consumer interest the recommended dose and proper waiting period must be observed by the producer before marketing the farm produce.

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