



Contamination of Pesticides Residues in Vegetables (Green Chili, Ladyfinger and Bottle Gourd) of Godwar Area (Bali and Falna) of Western Rajasthan, India

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ABSTRACT

The present study evaluates the contamination of pesticides in green vegetables as green chili, ladyfinger and bottle gourd in godwar area of western Rajasthan. These three types of vegetables are collected from different farm of Bali, Falna in Pali district and analysis of pesticides residues by using QuEChERS method. These two vegetable sample as ladyfinger and bottle gourd are found uncontaminated while green chili sample are found minimum contaminated with organochlorine pesticide alpha endosulphan (0.03ppm). The minimum contamination was found which show that farmers of this area are using eco-friendly method to prevent vegetables from pest and improve production.

Keywords: Pesticides residues, QuEChERS method, Contamination and Vegetables.

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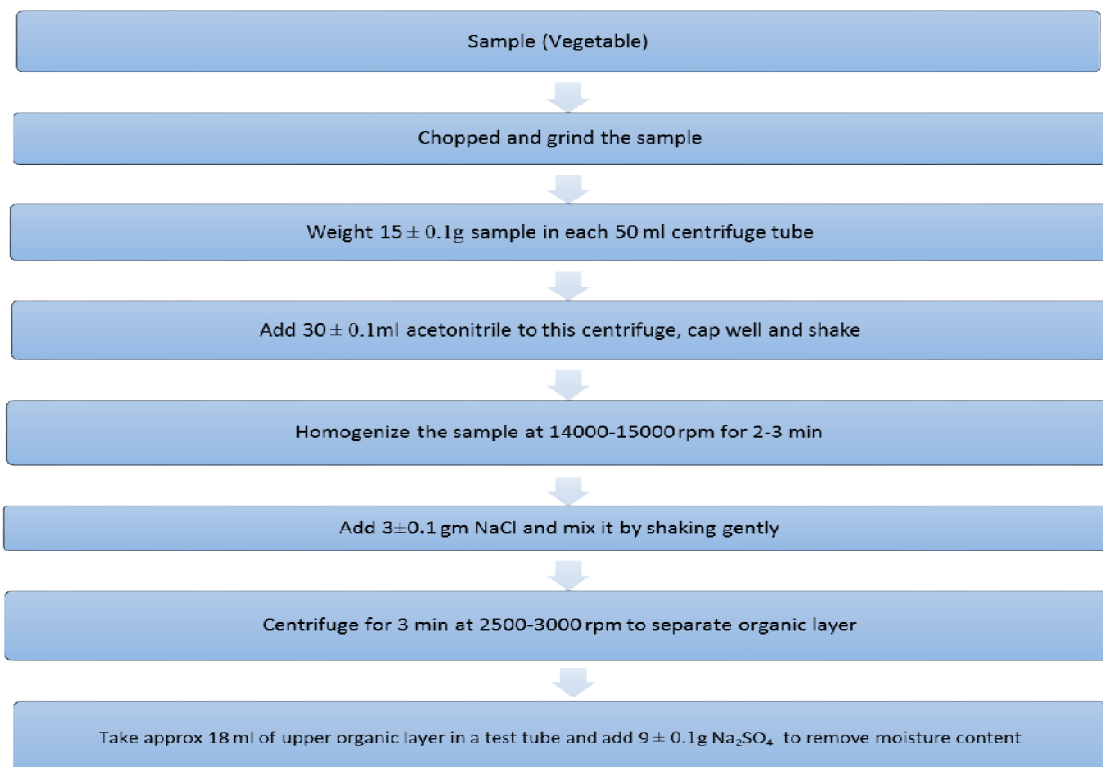
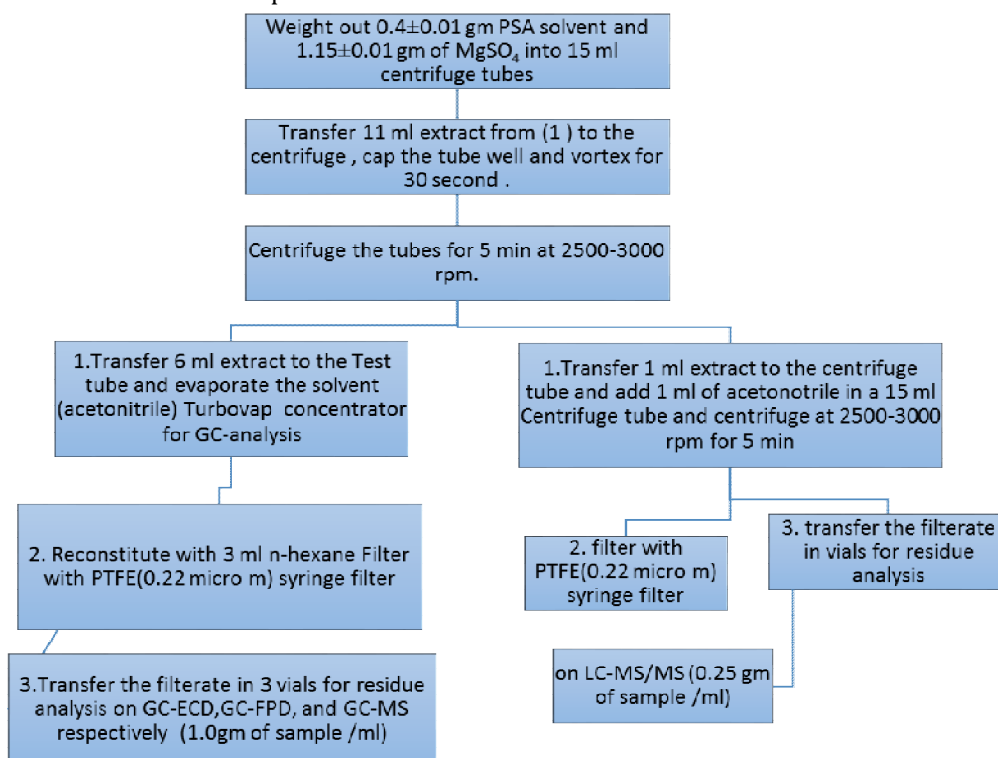
INTRODUCTION

