



## PESTICIDES USAGE PATTERN AND AWARENESS TOWARDS PESTICIDES USAGE IN COTTON AND CHILLI CROPS IN GUNTUR DISTRICT OF ANDHRA PRADESH

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**ABSTRACT**

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Cent per cent of the sample farmers in the study area have used acephate 75%SP and monocrotophos 36% SL for cotton. Next to follow were pendimethalin 30%EC by 95.56 per cent, Fipronil 5% SC by 94.44 per cent, chlorantraniliprole 18.5% SC by 85.56 per cent, acetamiprid 20% SP by 80 per cent and flonicamid 50% WG by 78.89 per cent of farmers. Major pesticides used by the sample farmers in chilli crop were diafenthiuron 50% WP by 94.44 per cent, fipronil 5% SC by 93.33 per cent, chlorantraniliprole 18.5% SC by 86.67 per cent, acephate 75% SP by 85.56 per cent carbendazim 12% + mancozeb 63% WP by 83.33 and streptomycin sulphate 90%w/w by 82.22 per cent of farmers. The use of pesticides among the sample farmers was found to be higher for chilli crop compared with the cotton crop. The farmers possessed adequate knowledge on issues like spraying techniques, pest enemies and type of sprayers available but they did not have proper knowledge about pesticide types and brands.

**KEY WORDS:** Pesticide consumption, pesticides usage, knowledge on pesticides

### INTRODUCTION

Agriculture is the backbone of the Indian economy. Agriculture accounts for 17.4 percent of India's GDP. The increasing demand for agricultural products and the resultant commercialization of agriculture have induced a rising use of agricultural chemicals in India. The crop damage caused is highest by insects, followed by pathogens and weeds. Consequently, the use of chemical pesticides in agriculture has been an integral part of crop production. The role of pesticides in augmenting agricultural output has been well perceived and these have been considered as essential inputs in agricultural production. Pesticides are generally classified into herbicides, insecticides, fungicides, rodenticides and nematocides.

India is the fourth largest global producer of pesticides with an estimated market size of around USD 4.9 billion in 2017 after United States, Japan and China. India's share in global pesticide market is around 10 per cent in 2017. India's pesticides consumption is one of the lowest in the world with per hectare consumption of just 0.6 Kg compared to US (5-7 Kg/ha) and Japan (11-12 Kg/ha).

Production of key pesticides for the year 2015-16 was 187524 MT. To avoid crop losses farmers, have to use pesticides at optimum level in appropriate time. To achieve high yields without crop losses, farmers must have proper knowledge of product and its usages like right pesticide, right time of usage and the right method of spraying *etc.*, (Mahantesh and Singh, 2009). Therefore farmers' pesticides usage pattern and awareness towards pesticides usage is very important for crop production (Kumar and Pani, 2000; Ganganpreet *et al.*, 2018). The present study has been taken up with this background.

### METHODOLOGY

Guntur district of Andhra Pradesh state was purposively selected to study the buying behaviour of farmers towards pesticides, as the district occupies a pride of place in consumption of pesticides, area and production of major crops like chilli and cotton in the state of Andhra Pradesh. All the mandals having maximum acreage of chilli and cotton were listed out and top three mandals viz., Veldurthy, Gurajala and Dachehalli with highest crop acreage of chilli and cotton were purposively selected for the study. From the selected three mandals all the villages having maximum acreage of chilli and cotton were listed out and

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top two villages from each mandal viz., Kandlagunta, Sirigiripadu from Veldurthy mandal, Gurajala, Madugula from Gurajala mandal and Dachehalli and Tangeda from Dachehalli mandal were selected purposively to make total six villages. Chilli and cotton growers of selected villages were listed and 15 farmers from each village were randomly selected for the survey thus making the total sample size to 90. The data pertaining to the agricultural year 2016-17 was collected by surveying method.

## TOOLS AND TECHNIQUES OF ANALYSIS

The data collected were subjected to appropriate set of statistical tools to arrive at valid conclusions. Data was statistically analyzed using SPSS program.

### 1.FREQUENCIES AND PERCENTAGES

Some of the data were also subjected to and interpreted in terms of their frequencies and percentages wherever necessary to know the distribution pattern of respondents according to variables.

