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## Awareness of vegetable growers towards safe application of pesticides

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**Abstract**

The study was conducted in Akola district in Vidarbha region of Maharashtra state with the objective to study the awareness of vegetable growers towards safe application of pesticides. Based on more area under vegetable cultivation, the Patur tahsil from Akola district was selected purposively. Ten villages from Patur were selected randomly and ten vegetable growers from each selected village were interviewed for collection of data. Thus total 100 respondents were considered as sample for the study. The exploratory research design was used for present study. The findings revealed that more than half of the respondents (67.00%) had medium level of awareness. The coefficient of correlation between selected characteristics revealed that, the characteristics extension contact showed positive and highly significant correlation with awareness of the respondents at 0.01 level of probability. The characteristics viz. training received, attitude towards use of pesticides, land holding, experience of growing vegetable crops, sources of information, irrigation facility, and high level of education were positively correlated with awareness at 0.05 level of probability about awareness of the vegetable growers towards safe application of pesticides.

**Keywords:** Awareness, vegetable growers, safe application, pesticides

**Introduction**

Pesticides have substantially contributed to the controlling of pests and increasing crop yields in meeting the food demand of escalating population and control of vector-borne diseases. Exposure to pesticides is one of the most important occupational risks among farmers in developing countries (Konradsen *et al.*, 2003) [3]. One of the major factors of pesticide contamination or poisoning in developing countries is the unsafe use or misuse of pesticides. Past research have identified elements of unsafe use of environmental hazards, and information about first aid and antidotes given by the label, the use of faulty and proper maintenance of spraying equipment, and lack of the use of protective gear and appropriate clothing during handling of pesticides (Damalas *et al.*, 2006 Ajayi and Akinnifesi, 2008; Sosan and Akingbohunge, 2009) [2, 1, 7]. Exposure to pesticides, both occupationally and environmentally, causes a range of human health problems. It is estimated that nearly 10,000 deaths occur annually due to use of chemical pesticide worldwide, with about three-fourth of these occurring in developing countries. At present, India is the largest producer of pesticides in Asia and ranks twelfth in the world for the use of pesticides with an annual production of 90,000 tons (Meera and Bahal, 2000) [4].

A vast majority of the population in India (56.70 per cent) is engaged in agriculture and is, therefore exposed to the pesticides used in agriculture. Use of pesticides in India is increasing at the rate of 2.00 to 5.00 per cent per annum and is about 3.00 per cent of total pesticides used in world. About 90,000 technical grade pesticides are currently produced and more than 67.00 per cent is used in agriculture sector alone. (Nigam and Murthy, 2000) [5]. Pesticides being used in agricultural tracts are released into the environment and come into human contact directly or indirectly. Humans are exposed to pesticides found in environmental media (soil, water, air and food) by different routes of exposure such as inhalation, ingestion and dermal contact. Exposure to pesticides results in acute and chronic health problems. These range from temporary acute effects like irritation of eyes, excessive salivation to chronic diseases like cancer, reproductive and developmental disorders etc.

**Methodology**

The study was conducted in Akola district in Vidarbha region of Maharashtra state. The objective of the study was, to study the awareness of vegetable growers towards safe

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application of pesticides. Based on more area under vegetable cultivation Patur Tahsil from Akola district was selected purposively. Ten villages from Patur were selected randomly and ten vegetable growers from each selected village were interviewed for collection of data. Thus total 100 respondents were considered as sample for the study. The exploratory research design was used for present study. Data were collected by the personally interviewing the respondents with the help of pre- tested and structured schedule.

**Table 1:** Distribution of respondents according to their awareness about pesticide application

Sl. No.	Awareness index	Respondents (n=100)	
		Frequency	Percentage
1	Low (Up to 33.33)	25	25.00
2	Medium (33.34 to 66.66)	67	67.00
3	High (Above 66.66)	08	08.00
	Total	100	100.00

Mean = 54

SD = 14.54

It was observed from Table-1 that, more than half (67.00%) of the respondents were observed in medium level of awareness about safety measures for pesticide application in vegetable crop, it was followed by (25.00%) respondents were had low level of awareness and might be adopting the safety measures and remaining eight per cent of the respondents (08.00%) were noted high level awareness. The findings thus concluded that majority of the respondents (67.00%) had medium level awareness about selected safety measures. Rao and Dubey

## Results and Discussion

### Awareness about safety measures while application of pesticides

The overall awareness level of vegetable farmers amongst the selected safety measures has been studied analyzed and computed in the form of index and the distribution of the respondents distributed into three categories by equal interval method is given in below Table-1.

(2001) [6] also reported that majority of respondents had medium level of awareness towards pesticide application.

