



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; SP5: 406-408

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(Special Issue- 5)

**International Conference on
“Food Security through Agriculture & Allied Sciences”
(May 27-29, 2019)**

Reducing the pesticide residues from foodstuff through food processing technique

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Abstract

Food safety is an area of growing food in concern of human health. The presence of pesticide residues in food has affected the human health. The study was conducted in the Nagaon and Jorhat districts of Assam. North West Jorhat Development Block under Jorhat Sub-Division of Jorhat District and Bratradoba Development Block under Nagaon Sub-Division of Nagaon District were selected purposively for the study owing to its proximity to the researcher. 120 numbers of women respondents were selected randomly for the research study. From the findings, it was observed that food processing techniques such as washing, peeling, canning or cooking lead to a significant reduction of pesticides residues. From this research we found that the common food processing operations along with the degree of residue removal in each process. 68.33 per cent of the respondents were wash vegetable properly before peeling followed by 67.50 per cent were washed and peel off the raw vegetables thoroughly, 60.00 per cent of the respondents did not used green leaves as food after immediately spraying pesticides, 30.83 per cent avoid purchase of off season vegetables due to application of high amount of pesticide, 25.83 per cent washed vegetables after peeling, 11.67 per cent applied pesticides only at recommended dose and a very negligible (8.33%) respondents cooked vegetables in pressure cooker to reduce pesticide residue. It can be concluded that respondents were somewhat aware about pesticide residue in foodstuff and its effect on health. It is therefore essential to make the respondents aware about the proper food processing techniques in order to avoid causing of health hazards and toxic effects on the users.

Keywords: Pesticides, Pesticide residues, Foodstuff, food processing techniques

Introduction

India is the second largest vegetable producer in the world, next only to China. India has produced 93.92 million tons of vegetables from the 6.24 million hectored of land per year (Singh and Singh, 2005) [7]. Historian believes that women who first started cultivation of crop and initiated the art and science of farming. In recent times also women are playing a pivotal role in agricultural occupation as a managers, decision makers and skilled farm workers. It is estimated that women are responsible for 70 per cent of actual farm work and constitute up to 60 per cent of the farming population (Chaudhary and Singh, 2013). It is therefore, not an exaggeration that women in developing countries are the back bone of food security.

Pesticide residues in fruits and vegetables are a major concern to consumers due to their negative health effects. They have been found in both raw and processed fresh produce. However, food processing techniques have been found to significantly reduce the pesticide residues in fruits and vegetables in several studies (Chavarri *et al.*, 2005) [4]. The techniques used in the studies focused on commercial or home processing of fruits and vegetables and they included washing, blanching, peeling, pureeing, cooking, roasting, frying and boiling.

Materials and methods

The study was conducted in the Nagaon and Jorhat districts in the state of Assam. North West Jorhat Development Block under Jorhat Sub –Division of Jorhat District and Bratradoba Development Block under Nagaon Sub- Division of Nagaon District were selected purposively for the study owing to its proximity to the researcher. From each block three villages were selected in consultation with block officials of the respective block. From the selected villages 20 women respondents were selected who engaged in crops and vegetable production. Thus,

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The totals of 120 numbers of respondents were selected randomly for the study. Lists of variables were prepared on the basis of the objectives of the study. Data were collected with the help of interview schedule by personal interview method. Collected data were analyzed by applying frequency and percentage.

Findings

This finding of the study revealed that 39.17 per cent of respondents were in the age group of 30-45 years and majority of the respondents were married (70.00 per cent). Forty five percent respondents were from More Other Backward Caste (MOBC). In case of educational level most of the respondents (41.67 per cent) can only read and write and farming is the main occupation of 77.50 per cent. Respondents from small land holding accounted highest percentage (42.50 per cent) for cultivation. Majority (64.17 per cent) of the respondents belonged to nuclear family and was found that 64.17 per cent had small family size with

mixed house (52.50 per cent). From the findings it was clear that majority (60.83 per cent) of the respondents had no membership in any organization, 55.83 per cent of respondents possessed medium level material and a large percentage (52.50 per cent) of respondents belonged to medium socio- economic level, majority (74.16 per cent) of the respondents had no contact with agricultural agent from Agricultural Department and 92.50 per cent of respondents had no contact with any credit giving agency. Majority of the respondents got exposure on radio (70.83 per cent) and television (91.67 per cent) as a mass media. Majority (65.83 per cent) of the respondents not participated any formal training programmes It is also evident from the finding that majority of the respondents (90.00 per cent) gained information about pesticide use from radio and most of the respondents (90.00 per cent) thought that lack of knowledge on application of pesticide as per recommended dose is the cause of pesticide residue.

