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Short Communication

Pesticides Found in Farmgate Vegetable in Western Rajasthan, India

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Abstract

Western Rajasthan is one of the most important areas of Rajasthan from vegetables production point of view. The majority of vegetables in western Rajasthan are found contaminated with pesticides residue. A total 50 samples of chilli were collected from different farms of western Rajasthan, for analysis of pesticide residue with the help of multiple residue method and gas chromatography. A considerable amount of samples (around 36%) were found infected with various organochlorine pesticide residues. The chilli samples were found with pesticide residue more than the permitted maximum residue limit (MRL) values.

Keywords: Pesticides, contamination, multiple residue method, gas chromatography, MLR values etc.

Introduction

The use of pesticides in food production is general practice adopted by the farmers in the country, but the excessive use may cause probable fitness risk from different exposures like professional and non- professional. The dietary pesticide residue can caused for the different diseases like immune impacts, mutagenicity chronic neurotoxicity, genotoxicity, carcinogenesis and endocrine disruption. It is usually accepted that fruits and vegetables be full of higher pesticide residue in contrast to other foods of plant origin, like bread based on cereal dispensation, because they are mostly consumed uncooked or semi-proceed. In western part of Rajasthan more than 20% of the cultivated area is under irrigation. Intensive agriculture is common in irrigated lands where commercial crops like cotton, chilli, cumin and groundnut are grown.

Osian Tehsil, an administrative block in the district, is well known for chilli cultivation. Chilli, grown for more than 70 years, occupies half of the cultivated area. On the other hand, high incidence of pests and diseases, for the most part, the Leaf Curl Virus (LCV) and die-back infection, has resulted in high pest executive costs[1]. The continuous application of pesticides has resulted in vectors like whitefly (Bemisia Tabaci) developing resistance, over a period of time. All these factors are mainly responsible to gradual reduction in the cropping region. Even the trendy ground race, Mathania Red chilli, known as for its bright red colour and low pungency, is now on the verge of extinction[2]. In view of the above points, a monitoring survey has conducted for the evaluation of organochlorine pesticide contamination in Chilli from the western Rajasthan[3].

Methodology

Sampling: Chilli sample was selected from the different part of western Rajasthan. Chilli is used in various ways in our daily food as uncooked in salad, vegetable, in ketchup etc. 50 sample of chilli were together in polyethene bags and then carried to the laboratory where they were stored and tested[4].

Withdrawal and Clean-up: All the HPLC grade solvents used in removal and cleanup procedure. Different organochlorine pesticide extracted from multi residue method (MRM*).* 50 gm of chilli was chopped, grinded and then extracted two times with 50 ml acetonitrile, than homogenise the sample for 2-3 minute. The collective take out was partitioned with the help of oil ether (50 ml). After this, in the extracted sample, Five millilitre of NaCl solution (2%) and 300 millilitre of distil water was added. The solvent coating, after abandonment aqueous film, was washed with two 100 ml portions of distil water. 7.5 gm anhydrous sodium sulphate solution was added to remove moisture content. After this, extract was evaporated till waterlessness, than closing add up to done with n-Hexane and stored in deep freezer for further analysis[5].

Results and Discussion

This paper presents that the study was undertaken to find out the pesticides residues absorption in chilli of western Rajasthan. Pesticides are known to be present in vegetables due to wide use of equivalent pesticides in field. The effect indicates that the 44% of whole analysed samples were infected with dissimilar pesticide residues. 36% of total polluted samples were exceeded the Maximum Residual Limit (MRL) values as per the FAO/WHO[2]. The concentration of pesticide residues were carried out by using following formula[4]:

$$\text{Concentration of Pesticide Residues in PPM} = \frac{\text{Area of sample peak}}{\text{Area of std. peak}} \times \frac{\text{Final Volume}}{\text{gm of sample taken}} \times \frac{\mu\text{l of std injected}}{\mu\text{l of std sampling}} \times \text{Conc. of Std.}$$

Table-1
Different pesticides in chilli samples of Western Rajasthan

No. of samples studied	Name of pesticides detected (No of sample contaminated)	Acute Toxicity	Overall samples contaminated with different pesticides	% of samples contaminated with pesticides	Value of MRL in ppm	Number of samples exceeded MRL in ppm
50	Aldrin	High	9	18.0 %	0.01	8
	Dieldrin	high	10	20.0 %	0.01	10
	DDT	Moderate	ND	ND	0.05	NIL
	Endosulfan	High	19	38.0 %	0.05	18
	HCH (Lindane)	Moderate	22	44.0 %	0.01	18

The range of pesticides was tabulated in Table 1. It is clear from the table that out of 50 samples of chilli, 9 were found infected with Aldrin and 8 were exceeded from MRL value. Ten were originate contaminated with Dieldrin and all ten were exceeded from MRL value[6]. Nineteen were found infected with Endosulfan and among them, eighteen samples were exceeded from MRL value. None were found contaminated with DDT.

It has also found that mainstream of vegetables in the western Rajasthan were found contaminated with insect killer residues. Therefore intervallic monitoring of farmgate vegetables must be carried out to know the existing picture of pesticide contamination of vegetables fully fledged in the western Rajasthan. The current study will be useful in taking essential and anticipatory compute to alleviate such trouble. These pesticides have originated from the nonstop and demanding farming performance going on in the areas since last several years, so at local level continuous monitoring of pesticide is very essential.

Conclusion

The present study indicates that in western Rajasthan some vegetables were found to be contaminated by some of the organochlorine pesticides. Aldrin, Dieldrin and Endosulfan were found as residues in chilli. However highest contamination of Endosulfan was detected for chilli. Therefore, we must instigate the awareness programme for the farmers about the hazards of the organochlorine pesticides on living being and our surrounding environment.

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