India is an agrarian country where about 60-65% of population is depending on agriculture and contributes 16-17% of GDP of India. India is the largest pesticides consumer and second largest pesticide manufacturer in Asia. From India news report² "India farmers use about 6000 tons of active ingredients of pesticides to control pests of vegetables and fruits". Personal talk with farmer shows that about 95% of farmer use synthetic pesticides in vegetables to protect them from different pests. Fact that 50-60% of the vegetables we get across the geographically regions are contaminated with pesticides even those banned several years before as DDT, Aldrin and Endrin. Broad variety comes include fungicides, herbicides, insecticides and on the basis of chemical structure can be classified as organochlorine, organosulphur and organophosphorous pesticides. Applications of pesticides are widely used before and after the harvesting, to protect the vegetables from pest and damage. The main reason of using pesticides is to protect the vegetables, fruits from pests and improve production and quality. A 2008 document of AVRDC [3] the world vegetable center, thus tightly suggest India pesticides use on vegetables alarmingly high.

We know that vegetables and fruits are very important part of our daily balance diet. It provides many types of minerals and vitamins, which are essential for human body metabolism, But the truth is that this mineral and vitamins source like vegetable and fruits are going to be contaminated day by day with different types of pesticides [4]. These types of pesticides cause harmful side effects on human body as well as on environment. This pesticide residue causes different types of health issues as respiratory, neurological damage etc. Common effects of pesticide residue on human body are nausea, vomiting and disorder in pregnancy. We study on various types of vegetable mostly on green chili, ladyfinger and bottle gourd of different farms of godwar area of western Rajasthan to find out the pesticide residues in these vegetables. We work mostly in Falna, and Bali area in Pali district of western Rajasthan and found interesting result, only green chili sample are found a minimum contaminated rather than other vegetables sample.