### 2.LIKERT'S SCALE:

Likert's scale is named after its creator, Rensis Likert, who developed it in 1932. Likert scale is a psychometric scale used to scale the responses of the consumers. It was used to give quantitative value on subjective or objective dimensions, with various levels between agreement and disagreement. It is considered symmetric or balanced because there are equal numbers of positive and negative positions. Five-point scale was given to the different parameters which are highly satisfied, satisfied, moderate, dissatisfied and highly dissatisfied to measure the pest management techniques adopted, services provided by pesticide private companies, agriculture department and support given by private dealers and peer group. analysis is pertaining to used three-point scale to measure awareness to pesticides usage.

## RESULTS AND DISCUSSIONS

Farmers in the study area used a wide range of pesticides in cotton to control wide range of weeds, insects, fungal and bacterial organisms. The analysis of the same is presented in Table 1.

A perusal of Table 1 unveils that cent per cent of the sample farmers used acephate 75%SP and monocrotophos 36% SL for cotton, followed by pendimethalin 30%EC by 95.56 per cent, fipronil 5% SC by 94.44 per cent, chlorantraniliprole 18.5% SC by 85.56 per cent, acetamiprid 20% SP by 80 per cent and flonicamid 50% WG by 78.89 per cent of farmers. Acephate 75%SP and Monocrotophos 36% SL were used as the first spray of insecticide in cotton to control sucking pests by all the farmer in the study area. Only around (8.89 %) of farmers used mancozeb 75% WP in minute quantity for cotton crop.

Chilli is another crop for which pesticides were used extensively, the details of which are presented in Table 2

A perusal of Table 2 unveils that major pesticides used by the sample farmers in chilli crop were Diafenthiuron 50% WP by 94.44 per cent, Fipronil 5% SC by 93.33 per cent, Chlorantraniliprole 18.5% SC by 86.67 per cent, Acephate 75% SP by 85.56 per cent Carbendazim 12% + mancozeb 63% WP by 83.33 and Streptomycin sulphate 90%w/w by 82.22 per cent of farmers. Diafenthiuron 50% WP was used by highest per cent of farmers as it controls a wide range of sucking pests like thrips, mites, jassids, aphids and white flies with better results.

Aspects like awareness towards pest enemies, different types of pesticides, pesticide solution preparation, spraying techniques, pesticides dosage, different kinds of pesticides brands, time of spray, bio-pesticides and type of sprayer were considered to measure the level of awareness towards pesticides use by the sample farmers.

A three point rating scale was used for the analysis. The scores of 3, 2 and 1 were given against highly aware, aware and not aware levels respectively. Mean scores were calculated and ranks were given to the aspects according to the mean score obtained.

A perusal of Table 3 unveils that according to the sample farmers, their level of awareness was high on spraying techniques used to spray the pesticides and it secured a mean score of 2.41. The next was the pest enemies and the least rank was given to the different kinds of brands available in the market. Many of pesticide companies are established in the market with wide range of products, hence most of the farmers are unaware of each kind of pesticide brands available in the market.

## CONCLUSION

The use of pesticides among the sample farmers was found to be highest for chilli crop compared with the cotton crop. Cent per cent of sample farmers used Acephate 75% SP and Monocrotophos 36% SL for cotton crop. Major pesticide used by the sample farmers (94.44 per cent) in chilli crop were Diafenthiuron 50% WP. The farmers possessed adequate knowledge on issues like spraying techniques, pest enemies and type of sprayers available but they did not have proper knowledge about pesticide types and brands (Augustine and Comfort, 2011).

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Table 1 Pesticides usage pattern in cotton by the sample farmers

