

Survey on selling trend of insecticides for insect pest management in vegetable crops at Raipur (Chhattisgarh)

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ABSTRACT

The findings revealed that out of 50 respondents, majority of the 64.00 per cent were middle age group, 44.00 per cent belong to 5-10 years of experience and 64.00 per cent were graduated and 92.00 per cent shops operated by owner. Peak period of demand for insecticides was in *Kharif* season identified by 56.00 per cent respondents. Highest demand of insecticides for a particular vegetable observed by 28.00 per cent in cabbage. Majority (80.00 %) of the respondents dealing insecticides alongwith herbicide, fungicide, seed, micro- nutrients and farm implements and 45.00 per cent were well aware about banned/registered insecticides. Most demanded Chlorpyrifos and cypermethrin insecticides identified by 36.00 per cent and 26.00 per cent respondents. The co-efficient of correlation showed positive and highly significant with the business experience. Constraints faced during the sale reported were knowledge on the handle of expired material (60 %) and payments were not received by farmers at proper time (54%).

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INTRODUCTION

India is the largest manufacturer of basic pesticides in Asia and ranks globally in 12th position. Insecticides account for 75 per cent of India's total pesticide consumption, followed by fungicides (12%) and herbicides (10%) (Kesavachandran *et al.*, 2009). Insecticides poison humans and insects similarly. The current systems of trading and use of pesticides pose significant risks to farmer health, risks of obsolete stockpile accumulation and present risks associated with

illegal trading of pesticide which do not respect basic safety and risk management as required according to the FAO Code Conduct. Any increases in the quantities of pesticides being traded in these conditions could be counter productive to the stated aims of poverty reduction and food security (Anonymous, 2006). As pesticide traders or retailers are an important source of information on the potential health risks of pesticides to farmers. It would be important to better understand the behaviour, knowledge and training habits of traders so that

policymakers can easily identify and target informational gaps for more effective pesticide information campaigns (Dasgupta *et al.*, 2005). The extensive and indiscriminate use of these chemicals on vegetables possesses serious residue problems, which are hazardous for human and animal health, natural enemies and the environment (Chahal, 1997). It has been estimated that on an average Indian ingested about 40 times more pesticide residues with food and water than the average Westerner (Gupta, 2006). A survey conducted in U.P. and Hyderabad revealed that the average pesticide intake through food on an average were 0.27 and 0.36 mg/person/day, respectively (Anonymous, 2004).

MATERIAL AND METHODS

Details of the materials used and the experimental techniques adopted during the course of investigation were under the following heads:

Location of the study:

The study was conducted in Raipur district of Chhattisgarh state during the year 2009-2010. Raipur district is situated in mid Eastern part of Chhattisgarh at 21.16° North latitude and 81.36° East longitude of 289.56 meters above mean sea level.

Sample and sampling procedure:

Selection of blocks and shops:

There were 15 blocks in the Raipur district *viz.*, Dharsiwa, Aarang, Tilda, Abhanpur, Simga, Bhatapara, Baloda Bazaar, Palari, Kasdol, Bilaigarh, Fingeshwar, Devbhog, Gariyaband, Chura, Mainpur. Out of these 4 blocks, Raipur (Bhatagaon), Baloda Bazaar, Aarang and Abhanpur were purposively selected for the study. In each block, insecticide dealers/ retailers shops were selected randomly and potential growing area of vegetables were selected for the study.

Selection of respondents:

In each of the selected blocks, maximum insecticide dealers/ retailers were selected to fill up questionnaire to all the selected four blocks. In this way 50 respondents were identified who possess small and big insecticide shops in the district, town and villages for the collection of primary data.

Independent and dependent variables:

Independent variables:

Age, education, ownership, status of plant protection advise skill, expired material, peak period/ seasons of insecticide demand, farmers demand insecticides for vegetables pest, management, nature of commodities, most selling chemicals (insecticide, fungicide, herbicide), knowledge about banned/ registered insecticides, duties of insecticide inspector on the area, highest selling insecticides for vegetables pest management, recommendation slip to purchase insecticides, farmers referred to consult someone if problem was beyond their capacity, warning by respondents to the farmers about residual toxicity of insecticides, providing knowledge on safe handling of insecticides, knowledge on inhalatic exposure, knowledge on safe transport and storage of insecticides and literature referred.