Table 1: Distribution of the respondents according to their Socio- economic profile, N-120

Sl. No	Item	Group	frequency	Percentage %
1	Age	Young (16-30 years)	30	25.00
		Middle (31-45 years)	47	39.17
		Old (>45 years)	43	35.83
2	Marriage status	Married	84	70.00
		Unmarried	16	13.33
		Divorced	6	5.00
		Widow	14	11.67
		Separated	0	0.00
3	Education	Primary	61	50.83
		HSLC	33	27.50
		HSLC Passed	21	17.50
		HSSLC passed	4	3.33
		Degree	1	0.83
4	Caste	ST	14	11.67
		SC	31	25.83
		OBC/ MOBC	74	61.67
		General	1	0.83
5	Occupation	Farming	83	69.17
		Daily wage earner	4	3.33
		Business	6	5.00
		Services	21	17.50
		others	6	5.00
6	Land holding	Small (below 7.5 bigha)	51	42.50
		Medium (7.5 -15 bigha)	40	33.33
		High (above 15 bigha)	29	24.17
7	Family income	Low (< Rs. 20000)	58	48.34
		Medium (Rs.20000 30000)	43	35.83
		High (> Rs. 30000)	19	15.83
8	Organizational embership	No membership	73	60.83
		Member of an organization	47	39.17
9	Training	participated	41	34.16
		Not participated	79	65.83

Existing practices of the respondents to decrease the pesticide residues from foodstuff through food processing technique

A. Existing practices to reduced pesticide residue in cereals and pulses

It is shown in the Table 2 that a large percentage of the respondents (81.67 per cent) cooked rice after thorough washing, followed by, 67.50 per cent respondents avoided mixing the new and old grains whereas 51.67 per cent of

respondents obeyed the waiting period between the spray and harvesting, 47.50 per cent of the respondents sun dried the grains before storage to reduce pesticide residues whereas 28.33 per cent of the respondents cooked rice in pressure cooker to reduce pesticide residues and a very negligible percentage (6.67 per cent) of respondents sprayed pesticides as per the economic threshold basis. Not a single respondent followed the tips related to Integrated Pest Management (IPM). Similar finding was also reported by Mahindra and Kour (2013) [3].

Table 2: Distribution of the respondents according to existing practices to reduced pesticide residue in cereals and pulses

Sl. No.	Measure	Frequency	Percentage
1	Obey the waiting period between the spray and harvesting	62	51.67
2	Sundry the grains before storage	57	47.50
4	Cook rice after washing thoroughly	98	81.67
5	Avoid mixing the new and old grains	81	67.50
6	Cook rice in pressure cooker	34	28.33
7	Spray pesticides as per economic threshold basis	8	6.67
8	Follow the tips of Integrated Pest Management	-	-

A. Existing practices to reduced pesticide residue in vegetables

Table 3 reveals that 68.33 per cent of the respondents wash vegetable properly before peeling followed by 67.50 per cent washed and peel off the vegetables thoroughly to be eaten as raw, 60 per cent of respondents did not used green leaves as food after immediately spraying pesticides, 30.83 per cent avoid purchase of off season vegetables due to application of high amount of pesticide, 25.83 per cent washed vegetables after peeling 11.67 per cent applied pesticides only at

recommended dose and a very negligible (8.33 per cent) respondents cooked vegetables in pressure cooker to reduce pesticide residue. It can be concluded that respondents were somewhat aware about pesticide residue in foodstuff and its effect on health. This might be due to the electronic mass media exposure of the respondents. This finding is supported by Adachi and Okan (2016) [2] that some extent of pesticide residues were removed from fruits and vegetables by washing with water.

Table 3: Distribution of respondents according to existing practices followed to reduced pesticide residues in vegetables

Sl. No.	Measures	Frequency	Percentage
1	Do not use green leaves as food after immediately spraying pesticide	72	60.00
2	Wash vegetables after peeling	31	25.83
3	Wash and peel off the vegetables thoroughly to be eaten as raw.	81	67.50
4	Avoid purchase of off season vegetables	37	30.83
5	Wash vegetable properly before peeling	82	68.33
6	Cook vegetables in pressure cooker	10	8.33
7	Apply pesticides only at recommended dose	14	11.67

Conclusion

On overall analysis it can be concluded that large number of farm families used chemical pesticides to control pest and diseases of crop and vegetables without following scientific norms, which causes pesticide residue on foodstuff. To make the farm women fully aware about pesticide residue in foodstuff vigorous publicity is essential through electronic media such as radio, television as the education level of the respondents is low. Extension agents should draw special attention in organizing training regarding safe use of pesticide on crops and vegetables at the door step of the farmers.

The concern authority may also take appropriate steps to educate the farm women with the Integrated Pest Management (IPM) techniques for the purpose of reducing pesticide residue in foodstuff for development of quality life of the people.

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