INTERNATIONAL JOURNAL OF APPLIED BIOLOGY AND PHARMACEUTICAL TECHNOLOGY

www.ijabpt.com

ISSN : 0976-4550

Volume-7, Issue-2, April-June-2016 Coden IJABFP-CAS-USA

Received: 5th Feb 2016 *Revised: 14th Mar 2016* *Accepted: 16th April 2016*

Research article

STUDY ON PESTICIDE RESIDUES IN TOMATO OF ANANTAPUR DISTRICT

Y.Ravi Kumar[1], M.Dastagiri Reddy[2] and K.N.Jayaveera[3]

[1, 2]Department of Chemistry, Brindavan Institute of Technology and Science, Kurnool
[3]Department of Chemistry, VEMU Institute of Technology, P.Kothakota (Near Pakala), Chittoor Dt., Andhra Pradesh, INDIA

ABSTRACT: Several studies have indicated the occurrence of undesirable residues of these pesticides in market sample of vegetables in India. Hence the present study was taken up to elucidate information on the magnitude of contamination of insecticide residues of chemicals in the Tomato vegetable of Anantapur markets. The samples of Tomato collected from six different places of Andhra Pradesh from six Rythu bazars of Anantapur during 2014- 2015 were subjected to multi residue method and estimation of insecticide residues was done by using Gas chromatography and Mass spectroscopy. The insecticide residues thus identified and quantified in the samples. The results of insecticide residues of Tomato samples collected from the farmer's field out of twenty four Tomato samples collected from surroundings areas of Anantapur farmer's field detected with Pesticides.

Key Words: Pesticides, Tomato, GCMS, Limit of Detection

*Corresponding author: Y.RaviKumar, [2]Department of Chemistry, Brindavan Institute of Technology and Science, Kurnool

INTRODUCTION

Indiscriminate use of pesticides on vegetables, their mishandling and negligence to follow proper waiting periods make marketed vegetables and fruits very often contaminated with pesticides or pesticide residues (Dikshith et al 1991).The term pesticide covers a wide range of compounds including insecticides, fungicides, herbicides, rodenticides, molluscicides, nematicides, plant growth regulators and others (singh et al 2002). Among these, Organochlorine (OC) insecticides, used successfully in controlling a number of diseases, such as malaria and typhus, were banned or restricted after the 1960s in most of the technologically advanced countries(Ismael Ibrahim Alyaseri et al 2012). The introduction of other synthetic insecticides – organophosphate (OP) insecticides in the 1960s, carbamates in 1970s and pyrethroids in 1980s and the introduction of herbicides and fungicides in the 1970s–1980s contributed greatly to pest control and agricultural output. Ideally a pesticide must be lethal to the targeted pests, but not to non-target species, including man. But, at the same time pesticides are affecting the human health by causing various abnormalities and diseases in form of the residues in the consumed food commodities (Ashutosh et al 2001). Pesticide residue refers to the pesticides that may remain on or in food after they are applied to food crops. The levels of these residues in foods are often stipulated by regulatory bodies in many countries. Many of these chemical residues, especially derivatives of chlorinated pesticides, exhibit bioaccumulation which could build up to harmful levels in the body as well as in the environment (Mutwakil et al 2005).

Persistent chemicals can be magnified through the food chain and have been detected in products ranging from meat, poultry, and fish, to vegetable oils, nuts, and various fruits and vegetables (Farag et al 2011). Indian agriculture has progressed a long way and became a significant exporter of different agricultural commodities from the regime of food shortages. In recent years India is facing a great challenge in exporting because of rejection of many food commodities containing residues higher than maximum residue limits (MRL's) (Bempah et al 2011). The US rejected as many as 256 food export consignments from India in August 2011, Indian marine products and spices, particularly chilli, continue to be rejected by the European Union because of Pesticide residue found in roasted chickpeas and red chilli (Nikolov et al 2006). Basmati rice which fetches twice the price of non-basmati rejected because of high pesticide residues. Residues of four pesticides which are banned in India are detected by analysis as aldrin in brinjal, chlordane in apple, chlorfenvinpfos in bitter gourd, and heptachlor in brinjal (Lozowicka et al 2012).

MATERIALS AND METHODS

The present investigations were carried out to monitor the pesticide residues in Tomato from the different markets of Anantapur District. To determine the permissible tolerance limits during the 2014-2015 employed in the present study are discussed in detail.

Pesticide Standards, Chemicals and Reagents

Preparation of Certified Reference materials

The certified Reference materials (CRMs) of Dr.Ehrensortfer , Ausberg, Germany and Sigma Aldrich standards used for the preparation of working standards of Different Strengths, also for standardization of Gas chromatography mass sectroscophyworking parameters and samples fortification and recovery studies for method validation. All the CRM Standards were prepared in n-hexane and Acetone. The working standards of individual pesticides and also the standard mixtures of 1ppm, 0.1ppm, 0.01ppm were prepared, and kept in the deep freezer at -20ºC. The following are the pesticides prepared for the analysis.