MATERIAL AND METHODS

Samples of ladyfinger, bottle gourd and green chilli are selected from different farm of Bali and Falna area and collected in a polyethene bag, then these samples are carried to the laboratory, where they are stored and tested⁵. QuEChERS method was used for analysis of pesticides residues in different vegetables samples.

A. Test Procedure**B. Dispersive Solid Phase Cleanup****B. Formula**

The concentrations of pesticides residue were carried out by using following formula:

$$\text{Concentration of pesticides residues in ppm} = \frac{\text{sample area}}{\text{std.area}} \times \frac{\text{conc.of std.(ppm)}}{\text{weight of the sample in gm}} \times \frac{\mu\text{L standard injected}}{\mu\text{L of sample injected}} \times \text{final volume of sample (ml)}$$

where

area of peak sample = as per chromatogram

area of standard peak = as per the chromatogram

final volume of sample = 3 ml

Weight of sample = 1.0gm /ml GC-ECD,GC-FPD,GC-MS and 0.25 gm/ml LC-MS

RESULT

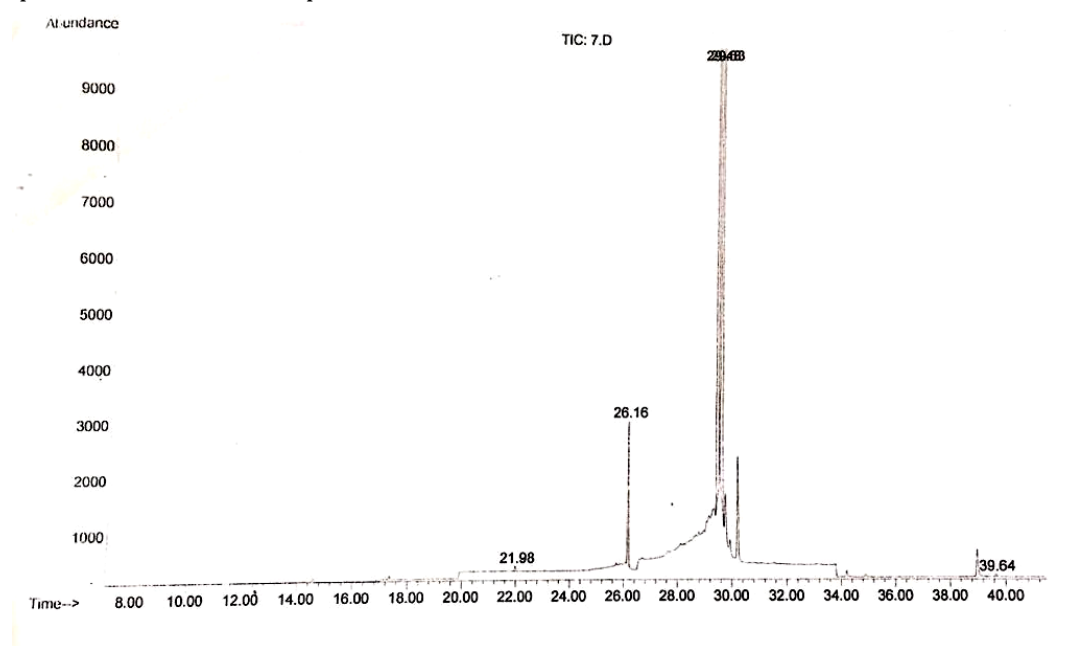
Table I: Result of pesticides residues in vegetable samples