Dependent variable:

Business experience:

Constraints faced by the respondents during the selling of insecticides:

To measure the problems faced by the respondents during the selling of insecticides, simple ranking technique was applied. Each respondent were asked to mention the problems for selling of insecticides in order to degree of difficulties.

Suggestions of respondents to overcome these constraints:

Considering the problems faced by the respondents regarding selling of insecticide and to overcome the same problems, they were asked to give their valuable suggestions. The offered suggestions were ranked on the basis of number and per cent of respondents reported for the respective suggestions.

Developing the interview schedule :

The interview schedule was designed on the basis of objectives which was framed out in the English but completely facilitated to be asked and discussed every question in "Hindi" and prior to conduct the interviews these questions were thoroughly examined and discussed with the experts. Adequate care was taken to formulate the question in a manner to understand by the respondents for their easy response.

The prepared interview schedule was presented in the study area. On the basis of experience gained in pre-testing, necessary modifications and suggestion were incorporated before finalizing the schedule.

Method of data collection/ interviewing :

Tools and techniques adopted in collecting data is the personal interview with respondents on their observations/ experiences. Respondents were interviewed through personal interview technique. Prior to interview, the respondents were taken in to confidence by revealing the actual purpose of the study with full care to develop good rapport by them.

They were assured that information given by them would be kept confidential. The interviews were conducted in the most formal and friendly atmosphere without any complications.

Data processing and statistical framework used for analysis :

The collected data were tabulated into the coding sheet and then appropriate statistical techniques were applied for analysis of data according to objectives as suggested by Cochran and Cox (1957). The statistical methods viz. percentage, frequency, mean, standard deviation, co-efficient of correlation were applied. The data were analysed with the help of computer section of IGKV, Raipur.

RESULTS AND DISCUSSION

The facts and the findings of the study are presented and discussed under the following heads:

Operationalization of Independent variables and its measurement :

Age :

The age of the respondents as informed by them during personal interview was recorded. The chronological order for age of the respondents were applied for analysis. Information provided by the respondents regarding the frequency distribution of respondents according to their age, 22.00 per cent belong to young age group (upto 29 years), 64.00 per cent respondents belong to middle age group (30 to 42 years) and 14.00 per cent respondents belong to old age group (above 42 years). It may be stated that the majority of the respondents belong to middle age group (30 to 42

years) (Table 1). Similar findings were reported by Dasgupta *et al.* (2005) that the average shopkeepers belong to 35 years old age group.

Sr.No.	Age	Frequency	Percentage
1.	Young (upto 29 years)	11	22.00
2.	Middle (29 to 42 years)	32	64.00
3.	Old (above 42 years)	7	14.00
	Total	50	100.00
	$\bar{X} = 35.50$	S.D. = 6.61	

Education:

Education is essential aspect to build the ability of an individual for the sake of knowledge to understand and utilize things in a better way. For the selling of insecticides by the respondents, it is necessary for him to read and understand the insecticides labels and other important instructions also. Information provided regarding educational qualification of the respondents, 24.00 per cent, 64.00 per cent and 12.00 per cent respondents were educated up to metriculate level, graduation and post graduation, respectively. It is quite clear that the maximum number of respondents were educated up to graduate level (Table 2).

Sr.No.	Education	Frequency	Percentage
1.	Illiterate	0	00.00
2.	Middle	0	00.00
3.	Metriculate	12	24.00
4.	Graduation	32	64.00
5.	Post graduation	6	12.00
	Total	50	100.00
	$\bar{X} = 3.88$	S.D. = 0.59	

Ownership:

Out of 50 respondents, 92.00 per cent shops were operated by the owner whereas only 8.00 per cent respondents had appointed manager to handle their shops. It may be stated that maximum respondents are owner of the shops (Table 3). Similar findings have been confirmed by Dasgupta *et al.* (2005) in which 87.3 per cent respondents was owner of their own shops.

Table 3: Distribution of respondents' ownership (n = 50)

Sr.No.	Ownership	Frequency	Percentage
1.	Owner	46	92.00
2.	Manager	4	8.00
	Total	50	100.00
	$\bar{X} = 1.92$	S.D. = 0.27	

Status of plant protection advise skill:

The data were recorded from the respondents according to their skill of plant protection advice on the basis of formal plant protection training. Only 12.00 per cent respondents had received some basic training from the authoritative sources on use of insecticides and safe handling. Remaining 88.00 per cent respondents had not received any formal training of insecticides use, safe handling and advise of plant protection. It may be stated that the maximum number of respondents have not taken any helpful formal training to advise the farmers for right selection of insecticides (Table 4).