Table-1: Tomatosamples locations

S.No	Location	District	Possibility of Contamination
1	Anantapur	Anantapur	Farmers are not Spraying pesticides at recommend dose , not follow the safe harvest intervals
2	Tadipatri	Anantapur	Farmers are not Spraying pesticides at recommend dose , not follow the safe harvest intervals
3	Uravakonda	Anantapur	Farmers are not Spraying pesticides at recommend dose , not follow the safe harvest intervals
4	Kalyanadurgam	Anantapur	Farmers are not Spraying pesticides at recommend dose , not follow the safe harvest intervals
5	Kadiri	Anantapur	Farmers are not Spraying pesticides at recommend dose , not follow the safe harvest intervals
6	Dharmavaram	Anantapur	Farmers are not Spraying pesticides at recommend dose , not follow the safe harvest intervals

Table-2: GCMS parametres for the analysis of pesticide residues:

Gas Chromatograph Mass Spectroscopy	:	Brukers scion TQD
Detector source	:	Mass spectrophotometer (Triple Quadrupole)
Column	:	Brukers 5ms column
Column temp Programmed	:	90^0C hold for 3min; increase to 150^0C @200^0C hold for 6 min; increase to 220^0C @ 20 C hold for 5min; increase to 280^0 c @ 5^0c/min hold for 5min. Total 63 min.
Injector Temp	:	260^0C
Split Ratio	:	10.0
Carrier Gas	:	Helium
Carrier gas flow	:	1ml/min
Mass range	:	50-400 M/Z
Transfer line Temp	:	250^0C
Manifold temp	:	40^0C

Determination of Recovery and Repeatability

The Quality parameter for method validation of 54 pesticides i.e repeatability in Tomato essential to assess the method are presented in table. The repeatability in terms of recovery percentage of the method was determined at three levels, 0.05 mg kg-1 (LOQ), 0.25 mg kg-1(5x LOQ), 0.50 mg kg-1 (10x LOQ),

At 0.5 mg kg-1 level of fortification, The mean percent recovery among organo chlorine pesticides Alpha HCH(90.02), Beta HCH(82.76), Lindane(87.01), Delta HCH(90.62), Alachlor(96.15), Heptachlor(83.51), Aldrin (84.64), Dicofol (98.56), o, p DDE (81.18), Alpha endosulfan (89.55), Hexaconazole(86.29), Dieldrin(93.76),p,p DDE(93.70), o,p DDD (84.85), Beta endosulfan(91.89), o,p DDT(84.76), p,p DDD(88.61), Endosulfansulphate (104.55), p,p DDT (108.50).

At 0.5 mg kg-1 level of fortification, the mean percent recovery among Organo phosphate pesticides Dichlorvos (97.22),Monocrotophos (97.03), Phorate (88.58),Dimethoate (93.90), Diazinon (80.44), Methamidophos (88.60), Chlorpyrifos methyl (94.31), Methyl parathion (90.41), Fenitrothion (88.54), Malathion (79.07), Chlorpyrifos (86.98), Phosphomidon (95.60), Parathion (96.29), Chlorfenvinphos (80.08), Quinalphos (85.65), Fenamiphos(84.89), Profenophos (88.23), Ethion (102.77), Phosalone (91.23),Triazophos (84.56), Azinphos ethyl (83.56),

At 0.5 mg kg-1 level of fortification, the mean percent recovery among Synthetic pyrethroid pesticides Bifenithrin (97.29),Fenpropathrin (101.32),Lambda cyhalothrin (84.29),Permetrin (107.40),Cyfluthrin (103.35), Cypermethrin (89.56),Alpha cypermethrin (90.94),Fenvalerate (92.57),Fluvalinate (90.56),Deltamethrin (94.62)

At 0.5 mg kg-1 level of fortification, the mean percent recovery among herbicide and fungicides and other pesticides like Atrazine (79.10), Fipronil (81.85), Butachlor (93.07), Trifloxystrobin (84.52).

At 0.25 mg kg-1 level of fortification, The mean percent recovery among Organo chlorine pesticides Alpha HCH(97.12), Beta HCH(95.94), Lindane(99.53), Delta HCH(88.00), Alachlor(90.98), Heptachlor (86.00), Aldrin (99.66), Dicofol (91.90), o,p DDE (92.62), Alpha endosulfan (86.74), Hexaconazole (91.30), Dieldrin (94.88),p,p DDE(92.74),o,p DDD(97.51), Beta endosulfan(88.16), o,p DDT(78.78), p,p DDD(92.28), Endosulfansulphate (85.33), p,p DDT (83.40),

At 0.25 mg kg-1 level of fortification, the mean percent recovery among organo phosphate pesticides Dichlorvos (99.75),Monocrotophos (94.56),Phorate (93.64), Dimethoate (81.99), Diazinon (103.72), Methamidophos (86.49),Chlorpyrifos methyl (99.01),Methyl parathion (98.08), Fenitrothion (84.10), Malathion (81.27), Chlorpyrifos (93.87),Phosphomidon (93.89),Parathion (87.93), Chlorfenvinphos (84.96), Quinalphos (97.44), Fenamiphos (89.67), Profenophos (85.79),Ethion (88.51),Phosalone (93.56),Triazophos (95.34),Azinphos ethyl (82.95),