Parameters	Results in Ladyfinger	Results in Green Chili	Results in Bottle Gourd	Test method
Organochlorine ,mg/kg				
Alpha HCH	Not Detected	Not Detected	Not Detected	FRAC/SOP/INST/317
Beta HCH	Not Detected	Not Detected	Not Detected	
Gamma HCH(lindane)	Not Detected	Not Detected	Not Detected	
Delta HCH	Not Detected	Not Detected	Not Detected	
Heptachlor and Epoxide	Not Detected	Not Detected	Not Detected	
Aldrin	Not Detected	Not Detected	Not Detected	
Dieldrin	Not Detected	Not Detected	Not Detected	
Cis Chlordane	Not Detected	Not Detected	Not Detected	
Trans Chlordane	Not Detected	Not Detected	Not Detected	
Alpha Endosulphan	Not Detected	0.03	Not Detected	
Beta Endosulphan	Not Detected	Not Detected	Not Detected	
Endosulphan Sulphate	Not Detected	Not Detected	Not Detected	
Endrin	Not Detected	Not Detected	Not Detected	
Endrin Aldehyde	Not Detected	Not Detected	Not Detected	
Endrin Ketone	Not Detected	Not Detected	Not Detected	
O,P,DDE	Not Detected	Not Detected	Not Detected	
P,P DDE	Not Detected	Not Detected	Not Detected	
O,P DDD	Not Detected	Not Detected	Not Detected	
P,P DDD	Not Detected	Not Detected	Not Detected	
O,P DDT	Not Detected	Not Detected	Not Detected	
P,P DDT	Not Detected	Not Detected	Not Detected	
Methoxychlor	Not Detected	Not Detected	Not Detected	

Table II: Pesticides residue in lady finger, green chili and bottle gourd

Parameters	Results in Ladyfinger	Results in Green Chili	Results in Bottle Gourd	Test method
Organophosphorous ,mg/kg				
Diclorvos	Not Detected	Not Detected	Not Detected	FRAC/SOP/INST/317
Monocrotophos	Not Detected	Not Detected	Not Detected	
Phorate	Not Detected	Not Detected	Not Detected	
Phorate Sulphoxides	Not Detected	Not Detected	Not Detected	
Phorate Sulphoxides	Not Detected	Not Detected	Not Detected	
Diazinon	Not Detected	Not Detected	Not Detected	
Methyl Parathion	Not Detected	Not Detected	Not Detected	
Parathion	Not Detected	Not Detected	Not Detected	
Fenitrothion	Not Detected	Not Detected	Not Detected	
Malathion	Not Detected	Not Detected	Not Detected	
Maloxan	Not Detected	Not Detected	Not Detected	
Fenthion	Not Detected	Not Detected	Not Detected	
Chlorpyrifos	Not Detected	Not Detected	Not Detected	
Ethion and analogue	Not Detected	Not Detected	Not Detected	
Phosalone	Not Detected	Not Detected	Not Detected	
Phosphamidon	Not Detected	Not Detected	Not Detected	
Chlorfenvinphos and its isomers	Not Detected	Not Detected	Not Detected	
Phenthoate	Not Detected	Not Detected	Not Detected	
Pirimiphos methyl	Not Detected	Not Detected	Not Detected	
Alachlor	Not Detected	Not Detected	Not Detected	
Quinolphos	Not Detected	Not Detected	Not Detected	

Detection limit: Organochlorine, Organophosphorous -0.01mg/kg
 Mass Spectra of Green Chili Samples



Graph I: Mass Spectra of green chili sample

DISCUSSION

It clears from the results show in above tables that there are no pesticides residues of organochlorine and organophosphorous were found in ladyfinger and bottle gourd but 0.03 ppm alpha sulphur residue of organochlorine was found in green chili. We know that most of the vegetables are found contaminated with different type of pesticides, because of to improve quality and productions of vegetables, but in Bali and Falna area, most of vegetable are found uncontaminated. It's clear from the mass spectra of ladyfinger and bottler gourd sample that there is no peak obtained due to the presence of pesticides residues. Only in green chili sample there is one peak obtained due to pesticide residue.

CONCLUSION

This study concluded that godwar area of western Rajasthan are mostly uncontaminated with pesticides, minimum amount of pesticides is used in mostly green chili. Thus minimum use of pesticides was found. So this study on pesticides residues in vegetables of godwar area mostly in Bali and Falna are most of uncontaminated with pesticides and good in quality and production.

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