Table 4: Distribution of respondents under plant protection advise skill (n = 50)

Sr. No.	Training	Frequency	Percentage
1.	Trained	6	12.00
2.	Un trained	44	88.00
	Total	50	100.00
	$\bar{X} = 1.12$	S.D. = 0.32	

Expired material:

It is observed that the majority of the respondents 38.00 per cent, 36.00 per cent and 26.00 per cent were selling expired material to the farmers, returned the expired material to company and buried the expired material for safe disposal of insecticides. Overall, it may be stated that maximum number of respondents were selling the expired material (Table 5).

Table 5: Distribution of knowledge about expired material of insecticides by the respondents (n = 50)

Sr. No.	Expired material	Frequency	Percentage
1.	Buried	13	26.00
2.	Returns to company	18	36.00
3.	Sale	19	38.00
	Total	50	100.00
	$\bar{X} = 2.12$	S.D. = 0.79	

Peak period/ seasons of insecticide demand:

Respondents were sold out 56.00 per cent, 36.00

per cent and 8.00 per cent insecticides for horticultural crops during *Kharif*, *Rabi* and summer seasons, respectively. However, all the insecticides were displayed regularly in the shops. It may be stated that *Kharif* season is identified as the peak period of demand for insecticides which differ slightly due to the change of cropping pattern in a particular area (Table 6).

Table 6: Distribution of insecticides sale in the peak period of demand by the respondents (n = 50)

Sr. No.	Seasons	Frequency	Percentage
1.	<i>Kharif</i>	28	56.00
2.	<i>Rabi</i>	18	36.00
3.	Summer	4	8.00
	Total	50	100.00
	$\bar{X} = 2.50$	S.D. = 0.64	

Farmers' demand of insecticides for vegetables pest management:

It was observed that the highest demand (28.00 %) of insecticides for a particular vegetable in cabbage had ranked number one followed by the brinjal, tomato, cucumber and chilli vegetables as 24.00 per cent, 20.00 per cent, 16.00 per cent and 12.00 per cent respondents had demand for the use of insecticides by the farmers, respectively. It may be studied that cabbage, brinjal and tomato were the crops of higher insecticide consumption. Chilli and cucumber were also reported for higher consumption of insecticides by a few respondents may be due to the concentric area for those crops (Table 7).

Table 7: Distribution of respondents according to farmers' demand of insecticides for vegetables pest management (n = 50)

Sr. No.	Vegetables	Frequency	Percentage
1.	Cabbage	14	28.00
2.	Brinjal	12	24.00
3.	Tomato	10	20.00
4.	Cucumber	8	16.00
5.	Chilli	6	12.00
	Total	50	100.00
	$\bar{X} = 2.60$	S.D. = 1.37	

Nature of commodities:

In response to this type of commodities sold by the respondents, only 20.00 per cent respondents were dealing insecticides and remaining 80.00 per cent with a wide range of inputs like insecticides alongwith herbicide,

fungicide, seed, micro nutrients growth regulators and farm implements etc. It may be stated that the respondents are providing a large number of materials for farmers use as per the cropping pattern/ demand from their surrounding areas (Table 8). In conformity of this, similar findings have been reported by Yang *et al.* (2006) that most of the respondents selling pesticides alongwith chemicals, fertilizer, seed etc.

Sr. No.	Nature of shops	Frequency	Percentage
1.	Insecticides only	10	20.00
2.	Chemicals (Insecticide, fungicide, herbicide) and agricultural inputs	40	80.00
	Total	50	100.00
	\bar{X} = 1.80	S.D. = 0.40	

Most selling chemicals (insecticide, fungicide, herbicide):

On the basis of farmers' demand of agrochemicals most selling insecticides, fungicides and herbicides were 62.00 per cent, 22.00 per cent and 16.00 per cent by the respondents. It is quite clear that insecticide is the number one pesticide occupied the maximum share among all kinds of pesticides used by the farmers in general (Table 9). Yang *et al.* (2006) confirmed the similar findings of selling 67.5 per cent of insecticides, 30 per cent fungicides, 21.4 per cent herbicides and 5.8 per cent rodenticides, respectively.