At 0.25 mg kg-1 level of fortification, the mean percent recovery among Synthetic pyrethroid pesticides Bifenithrin (110.00), Fenpropathrin (76.45),Lambda cyhalothrin (85.87), Permetrin (88.30),Cyfluthrin (95.27), Cypermethrin (105.23), Alpha cypermethrin (92.32),Fenvalerate (110.29),Fluvalinate (91.22),Deltamethrin (105.16)

At 0.25 mg kg-1 level of fortification, the mean percent recovery among herbicide and fungicides and other pesticides like Atrazine (93.36), Fipronil (90.00), Butachlor (97.53), Trifloxystrobin (87.34).

At 0.05 mg kg-1level of fortification, The mean percent recovery among organo chlorine pesticides Alpha HCH(98.84), Beta HCH(101.81), Lindane(93.99), Delta HCH(93.95), Alachlor(83.65), Heptachlor(98.66), Aldrin (102.92), Dicofol (92.14), o,p DDE (99.74), Alpha endosulfan (94.11), Hexaconazole(98.00), Dieldrin(96.77),p,p DDE(93.84),o,p DDD (96.65), Beta endosulfan(94.12), o,p DDT(90.41), p,p DDD(89.25), Endosulfansulphate (95.52), p,p DDT (86.92),

At 0.05 mg kg^{-1} level of fortification, the mean percent recovery among organo phosphate pesticides Dichlorvos (97.27), Monocrotophos (92.00),Phorate (88.58),Dimethoate (96.16), Diazinon(86.84), Methamidophos (85.40), Chlorpyrifos methyl (98.52), Methyl parathion (89.19),Fenitrothion (91.58),Malathion(88.71), Chlorpyrifos (87.25), Phosphomidon (96.06), Parathion (95.04),Chlorfenvinphos (88.78),Quinalphos (90.49),Fenamiphos (88.96), Profenophos (89.02), Ethion (100.60),Phosalone (99.34),Triazophos (91.34),Azinphos ethyl (81.45),

At 0.05 mg kg-1 level of fortification, the mean percent recovery among Synthticpyrethroid pesticides Bifenithrin (94.50), Fenpropathrin (94.89),Lambda cyhalothrin (83.23), Permetrin (98.69), Cyfluthrin (92.37), Cypermethrin (97.67), Alpha cypermethrin (91.24),Fenvalarate (91.00),Fluvalinate (93.45), Deltamethrin (98.59)

At 0.05 mg kg-1 level of fortification, the mean percent recovery among herbicide and fungicides and other pesticides like Atrazine (95.65), Fipronil (97.37), Butachlor (98.72), Trifloxystrobin (93.57).

RESULTS AND DISCUSSION

The present investigations were intended to monitor the insecticide residues in Tomato in 6 different places. The results obtained in the present investigations were given below.

Determination of Limit of detection (LOD)

The Limit of Detection (LOD) of GC and GCMS for 56 pesticides were considered to be the concentration that produced a signal to noise ration of more than 3, and LOD was estimated from the chromatogram corresponding to the lowest point used in the matrix matched calibration, In this work, the LOD of GC and GCMS for 56 pesticides under the study were 0.01 mg kg-1 and at LOD, the S/N ratio for all the 56 pesticides were < 3. The retention time of test pesticides under specified operating conditions of GC and GCMS are given in tables.