Type of pesticide	Name of pesticide	Average quantity used per hectare	Used for	Number of farmers used	Percentage
Herbicide	Pendimethalin 30%EC	2500ml	Annual grasses and broad leaved weeds	86.00	95.56
Herbicide	Quizalofop ethyl 5% EC	1000ml	Annual and perennial grass weeds	21.00	23.33
Herbicide	Propanil 10% EC	625ml	Annual and perennial grass weeds	16.00	17.78
Herbicide	Glyphosate 41% SL	2500ml	Non selective herbicide	16.00	17.78
Insecticide	Acephate 75%SP	1625gms	Sucking pests	90.00	100.00
Insecticide	Monocrotophos 36% SL	1250ml	Sucking pests	90.00	100.00
Insecticide	Imidacloprid 17.8% SL	550ml	Sucking pests	57.00	63.33
Insecticide	Imidacloprid 30.5% SC	150ml	Sucking pests	33.00	36.67
Insecticide	Imidacloprid 70% WG	187.5gms	Sucking pests	14.00	15.56
Insecticide	Acetamiprid 20% SP	500gms	Sucking pests	72.00	80.00
Insecticide	Thiamethoxam 25% WG	375gms	Sucking pests	18.00	20.00
Insecticide	Fipronil 5% SC	1500ml	Sucking pests	85.00	94.44
Insecticide	Diafenthiuron 50% WP	875gms	Sucking pests	73.00	81.11
Insecticide	Thiamethoxam 12.6% + lamda cyhalothrin 9.5% ZC	200ml	Sucking pests	38.00	42.22
Insecticide	Fonicamid 50 % WG	200gms	Sucking pests	71.00	78.89
Insecticide	Profenofos 50% EC	1250ml	Lepidopteran insects	17.00	18.89
Insecticide	Quinalphos 25% EC	1875ml	Lepidopteran insects	17.00	18.89
Insecticide	Chlorpyrifos 20% EC	1875ml	Lepidopteran insects	18.00	20.00
Insecticide	Indoxacarb 15.8 % EC	500ml	Lepidopteran insects	15.00	16.67
Insecticide	Emamectin benzoate 5 % SG	375gms	Lepidopteran insects	16.00	17.78
Insecticide	Flubendiamide 20 % WG	200gms	Lepidopteran insects	16.00	17.78
Insecticide	Chlorantraniliprole 18.5 % SC	225ml	Lepidopteran insects	77.00	85.56
Insecticide	Novaluron 10% EC	925ml	Lepidopteran insects	14.00	15.56
Insecticide	Lamda-cyhalothrin 2.5%EC	875ml	Lepidopteran insects	16.00	17.78
Insecticide	Novaluron 5.25%+ indoxycarb 4.5% SC	500ml	Lepidopteran insects	13.00	14.44
Acaricide	Abamectin 1.9% EC	250ml	Mites	13.00	14.44
Acaricide	Dicofol 18.5% EC	625ml	Mites	9.00	10.00
Fungicide	Copper oxychloride 50% WP	1875gms	Root rot and wilt	16.00	17.78
Fungicide	Carbendazim 50% WP	1250gms	Leaf spot and wilt	17.00	18.89
Fungicide	Mancozeb 75% WP	1250gms	Leaf spot	8.00	8.89
Fungicide	Pyraclostrobin 20% WG	500gms	Leaf spot	9.00	10.00
Fungicide	Carbendazim 12% + mancozeb 63% WP	625gms	Leaf spot	24.00	26.67
Bactericide	Streptomycin sulphate 90%w/w	250gms	Broad spectrum antibiotic	20.00	22.22

Table 2 Pesticides usage pattern in chilli by the sample farmers

Type of pesticide	Name of pesticide	Average quantity used per hectare	Used for	Number of farmers used	Percentage
Herbicide	Pendimethalin 30%EC	2500ml	Annual grasses and broad leaved weeds	33	36.67
Herbicide	Pendimethalin 38.7% CS	1750ml	Annual grasses and broad leaved weeds	57	63.33
Herbicide	Propaquizafop 10% EC	625ml	Annual and perennial grass weeds	37	41.11
Herbicide	Quizalofop ethyl 5% EC	1000ml	Annual and perennial grass weeds	39	43.33
Insecticide	Monocrotophos 36% SL	1000ml	Sucking pests	49	54.44
Insecticide	Acephate 75% SP	1250gms	Sucking pests	77	85.56
Insecticide	Imidacloprid 17.8% SL	500ml	Sucking pests	68	75.56
Insecticide	Imidacloprid 30.5% SC	150ml	Sucking pests	22	24.44
Insecticide	Imidacloprid 70% WG	187.5gms	Sucking pests	14	15.56
Insecticide	Cyantraniliprole 10.26% w/w OD	1800ml	Sucking and lepidopteran insects	29	32.22
Insecticide	Imidacloprid 40% + fipronil 40% WG	125gms	Root grubs	24	26.67
Insecticide	Thiamethoxam 25% WG	375gms	Sucking pests	51	56.67
Insecticide	Acetamiprid 20% SP	500gms	Sucking pests	71	78.89
Insecticide	Diafenthiuron 50% WP	875gms	Sucking pests	85	94.44
Insecticide/acaricide	Spiromesifen 22.9% SC	625ml	Whitefly and mites	34	37.78
Insecticide	Spinosad 45% SC	150ml	Thrips and helioverpa	36	40
Insecticide	Thiodicarb 75% WP	1250gms	Lepodopteran insects	23	25.56
Insecticide	Fipronil 5% SC	1250ml	Thrips	84	93.33
Insecticide	Emamectin benzoate 5 % SG	375gms	Lepodopteran insects	35	38.89
Insecticide	Chlorpyrifos 20% EC	1875ml	Lepodopteran insects	45	50
Insecticide	Novaluron 5.25%+ indoxycarb 4.5% SC	500ml	Lepodopteran insects	21	23.33
Insecticide	Quinalphos 25% EC	1875ml	Lepodopteran insects	23	25.56
Insecticide	Chlorantraniliprole 18.5 % SC	300ml	Lepodopteran insects	78	86.67