Sr. No.	Demand	Frequency	Percentage
1.	Insecticide	31	62.00
2.	Fungicide	11	22.00
3.	Herbicide	8	16.00
	Total	50	100.00
	\bar{X} = 2.46	S.D. = 0.76	

Knowledge about banned/ registered insecticides:

In response to the question regarding knowledge of respondents on the banned or registered insecticides, it was observed that 90.00 per cent respondents were well aware whereas 10.00 per cent respondents were not known on the banned or registered insecticides. It was

understood that maximum respondents were well aware about banned or registered insecticides selling to the farmers (Table 10).

Sr. No.	About registered/banned insecticides	Frequency	Percentage
1.	Known	45	90.00
2.	Unknown	5	10.00
	Total		100.00
	\bar{X} = 1.90	S.D. = 0.30	

Duties of insecticide inspector on the area:

It was observed that 84.00 per cent respondents were well aware about the duties of insecticide inspector posted for their area. However, 16.00 per cent respondents had no idea about such kind of inspection performed by the govt. officers regarding license etc (Table 11).

Sr. No.	Inspection	Frequency	Percentage
1.	Inspected	42	84.00
2.	Not inspected	8	16.00
	Total	50	100.00
	\bar{X} = 1.84	S.D. = 0.37	

Highest selling insecticides for vegetables pest management:

In response to this question regarding highest selling insecticide for vegetables pest management, chlorpyrifos (36.00 %) was noticed as most demanded followed by cypermethrin (26.00%), monocrotophos

Sr. No.	Demanded insecticides	Frequency	Percentage
1.	Chlorpyrifos	18	36.00
2.	Cypermethrin	13	26.00
3.	Monocrotophos	9	18.00
4.	Endosulfan	6	12.00
5.	Dimethoate	4	8.00
	Total	50	100.00
	\bar{X} = 2.30	S.D. = 1.29	

(18.00%) (banned for vegetable use), endosulfan (12.00%) (ecofriendly insecticide) and diamethoate (8.00%), respectively by the respondents. It may be stated that among the insecticides available for sell in the counter, chlorpyrifos (contact and stomach poison on insect) was reported as the most demanded insecticide for vegetables pest management followed by cypermethrin for vegetables pest management (Table 12).

Recommendation slip to purchase insecticides:

In response to this, the answer may be categorized in two categories on the basis of recommendation slip available with insecticide buyer (i) have prescription slip and (ii) do not have any prescription slip. Farmers with prescription slip were further classified on the basis of source of advise. Out of which 38.00 per cent respondents brought prescription slip and 62.00 per cent were without slip. The prescription slip prescribed by the RAEO (8.00%), neighbour (4.00%), agents (16.00%) and all (10.00%) for the purchase of insecticides. Respondents provided the insecticides on the basis of their own experience (28.00%) based on seasonal demand followed by available companies' literature (22.00%) and motivated through mass media (12.00%) if the purchaser do not have prescription slip. It may be stated that 62.00 per cent respondents had attended the farmers without prescription slip. The respondents sold insecticides to farmers according to their own experience, companies' literature and mass media (Table 13).

Table 13: Distribution of respondents according to their selling trend of chemicals required by farmers recommendation slip to purchase insecticides (n = 50)

Sr. No.	Required recommendation slip	Frequency*	Percentage
1.	Required		
	RAEO	4	8.00
	Neighbour	2	4.00
	Agents	8	16.00
	All	5	10.00
	Total	19	38.00
2.	Not required		
	Own experience	14	28.00
	Companies literature	11	22.00
	Mass media	6	12.00
	Total	31	62.00
	$\bar{X} = 4.98$	S.D. = 1.07	

Farmers referred to consult someone if problem was beyond their capacity:

In response to this question, majority of the respondents (72.00%) referred the farmers to consult the person who know about the farmer's problem if the problem was beyond their capacity followed by 28.00 per cent respondents who do not refer the farmers to consult the person. It may be stated that the maximum respondents referred the farmers to consult someone who possessed knowledge if the problem was beyond their capacity (Table 14).

Table 14: Distribution of respondents on the basis of referred the farmers to consult someone if problem was beyond their capacity (n = 50)

Sr. No.	Consult	Frequency	Percentage
1.	Referred	36	72.00
2.	Not referred	14	28.00
	Total	50	100.00
	$\bar{X} = 1.72$	S.D. = 0.45	

Warning by respondents to the farmers for residual toxicity of insecticides:

Moral duty of the respondents was to provide information to the farmers regarding warning for residual toxicity of insecticides. Majority of the 54.00 per cent respondents possessed knowledge on the residual toxicity of insecticides, whereas 46.00 per cent respondents were not provided knowledge to the farmers about residual toxicity of insecticides. It may be stated that 54.00 per cent respondents were provided the knowledge about residual and persistence toxicity at the time of insecticide selling from their shops (Table 15).