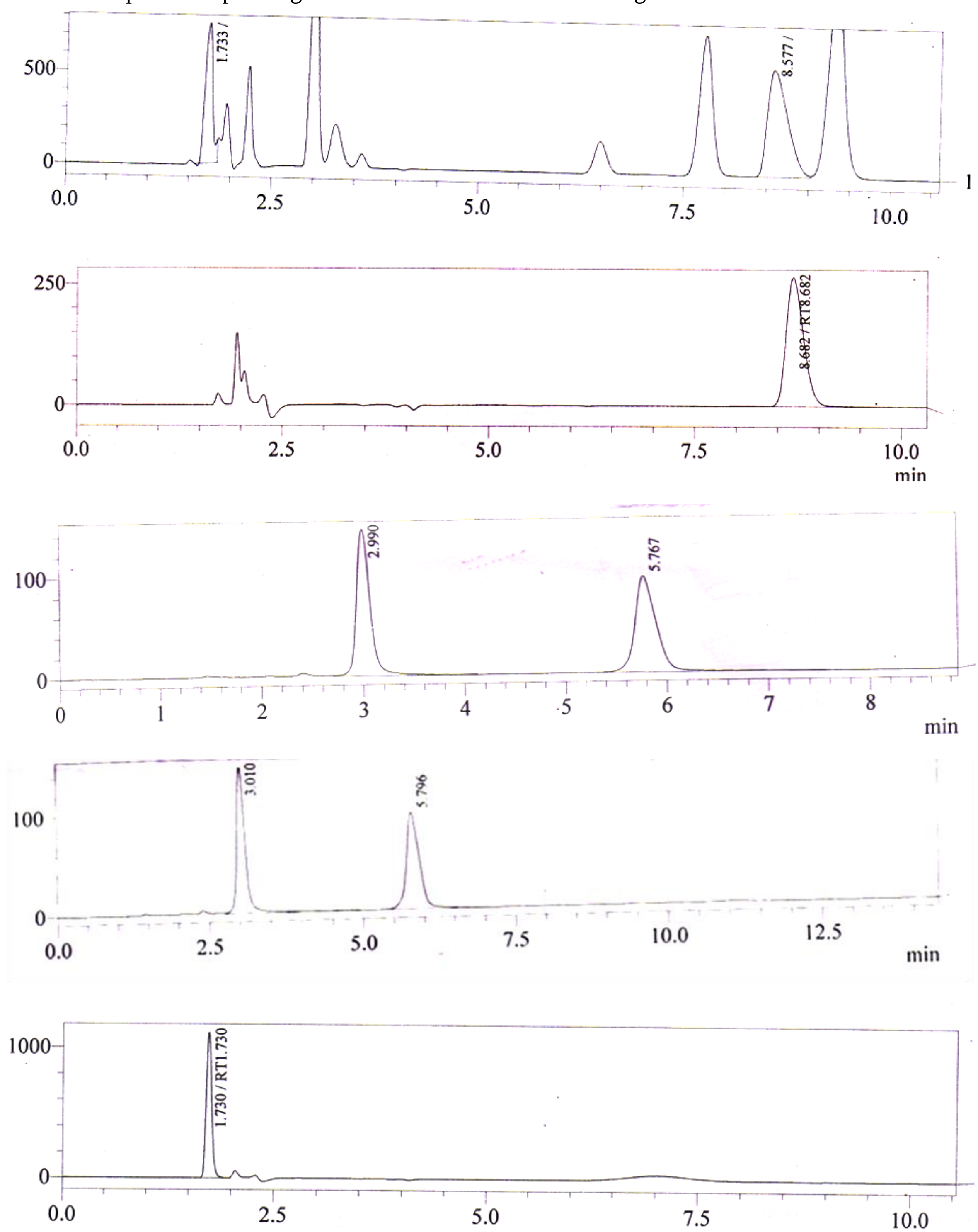

Fig 1: OC, OP, SP, Herbicide and fungicides Standard mixture 250 ppb

Table-3: Standardization in GC-MS/MS (TQD) OC, OP, SP, Fungicides and Herbicides Standard and Retention times and their ions

Synod	Name of the Pesticide	Retention time	Ion counts (Q1)	Ion counts (Q3)	Quantifier ion
	Dichlorvos	7.70	185	63,93,109	93
	Monocrotophos	17.48	127	109,85,79	109
	Phorate	17.92	260,121	175,231,93	109
	Alpha HCH	18.14	18,219	145,183	145
	Dimethoate	19.2	125,229	79,93,125,87	125
	Atrazine	20.11	215	200,172,138	200
	Beta HCH	20.12	181,219	145,183	145
	Lindane	20.3	219	109,147,183	183
	Diazinon	21.4	304,179	137,164,179,137	179
	Methamidophos	21.87	141	64,79,95	95
	Delta HCH	22.66	181,219	145,183	145
	Chlorpyrifos methyl	24.93	286	208,241	241
	Methyl parathion	25.42	263	109,127,246	109
	Alachlor	25.57	260,277	109,125,151,260	160
	Heptachlor	25.64	272	237,141,117	237
	Fenitrothion	27.43	260,277	109,125,151,109,277	109
	Malathion	28.18	173	99,117,127	99
	Aldrin	28.42	263	193,228	193
	Chlorpyrifos	28.81	314,286	166,93,271,258,286	258
	Phosphomidon	29.09	264	72,127,193	193
	Parathion	29.29	291	109,137	175
	Dicofol	30.16	251	139,111	139
	Fipronil	32.36	367	178,213,255	213
	Chlorfenvinphos	32.51	267,323	159,267	159
	Quinalphos	32.84	298,146,157	129,156,190,118	118
	o,p DDE	34.14	246,318	176,246	176
	Alpha endosulfan	34.88	241,265	206,170,229,195,193	206
	Butachlor	35.08	237,176,188	160,188,134,146	146
	Fenamiphos	35.75	303	139,154,180	154
	Hexaconazole	36.28	214	1,242,152,214	172
	Dieldrin	36.90	277,263	242,206,170,193,228	193
	p,p DDE	36.98	246	176,211	176
	o,p DDD	37.41	235	165,199	165
	Profenophos	38.69	339,139	188,251,269,97	269
	Beta endosulfan	39.9	195,241	159,206	269
	o,p DDT	40.57	235	165,199	165
	Ethion	40.84	367,182	111,138,182	129
	Phosalone	40.84	367,182	111,138,182,138	182
	p,p DDD	40.94	235	165,199	165
	Triazophos	42.65	257	119,134,162	162
	Endosulfansulphate	43.44	272,387	141,165,237,253	237
	p,p DDT	44.08	235	165,200	165
	Trifloxystrobin	44.28	222,116,190	190,162,130,89,190	89
	Bifenithrin	49.73	181,165	115,165,166	166
	Fenpropathrin	50.36	265,165,181	210,181,153,152	152
	Lambda cyhalothrin	50.86	181	127,152	152
	Azinphos ethyl	53.06	160	102,105,132	132
	Permetrin	55.79	163,183	127,153	153
	Cyfluthrin	57.7	206,163,226	151,177,129,127	127
	Cypermethrin	57.92	163,181	127,152	152
	Alpha cypermethrin	58.17	163,181	127,152	152
	Fenvalarate	60.28	225	914,119,147	119
	Fluvalinate	60.65	250	55,200	200
	Deltamethrin	62.9	253,172	172,199,93	93