### Statement wise awareness about safety measures while application of pesticides

The personal, occupational, professional and social awareness attitude possessed by the vegetable growers about safety measures was studied, analyzed and statement wise distribution of the respondents according to the awareness about safety measures is depicted in below Table-2

**Table 2:** Distribution of the respondents according to their awareness about safety measures about application of insecticides/pesticides

Sl. No.	Statements	Respondents (n=100)		
		Completely aware	Aware to some extent	Not aware
1.	Insecticides/pesticides should be purchased in original packing only.	58.00 (58.00%)*	34.00 (34.00%)	08.00 (08.00%)
2.	The label and leaflet of insecticides and pesticides should be read carefully before spraying.	29.00 (29.00%)	50.00 (50.00%)	21.00 (21.00%)
3.	Examination of statutory warning symbol given for toxicity level on insecticides/pesticides container	05.00 (05.00%)	45.00 (45.00%)	50.00 (50.00%)
4.	Insecticides/pesticides should be stored in cool, dry, safe place, and in lock and key.	35.00 (35.00%)	55.00 (55.00%)	15.00 (15.00%)
5.	Insecticides/pesticides should be kept out of reach of children.	68.00 (68.00%)	25.00 (25.00%)	07.00 (07.00%)
6.	Insecticides/pesticides should not be transported along with food and edibles	22.00 (22.00%)	46.00 (46.00%)	32.00 (32.00%)
7.	Use of recommended dose of insecticides/pesticides by taking exact measurement with measuring cup	59.00 (59.00%)	33.00 (33.00%)	08.00 (08.00%)
8.	Stick or long handled spoon should be used for mixing of insecticides/pesticides with water.	62.00 (62.00%)	32.00 (32.00%)	06.00 (06.00%)
9.	Dirty, leak or under repair sprayer / duster should not be used for spraying	75.00 (75.00%)	15.00 (15.00%)	10.00 (10.00%)
10.	Nozzle of sprayer should not be cleaned by mouth out breathing	22.00 (22.00%)	48.00 (48.00%)	30.00 (30.00%)
11.	Funnel should used for pouring insecticides/pesticides mixture in sprayer.	59.00 (59.00%)	33.00 (33.00%)	08.00 (08.00%)
12.	Mask, cap, gloves, sleeves and apron should be used while spraying.	57.00 (57.00%)	33.00 (33.00%)	10.00 (10.00%)
13.	Spraying should be taken in wind free environment or should be taken towards direction of wind.	52.00 (52.00%)	34.00 (34.00%)	14.00 (14.00%)
14.	Foodstuff and drinking water should not be kept in the spraying operation area	75.00 (75.00%)	20.00 (20.00%)	05.00 (05.00%)
15.	Consumption of food, drinking of water and smoking should be strictly avoided while spraying operation	37.00 (37.00%)	13.00 (13.00%)	50.00 (50.00%)
16.	Complete cleaning of hands and face should be done before consumption of food, drinking of water or smoking	72.00 (72.00%)	20.00 (20.00%)	08.00 (08.00%)
17.	Highly toxic or long persistence insecticide/pesticide should not be sprayed at harvesting stage of vegetables	27.00 (27.00%)	47.00 (47.00%)	26.00 (26.00%)
18.	If insecticides/pesticides comes directly in contact with body or clothes accidentally, proper cleaning should be done immediately	57.00 (57.00%)	39.00 (39.00%)	04.00 (04.00%)
19.	In case of accidental poisoning by insecticides/pesticides, first-aid should	69.00 (69.00%)	31.00 (31.00%)	00.00 (00.00%)

	be given to the victim and to call the doctor immediately.			
20.	Complete bath should be taken and the clothes used should be washed cleanly to remove traces after the spraying operation	69.00 (69.00%)	23.00 (23.00%)	08.00 (08.00%)
21.	Empty containers of insecticides/pesticides should be disposed off and buried in the corner of the field to keep the environment pollution free.	07.00 (07.00%)	20.00 (20.00%)	73.00 (73.00%)
22.	Economic threshold level of pest incidence should be checked regularly to avoid frequent spraying of Insecticide/pesticide on vegetables crops	05.00 (05.00%)	13.00 (13.00%)	82.00 (82.00%)
23.	Harvested vegetables should not be treated with insecticides/ pesticides or chemical fertilizer solution before taking to the market	91.00 (91.00%)	09.00 (09.00%)	00.00 (00.00%)

\* Figures in parentheses indicates percentage

The awareness possessed by the respondents about safety measures illustrated in Table-2 that over majority of the respondents (91.00%) were completely aware about not to treat the harvested vegetables with insecticides/ pesticides or chemical fertilizer solution before taking to the market as a professional and social attitude towards consumers health, it was also followed by majority of equal percentage of the respondents (75.00%) were aware about not to use the dirty, leak or under repair sprayer/duster for spraying and not to keep the foodstuff and drinking water in spraying operation area respectively, nearly majority of the respondents (72.00%) were well-known about washing and cleaning of hands and face before Consumption any food material, drinking of water and smoking, 69.00 per cent of each of the respondents were aware to give first-aid to the victim and to call the doctor immediately in case of accidental poisoning by insecticides/pesticides and about taking bath and cleaning of clothes respectively, 68.00 per cent of the respondents also know that insecticides/pesticides keep out of reach of children. 62.00 per cent of the respondents were aware about use stick or long handled spoon for mixing of insecticides/pesticides with water, 59.00 per cent of each of the respondents were aware to use the recommended dose of insecticides/pesticides by taking exact measurement with measuring cup provided with the container and to use funnel for pouring the mixture in sprayer respectively. 58.00 per cent, 57.00 per cent and 55.00 per cent of the respondents were awareness about purchase of insecticides/pesticides in original packing only, using mask, cap, gloves, sleeves and apron while spraying and if the insecticides/pesticides comes directly in contact with body or clothes accidentally, proper cleaning should be taken immediately as a part of safety measure while handling of insecticides/pesticides respectively.