Table 15: Distribution of respondents for warning to the farmers on residual toxicity of insecticides (n = 50)

Sr. No.	Knowledge	Frequency	Percentage
1.	Provided	27	54.00
2.	Not provided	23	46.00
	Total	50	100.00
	$\bar{X} = 1.54$	S.D. = 0.50	

Providing knowledge on safe handling of insecticides:

Majority of the 74.00 per cent respondents provided knowledge on safe handling of insecticides because most of the farmers do not know the safe use of insecticides. However, 26.00 per cent respondents were not provided

knowledge about safe handling of insecticides to the farmers at the time of purchase insecticides from their shop (Table 16).

Sr. No.	Knowledge	Frequency	Percentage
1.	Provided	37	74.00
2.	Not provided	13	26.00
	Total	50	100.00
	$\bar{X} = 1.74$	S.D. = 0.44	

Knowledge on inhalatic exposure:

In response to this question, knowledge of respondents for inhalation exposure of insecticides while sitting in the shop was 68.00 per cent whereas 32.00 per cent respondents do not know the ill effects of insecticides which they inhaling while sitting in shop. It may be stated that maximum respondents were known about the inhalatic exposure of insecticides while sitting in the shop (Table 17).

Sr. No.	Inhalatic exposure	Frequency	Percentage
1.	Known	34	68.00
2.	Unknown	16	32.00
	Total	50	100.00
	$\bar{X} = 1.68$	S.D. = 0.47	

Knowledge on safe transport and storage of insecticides:

In response to this question, the majority of the respondents (88.00%) had applied the safety measures during the transport and storage of insecticides whereas 12.00 per cent respondents do not applied any safety measures. It may be concluded that the maximum respondents applied safety measures during the transport and storage of insecticides (Table 18).

Sr. No.	Safety measures	Frequency	Percentage
1.	Applied	44	88.00
2.	Not applied	6	12.00
	Total	50	100.00
	$\bar{X} = 1.88$	S.D. = 0.32	

Literature referred:

The information about insecticides from the agricultural universities or government agencies was very helpful for selling and increasing knowledge on insecticides selling pattern. On the basis of collected data, 64.00 per cent respondents referred literature on farm chemicals while 36.00 per cent respondents do not referred literature on agricultural magazines. It may be stated that maximum respondents referred literature from the agricultural university or government agency (Table 19).

Sr. No.	Literature	Frequency	Percentage
1.	Referred	32	64.00
2.	Not referred	18	36.00
	Total	50	100.00
	$\bar{X} = 1.64$	S.D. = 0.48	

Operationalization of dependent variable and its measurement:

Business experience:

Information provided regarding the length of experience on insecticides business, maximum respondents (44.00%) belong to 5 to 10 years of business experience. However, 30.00 per cent, 18.00 per cent and 8.00 per cent respondents were having business experience of 10 to 15 years, more than 15 years and less than 5 years, respectively (Table 20).

Sr. No.	Business experience	Frequency	Percentage
1.	Less than 5 years	4	8.00
2.	5 to 10 years	22	44.00
3.	10 to 15 years	15	30.00
4.	More than 15 years	9	18.00
	Total	50	100.00
	$\bar{X} = 2.58$	S.D. = 0.88	

Correlation analysis on selling trend of insecticides with independent and dependent variables for vegetables pest management:

Correlation co-efficient between the selected independent and dependent variables (business experience) of selling trend of insecticide for vegetables pest management by respondents was worked and the values of correlation co-efficient were presented in the Table 21. It showed that from out of selected variables

viz., age, ownership, nature of commodities, most selling chemicals (insecticide, fungicide and herbicide), knowledge about banned/ registered insecticides and knowledge on safe transport and storage of insecticides were positive and highly significant with the business experience at 0.01 per cent level of

probability. However, variables *viz.*, education, status of plant protection advise skill, peak period/ seasons of insecticide demand, duties of insecticide inspector on the area, highest selling insecticides for vegetables pest management, warning by respondents to the farmers for residual toxicity of insecticides and