Estimation of insecticide residues in Tomato samples collected from 6 different places of Anantapur district

The Tomato sample collected from the farmer's field in surrounding areas of Anantapur during Rabi 2014 detected with organo chlorines, alpha endosulfan and lindaneat the concentration of 0.009, 0.008 mg kg^{-1}respectively. The organophosphates, phorate, chlorpyrifos, quinalphos and phosalone were detected at 0.08, 0.14, 0.20, 0.63 mg kg^{-1} respectively. The deltamethrin was detected at the concentration of 0.050 mg kg^{-1}. Samples were collected during the period of Kharif 2014 Tomato was contaminated with dimethoate, malathion, quinalphos 0.004, 0.008 and 0.16 mg kg^{-1}respectively.The fipronil and cyfluthrinwere detected at the level of 0.35.0.56 mg kg^{-1}respectvily.While the sample collected during Rabi 2015Tomatowas detected with alpha HCH and o,p DDE at 0.007,0.09 mg kg^{-1}respectively.The concentration of 1.09,0.76 mg kg-1 of profenophos, triazophos were determined in the Tomato samples. Where as in Kharif 2015sample were contaminated with monocrotophos, fipronil, triazophos at the level of 0.07, 0.47, 0.45 mg kg^{-1}respectively and cyfluthrin was detected at the concentration of 0.59 mg kg^{-1}.

The Tomato sample collected from the farmers field in surrounding areas of Tadipatri during Rabi 2014 detected organo phosphates, dimethoate, diazinon, malathion, profenophosat concentration of 0.150,0.10,0.26 and0.06 mg kg-1 respectively, the fipronil was detected at 0.57 mg kg^{-1},the synthetic pyrethroids, bifenithrin, cypermethrin and deltamethrin were detected with 0.18, 0.006, 0.002 mg kg^{-1}respectively. The samples collected during Kharif 2014 Tomato sample were detected with organo phosphates phorate, chlorpyrifos0.07 and 0.20mg kg^{-1} respectively. The concentration 0.10, 0.13 mg kg^{-1} of alpha endosulfan and fenpropathrin were detected. Where as during Rabi 2015Tomato sample were detected with organo phosphates, malathion and quinalphos 0.72, 0.120 mg kg^{-1} respectively, whereas synthetic pyrethroidsbifenithrin, deltamethrin were detected at the concentration of 1.05 and 0.0099 mg kg^{-1} respectively. The samples collected during Kharif 2015Tomato sample were detected with monocrotophos, fipronil and triazophos at the level of 0.07, 0.47, 0.45 mg kg^{-1} respectively. The cyfluthrin was detected at the level of 0.59 mg kg^{-1}.

The Tomato sample collected from the farmer's field in surrounding areas of Uravakonda during Rabi 2014 detected with alpha HCH at concentration 0.004 mg kg^{-1},whereas Organo phosphates, monocrotophos, methyl parathion, chlorpyrifos, quinalphos, profenophos, ethionand triazophos were detected at concentration of 0.08, 0.093, 0.08, 0.10, 0.006, 0.21, 0.08mg kg^{-1}respectively.The sample collected during Kharif 2014Tomato detected at concentration of 0.006, 0.004, 0.08, 0.10mg kg^{-1} of phorate, parathion, profenophos, and ethion respectively. Where as samples collected during Rabi 2015 contaminate with phorate, fipronil, p, p DDE and cyfluthrinat the level of 0.07, 0.18, 0.008, 0.19 mg kg^{-1} respectively. While during Kharif 2015Tomato samples detected with organo phosphates, chlorpyrifos and ethion 0.66, 0.33mg kg^{-1}respectively. The bifenithrinwas detected at the level of 0.98 mg kg^{-1}.