TABLE 2. CONT...

Insecticide	Lamda-cyhalothrin 2.5% EC	1875ml	Lepodopteran insects	42	46.67
Insecticide	Flubendiamide 19.92% + thiacloprid 19.92 % SC	250ml	Lepodopteran insects	21	23.33
Insecticide	Profenofos 50% EC	1875ml	Lepodopteran insects	37	41.11
Insecticide	Triazophos 40% EC	1875ml	Gall midge and lepidopteran insects	32	35.56
Insecticide	Flubendiamide 20 % WG	200gms	Lepodopteran insects	24	26.67
Fungicide	Mancozeb 75% WP	1250gms	Damping off, fruit rot, ripe rot and leaf spot	27	30
Fungicide	Copper oxychloride 50% WP	1875gms	Root rot	49	54.44
Fungicide	Metalaxyl 35% WS	375gms	Damping off and downymildew	25	27.78
Fungicide	Metalaxyl 8% + mancozeb 64% WP	1250gms	Damping off and downymildew	29	32.22
Fungicide	Carbendazim 12% + mancozeb 63% WP	1375gms	Leaf spot,downey,die back	75	83.33
Fungicide	Carbendazim 50% WP	1250gms	Leaf spot and wilt	26	28.89
Fungicide	Azoxystrobin 23% SC	375ml	Broad spectrum fungicide	69	76.67
Fungicide	Azoxystrobin 11% + tebuconazole 18.3% SC	750ml	Broad spectrum fungicide	30	33.33
Fungicide	Pyraclostrobin 5% + metiram 55% WG	1000gms	Broad spectrum fungicide	41	45.56
Fungicide	Tebuconazole 50% + trifloxystrobin 25% WG	375gms	Broad spectrum fungicide	38	42.22
Fungicide	Tebuconazole 25.9% EC	500ml	Root rot and stem rot	35	38.89
Acaricide	Abamectin 1.9% EC	250ml	Mites	40	44.44
Acaricide	Dicofol 18.5% EC	625ml	Mites	15	16.67
Acaricide	Propargite 57% EC	625ml	Mites	34	37.78
Acaricide/fungicide	Sulphur 80% WG	625gms	Mites	27	30
Bactericide	Kasugamycin 3% SL	1250ml	Broad spectrum antibiotic	47	52.22
Bactericide	Streptomycin sulphate 90% <sub>ow/w</sub>	42.5gms	Broad spectrum antibiotic	74	82.22

**Table 3** Awareness of farmers on usage of pesticides

Particulars	Highly aware		Aware		Not aware		Total score	Mean score	Rank
	NR	S	NR	S	NR	S			
Pest enemies	28	84	60	120	2	2	206	2.29	II
Different types of pesticides	8	24	78	156	4	4	184	2.04	VIII
Pesticide solution preparation	20	60	70	140	0	0	200	2.22	IV
Spraying techniques	37	111	53	106	0	0	217	2.41	I
Pesticides dosage	6	18	83	166	1	1	185	2.06	VII
Different kinds of brands	4	12	69	138	17	17	167	1.86	IX
Time of spray	17	51	73	146	0	0	197	2.19	V
Bio pesticides	24	72	58	116	8	8	196	2.18	VI
Type of sprayer	24	72	63	126	3	3	201	2.23	III

\*NR = Number of respondents

\*S = Score