Table 21: Correlation analysis on selling trend of insecticides with independent and dependent variables for vegetables pest

Sr. No.	Independent variables	Correlation co-efficient (r)
		Business experience
1.	Age	0.741**
2.	Education	0.291*
3.	Ownership	0.364**
4.	Status of plant protection advise skill	0.318*
5.	Expired material	0.187 NS
6.	Peak period/ seasons of insecticide demand	0.303*
7.	Farmers demand insecticides for vegetables pest management	0.226 NS
8.	Nature of commodities	0.503**
9.	Most selling chemicals (insecticide, fungicide, herbicide)	0.414**
10.	Knowledge about banned/ registered insecticides	0.368**
11.	Duties of insecticide inspector on the area	0.289*
12.	Highest selling insecticides for vegetables pest management	0.279*
13.	Recommendation slip to purchase insecticides	0.260 NS
14.	Farmers referred to consult someone if problem was beyond their capacity	0.108 NS
15.	Warning by respondents to the farmers for residual toxicity of insecticides	0.299*
16.	Providing knowledge about safe handling of insecticides	0.289*
17.	Knowledge about inhalatic exposure	0.013 NS
18.	Knowledge on safe transport and storage of insecticides	0.369**
19.	Literature referred	0.116 NS

*and ** indicate significance of values at P=0.05 and 0.01, respectively

NS = Non-significant

Table 22: Constraints faced by the respondents during the sale of insecticides

Sr. No.	Problems	Frequency*	Per cent	Rank
1.	Payments were not received by the farmers at proper time	27	54	II
2.	Lack of training on insecticides dealing	18	36	III
3.	Knowledge on the handle of expired material	30	60	I
4.	Unable to explain the new molecules	11	22	V
5.	Health hazards <i>viz.</i> headache, weakness, skin irritation, smell	9	18	VI
6.	Unavailability of other agricultural inputs	17	34	IV

(* based on multiple responses)

Table 23: Suggestions of respondents to overcome these constraints faced by him

Sr. No.	Suggestions	Frequency*	Per cent
1.	Provision of Govt. credit at proper time	23	46
2.	Training camp and dealers meeting conducted by govt. and dealers union	15	30
3.	Received back facilities of expired material and used for selling	17	34
4.	Respondents admitted customers to know him name and bottle of insecticides to be purchased	10	20
5.	Follow-up of protective measures during transportation and handling of insecticides	33	66
6.	Respondents attract the farmers for higher investment through display many types of insecticides alongwith many choices	25	50

(* based on multiple responses)

providing knowledge on safe handling of insecticides showed significantly positive with business experience at 0.05 per cent level of probability.

It may be concluded that there was significant positive correlation between the independent and dependent variables, when independent variables increase then dependent variable also increase automatically. Such as increase in the age denote increase of the experiences of respondents it means respondents will be as experienced as he old.

Constraints faced by the respondents during the sale of insecticides:

Multiple responses were taken to ascertain the problems faced by the respondents during the selling of insecticides. It was observed from the data in Table 22 that major problems *viz.*, maximum number of respondents reported that the knowledge on the handle of expired material (60 %), payments were not received by farmers at proper time (54%), lack of training on insecticides dealing (36%), unavailability of other agricultural inputs (34%), unable to explain the new molecules (22%) and health hazards *viz.*, headache, weakness, skin irritation, smell (18%), respectively.

Suggestions of respondents to overcome these constraints:

To overcome the constraints it was observed that maximum (66.00%) respondents suggested the use of protective measures during transportation and handling of insecticides, followed by respondents (50.00 %) attract the farmers for higher investment through display many types of insecticides alongwith many choices, provision of govt. credit at proper time (46%), received back facilities of expired material and used for selling (34%), training camp and dealers meeting conducted by govt. and dealers union (30%) and respondents admitted customers to know him name and bottle of insecticides to be purchased (20.00%), respectively (Table 23).

(Tyagi *et al.*, 2015) studied the survey among 100 farmers in cauliflower and tomato cultivating areas. Cypermethrin (62%) and profenofos (58%) were found as the most popular insecticides. Manual application was reported as the method of choice for pesticide application

by 70 per cent farmers and 56 per cent of the farmers confirmed that no requisite safety measures and precautions were adopted while applying the pesticides. Education was observed to influence the approach of the farmers towards adopting requisite protective measures however no association was found between the age of the farmers and the health effects of pesticide.

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