The Tomato sample collected from the farmer's field in surrounding areas of Kalyandurgam during Rabi 2014 detected with beta endosulfanat 0.008 mg kg^{-1}, Theorgano phosphates, monocrotophos, malathion and parathion and fenamiphos were detected at level of 0.003, 0.008, 0.30, 0.003 mg kg^{-1} respectively. The concentration 0.42, 0.18 mg $kg^{-1}$of bifenithrin and cyfluthrin of synthetic pyrethroid were detected. Whereas during kharif 2015Tomato sample were detected at conc heptachlor 0.006 mg kg-1, the diazinon and quinalphosof organo phosphates were detected at conc of 0.007, 0.30mg kg^{-1} respectively, the bifenithrin was detected at the conc of 0.74 mg kg-1. Whereas during Rabi 2015 the Tomato sample were detected with organo phosphates, methyl parathion and parathion at conc of 0.089, 0.007mg kg^{-1} respectively. The beta endosulfan and trifloxystrobin were detected at conc of 1.45, 0.99mg kg-1respectively. Where as during kharif 2014 Tomato samples were detected with monocrotophosfipronil, profenophos and ethionat conc of 0.008, 0.006, 0.17, 0.32mg kg^{-1} respectively.

The Tomato sample collected from the farmers field in surrounding areas of Kadiri during Rabi 2014 detected alpha endosulfanat conc0.001 mg kg^{-1}, The organo phosphates, methyl parathion, quinalphosand phosalone were detected at concentration of 0.007, 0.10, 0.40 mg kg-1 respectively. The concentration of 0.36, 0.19mg kg^{-1} of trifloxystrobin and cyfluthrin Synthetic pyrethroidwere detected. While in during kharif 2014Tomato sample were detected with alpha endosulfan 0.007 mg kg-1, Theorgano phosphates, monocrotophos, profenophos and azinphos ethyl were detected at concentration of 0.009, 0.26, 0.19 mg kg^{-1}respectively.Whereas during Rabi 2015 Tomato sample contaminate with organo phosphates, dimethoate and profenophosat conc of 0.21, 0.88 mg kg^{-1}respectively .The fipronil and cypermethrin were detected at concentration of 0.33 and 0.22 mg kg^{-1} respectively. While during kharif 2015, Tomato samples detected with alpha endosulfan, diazinon, ethion and bifenithrin at concentration of 0.09 0.04, 0.22, 0.51 mg kg^{-1} respectively.

The Tomato sample collected from the farmer's field in surrounding areas Dharmavaram during Rabi 2014 detected with dimethoate, fenitrothion, chlorpyrifos, triazophos, azinphos ethyl at conc of 0.009, 0.36, 0.46, 0.41, 0.09 mg kg^{-1} respectively. The concentration of 0.007, 0.004, 0.10 mg kg^{-1} of fipronil, hexaconazole and deltamethrin were detected respectively. Whereas during Kharif 2014Tomato sample were detected with organo phosphates, phorate, phosalone at conc of 0.14, 0.68mg kg^{-1} respectively. The fipronil and cypermethrindetected at conc of 0.09, 0.27mg kg^{-1} respectively.Where as during Rabi 2015 Tomato sample detected with organo phosphates phorate, quinalphos, fenamiphos at the conc of 0.09, 0.44, 0.11 mg kg^{-1} respectively. The bifenithrinwas detected at conc of 0.13 mg kg^{-1}.During Kharif 2015 Tomato samples were detected with lindane, fipronil, profenophos, fenpropathrinconc of 0.020, 0.37 0.21, 0.11mg kg^{-1}respectively.

Table 4: Analysis of pesticide residues in Tomato vegetable during the period of 2014-15