Further it was reveal that, More than half of the respondents (55.00%) were partially awareness about storage of insecticides/pesticides in cool, dry, safe place, and in lock and key, it was followed by half of the respondents (50.00%) who partially know that label and leaflet of insecticides and pesticides should be studied carefully before using it for spraying, 48.00 per cent of the respondents were partially aware that the nozzle of sprayer should not be cleaned by out breathing with mouth, 47.00 per cent, 46.00 per cent and 45.00 per cent of the respondents had partial awareness that highly toxic or long persistence insecticide/pesticide should not sprayed at harvesting stage of vegetables, insecticides/pesticides should not be transported along with food and edibles and to the statutory warning given on insecticide/pesticide container for checking the toxicity level of insecticides/pesticides as a part of safety measure respectively.

Whereas it was also observed that, majority of the respondents (82.00%) were not aware about checking of economic threshold level regularly to avoid frequent spraying of insecticide/pesticide on vegetables crops, it was followed

by nearly majority of the respondents (73.00%) who were not aware that empty container of insecticides/ pesticides should be disposed off and buried in the corner of the field to keep the environment pollution free, 50.00 per cent and 49.00 of the respondents were not aware about strictly avoiding the consumption of food, drinking of water and smoking while spraying operation and checking statutory warning given on container of insecticide/pesticide for toxicity level, respectively. The study thus concluded that medium level of awareness was possessed by the respondents about safety measures to be followed during application of insecticides/pesticides in vegetable crops.

### Correlates of awareness about safety measures while application of pesticides

With an assumption that awareness is influenced by personal, socio-economic, situational, communication and psychological characteristics of the respondents has been worked out and depicted in Table-3

**Table 3:** Coefficient of correlation between selected characteristics of the respondents with their awareness

Sl. No.	Variables	'r' values
1	Age	-0.2134*
2	Education	0.2045*
3	Land holding	0.2295*
4	Irrigation facility	0.2086*
5	Major crops grown	-0.0856 <sup>NS</sup>
6	Major vegetable crop grown	-0.1727 <sup>NS</sup>
7	Experience of growing vegetable crops	0.2279*
8	Labour availability	-0.0216 <sup>NS</sup>
9	Annul income	-0.0339 <sup>NS</sup>
10	Sources of information	0.2145*
11	Extension contact	0.2669**
12	Training received	0.2508*
13	Social participation	-0.2158*
14	Number of spray per vegetable crop	-0.2141*
15	Attitude towards pesticides use	0.2330*

\*\* -Significant at 0.01 level of probability

\*-Significant at 0.05% level of probability

The coefficient of correlation between selected characteristics of the respondents with their awareness about safety measures to be followed in application of insecticides/pesticides to the vegetable crops depicted in Table-3 revealed that, among selected characteristics extension contact showed positive and highly significant correlation with awareness of the respondents at 0.01 level of probability. The characteristics viz. training received, attitude towards use of pesticides, land holding, experience of growing vegetable crops, sources of information, irrigation facility and high level of education were positively correlated with awareness at 0.05 level of probability.

The characteristics age, number of spray per vegetable crops and social participation showed negative but significant correlation at 0.05% level of probability with awareness

possessed by the respondents about use of safety measures. Therefore, the null hypothesis for this variable was rejected. The characteristics major vegetable crops grown, labour availability, annual income and major crops grown were negative and not shown any significant relationship with the awareness possessed by the respondents about use of safety measures. The null hypothesis is therefore accepted.

Thus correlation analysis concluded that, the respondents having high extension contact, training received, attitude towards use of pesticides, land holding, experience of growing vegetable crops, sources of information, irrigation facility, and high level of education were possessing more awareness by about use of safety measures in application of insecticides/pesticides to the vegetable crops.

### Conclusion

The findings of the study concluded that, more than half of the respondents (67.00%) were having medium level of awareness about safety measures in application of pesticides in vegetable crops. It is also observed that majority of farmers were not awareness about checking of economic threshold level to avoid frequent spraying of insecticides/ pesticides, disposed off empty insecticides/ pesticides containers and to take care of using recommended dose of insecticides/ pesticides. In this context it is suggested that extension functionaries of State Department of Agriculture, NGO's and Agriculture Universities should make aware the vegetable growers by means of organization of crop demonstrations, method demonstrations, result demonstrations, farmers field schools, field visits through the crop sap and other field level extension programmes like trainings, distribution printed materials viz. leaflets, folders, booklets etc. and conduction of transfer of technology programmes through mass media for vegetable growers to adopt safety measures while application of pesticides in vegetable crops

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