Rabi 2014				**Kharif 2014**		**Rabi 2015**		**Kharif 2015**	
S.no	Area	Name of the pesticides	Conc (ppm)	Name of the pesticides	Conc (ppm)	Name of the pesticides	Conc (ppm)	Name of the pesticides	Conc (ppm)
1	Anantapur	Phorate	0.08	Dimethoate	0.004	Alpha HCH	0.007	Monocrotophos	0.07
		Lindane	0.008	Malathion	0.008	o,p DDE	0.030	Fipronil	0.47
		Quinalphos	0.20	Fipronil	0.35	Profenophos	1.09	Triazophos	0.45
		Alpha endosulfan	0.009	Quinalphos	0.16	Triazophos	0.76	Cyfluthrin	0.59
		Phosalone	0.63	Cyfluthrin	0.56				
		Deltamethrin	0.050						
2	Tadipatri	Dimethoate	0.15	Phorate	0.04	Malathion	0.72	Chlorpyrifos	0.25
		Diazinon	0.10	Alpha endosulfan	0.10	Quinalphos	0.120	Ethion	1.20
		Malathion	0.26	Fenpropathrin	0.13	Bifenithrin	1.05	Deltamethrin	0.009
		Fipronil	0.57			Deltamethrin	0.009		
		Profenophos	0.06						
		Bifenithrin	0.18						
		Cypermethrin	0.006						
		Deltamethrin	0.002						
3	Uravakonda	Alpha HCH	0.004	Phorate	0.006	Dimethoate	0.07	Chlorpyrifos	0.66
		Methyl parathion	0.093	Parathion	0.004	Fipronil	0.18	Ethion	0.33
		Chlorpyrifos	0.08	Profenophos	0.08	p,p DDE	0.008	Bifenithrin	0.98
		Quinalphos	0.10	Ethion	0.10	Cyfluthrin	0.19		
		Profenophos	0.006						
		Ethion	0.21						
		Triazophos	0.08						
4	Kalyanadurgam	Monocrotophos	0.003	Diazinon	0.007	Methyl parathion	0.089	Monocrotophos	0.008
		Malathion	0.008	Heptachlor	0.006	Parathion	0.007	Fipronil	0.006
		Parathion	0.30	Quinalphos	0.30	Beta endosulfan	1.45	Profenophos	0.17
		Fenamiphos	0.003	Bifenithrin	0.74	Trifloxystrobin	0.99	Ethion	0.32
		Beta endosulfan	0.008						
		Bifenithrin	0.42						
		Cyfluthrin	0.18						
5	Kadiri	Methyl parathion	0.007	Monocrotophos	0.009	Dimethoate	0.21	Diazinon	0.04
		Quinalphos	0.10	Alpha endosulfan	0.007	Fipronil	0.33	Alpha endosulfan	0.09
		Alpha endosulfan	0.001	Profenophos	0.26	Profenophos	0.88	Ethion	0.22
		Phosalone	0.40	Azinphos ethyl	0.19	Cypermethrin	0.22	Bifenithrin	0.51
		Trifloxystrobin	0.36						
		Cyfluthrin	0.19						
6	Dharmavaram	Dimethoate	0.009	Phorate	0.14	Phorate	0.009	Lindane	0.020
		Chlorpyrifos	0.41	Fipronil	0.09	Quinalphos	0.44	Fipronil	0.37
		Fipronil	0.007	Phosalone	0.68	Bifenithrin	0.13	Profenophos	0.21
		Hexaconazole	0.004	Cypermethrin	0.27			Fenpropathrin	0.11
		Triazophos	0.46						
		Azinphos ethyl	0.09						

EFFECT OF HOUSEHOLD PRACTICES TO DECONTAMINATE PESTICIDE RESIDUES IN FOOD COMMIDITIES

The food safety issue inducued by food contamination concerning pesticide residues is becoming more and more important. Food processing at domestic and insustrial level would offer a suitable means to tackle the current scenario of unsafe food. But the efficiency the food processing technique depends on many factors like physiochemical properties of both pesticides and the commodity, age of the residue ectc. In the present study the Effective of house hold processing methods removal of pesticide residues in Tomatoes and grapes.

Risk mitigation methods for the removal of pesticides in tomato:

The data obtained for the estimation of percentage reduction of various pesticides such as Dimethoate, Chlorpyrifos, Quinolphos, Profenophos, Phosalone, Lamdacyhalothrin, Malathion. After washing with Tap water for 10min, the percentage reduction was found to be in the range of 37.0 – 73.2% for various pesticides. Washing with Lemon water for 10 min, the percentage reduction was found to be in the range of 42.5-72.3% for various pesticides. Washing with 2% Tamarind solution for 10 min, the percentage reduction was found to be in the range of 26.1-69.1% for various pesticides. Washing with 2% Salt solution for 10 min, the percentage reduction was found to be in the range of 44.3-78.7% for various pesticides. Washing with 0.1% sodium bicarbonate for 10 min, the percentage reduction was found to be in the range of 24.0-65.1% for various pesticides. Washing with 4% Acetic acid for 10 min, the percentage reduction was found to be in the range of 17.1-58.5% for various pesticides. Washing with Bio-wash for 10 min, the percentage reduction was found to be in the range of 44.5-75.2% for various pesticides, cooking in Pressure cooker for 10 min, the percentage reduction was found to be in the range of 42.9-83.2% for various pesticides.

Tap water: In tap water washing in the removal of Chlorpyrifos was singnificantly 73.2%. The results of 42.3 %, 37.0 %, 49.4 %, 44.7 %, 49.6 % and 44.3 % percent loss of pesticides like dimethoatequinalphos, profenophos, phosalone, lambda cyhalothrin, malathion respectively.

Lemon water: In lemon water wash the removal of chlorpyrifos up to 72.3%.The reslts of 52.2 %, 42.5 %, 52.3 %, 48.9 %, 54.6% and 50.0 % percent loss of pesticides like dimethoate, quinalphos, profenophos, phosalone, lambda cyhalothrin and malathion respectively.

2% Tamarind solution: In Tamarind solution the reduction of chlorpyrifos up to 69.1%. The dimethoate, quinalphos, profenophos, phosalone, lambda cyhalothrin and malathion reduced to
39.9 %, 26.1%, 39.0 %, 33.6 %, 36.7 %, 28.8 % respectively.

2% Salt solution: In 2% salt solution the reduction of chlorpyrifossignicantly 78.7%. The results of 55.1 %, 55.9 %, 52.0 %, 58.5 % and 51.1 % percent loss of pesticides like dimethoatequinalphos, profenophos, phosalone, lambda cyhalothrin, malathion respectively.

0.1% Sodium bicarbonate solution: In 0.1% sodium bicarbonate solution the reduction of chlorpyrifossignicantly 65.1%.The results of 37.9 %,24.0 %,39.1 % ,32.9 %,40.5%, 35.3 % percent loss of pesticides like dimethoate, quinalphos, profenophos, phosalone, Lambda cyhalothrin and malathion respectively.

4% acetic acid solution: In 4 % acetic acid solution the reduction of chlorpyrifossignicantly 58.5%.The dimethoate, quinalphos, profenophos, phosalone, lambda cyhalothrin, malathion reduced to 38.0 %, 17.1 %, 33.7 %, 26.6 %, 29.8% and 18.6 % respectively.

BIO WASH Solution: In Bio wash solution the reduction of chlorpyrifossignicantly 75.2%. The reslts of 47.6 %, 44.5%, 52.7%, 50.0%, 56.3% and 55.3 % percent loss of dimethoatequinalphos, profenophos, phosalone, lambda cyhalothrinandmalathion reduced to respectively.

Cooking in Pressure cooker: In cooking the reduction of chlorpyrifossignicantly 83.2%.The dimethoate, quinalphos, profenophos, phosalone, lambda cyhalothrin, malathion reduced to 70.4 %, 47.4%, 42.9%, 55.1 %, 47.4%, 50.8% respectively.

CONCLUSION

Insecticides have gained a paramount importance in modern agriculture and have become an integral part of man's environment, indiscriminate use of pesticides on vegetable crops, their mishandling and negligence to follow proper waiting period make marketed vegetables very often contaminated with pesticides. Thus contamination of the vegetable crops sometimes may reach more than the prescribed tolerance limit. The samples of Tomato collected from six different places of Andhra Pradesh from six Rythu bazars of Anantapurduring 2014- 2015 were subjected to multi residue method and estimation of insecticide residues was done by using Gas chromatography and Mass spectroscopy. The insecticide residues thus identified and quantified in the samples.

The results of insecticide residues of Tomato samples collected from the famers field out of twenty four Tomato samples collected from surroundings areas of Anantapur farmers field detected with phorate, lindane, quinalphos, alphaendosulfan, phosalone, deltamethrin, dimethoate, diazinon, malathion, fipronil, profenophos, bifenithrin, cypermethrin, alpha HCH, methylparathion, chlorpyrifos, ethion, triazophos, monocrotophos Parathion, fenamiphos, betaendosulfan, cyfluthrin, trifloxystrobin, hexaconazole, azinphos ethyl fenpropathrin, heptachlor was detected.

REFFERENCES

Dikshith T S S, Mishra V K, Joshi D D ,Srivasthava M K and raizada R B (1991). Organochlorine insecticide residues in vegetables of Lucknow market in india. Journal of food science and Technology 29(5): 335-337.

Singh B and Gupta A (2002). Monitoring of pesticide residues in farm gate and market samples of vegetables in a samirid, irrigated area. Bulletin of Environmental Contamination and Toxicology 68 (5) : 747-751.

Ismael Ibrahim Alyaseri, Mukhtar Abdul Sattar Ali, Abdul Karimjawad Ali, Nadir KamilBahi (2012). Determination of pesticides residues in some fruits and vegetables imported to Iraq. Journal of Agriculture science and Technology 65-70.

AshutoshK.Srivastava. PurushottamTrivedi, m.k. Srivastava. M.lohani, laxman Prasad srivastava (2001). Monitoring of pesticide residues in market basketnsamples of vegetables from luknow city, India: QuEChERS method, Environ.Monit Assess 176:465-472.

Mutwakil M.A., Malik E.M, ViJay P (2005). Monitoring of pesticide residues in fruits and vegetables on UAE markets. Central laboratories Ministry of Environment & water.

Farag,R.S., Abdel latif,M.S., Abd EI- gawad, A.E. and Dogheim,S.M. (2011). Monitoring of pesticide residues in some Egyptian herbs, Fruits and vegetables, international food research journal 18; 659-665.

Bempah, C. K. Buah-Kwofie, A. Denutsui, D. Asomaning, J. Tutu, A. O. (2011). Monitoring of pesticide residues in fruits and vegetables and related health risk assessment in Kumasi metropolis,Ghana.Research Journal of Environmental and Earth Sciences; 3(6):761-771.48.

Nikolov, P.Rasteniev'dni, (2006). Monitoring of pesticide residues in fresh fruit and vegetables produced in Bulgaria. [Bulgarian], Nauki; 43(2):181-188. 18.

Lozowicka, B. Hrynko, I. Rutkowska, E. Jankowska, M. Kaczynski, P. Janowicz, T, (2012). Pesticide residues in fruit and vegetables from north-eastern Poland (2008-2011).Progress in Plant Protection;. 52(2):423-430. 16.

ISSN : 0976-4550

INTERNATIONAL JOURNAL OF APPLIED BIOLOGY AND PHARMACEUTICAL TECHNOLOGY

Email : editor.ijabpt@gmail.com

Website: www.ijabpt.com