

A Study on Ill-Effect of Pesticide Residue in Vegetable and to Promote Kitchen Gardening

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Abstract

To detect the pesticide residue that are present in the vegetables. The aim of this study is to assess the level of pesticide residue in commonly consumed vegetable and green leafy vegetables in Hyderabad. Vegetable such as tomato and green leafy vegetables such as spinach and curry leaves were analyzed for the presence of pesticides by using QUECHERS method (easy cheap effective rugged and safe). Multi residue extraction followed by GC-ECD (electron capture detector) LC-MS/MS method. For the present project random sampling was done from the various markets in the twin cities of Hyderabad, (gudi malkapur, rythu bazar). Depending upon the nature of the vegetation (size, shape, etc.), samples were mixed and enclosed. The addition of a small sachet of silica gel to the envelope helps to reduce the moisture content of the system. However, samples were provided to the analytical laboratory to check for possible coextractives, which could interfere with the analysis. Only a few amount of pesticide can be permissible it shouldn't cross its residual levels. The sample were contaminated with more than 6 pesticide such as Acetamiprid, chlorantraniliprole, Acephate methamidophos, bifenthrin, alfa cypermethrin etc and organic compost is prepared to promote kitchen gardening.

Keywords : pesticide residue, vegetables, promoting kitchen gardening, preparation of biodegradable natural compost.

I. INTRODUCTION

The term PESTICIDES is used to indicate any substance which is used to kill or repel or otherwise control pests, rodents, snails, fungi, bacteria and weeds. Pesticide is used an element to protect any pest including animal or human diseases causing harm or interfering with the production, processing, transport of food commodities. Advantages such as Pesticides have been used. Over last 60 years, by the farmers to achieve progress of production in foodstuff. The farmers done this principally to reduce losses of agricultural due to activity of pests which resulted in best yield and availability of food greater, at a reasonable price and over all seasons. By the using pesticides in agriculture, the productivity has increased in many countries. For example, corn

yields in the USA and total yields in the Russia and other countries were enhanced enormously. It has been long believed that diets containing fresh fruits and vegetables featuring low residues of pesticides in crops will improve nutrition and reduce drudgery both improve the quality of life and longevity. Disadvantages such as Pesticide include number of environmental concerns, including human and animal health (maksymiv et.al 2015).

hazards. Food contaminated with pesticides is associated with toxic effects on the human health. Continued exposure to these chemicals may lead to a long period of diseases some of it as: Acute effect of pesticide poisonings, both occupational and non-occupational which are listed as Neurological, psychological and behavioral dysfunctions, Hormonal imbalances, leading to infertility breast pain, Immune system dysfunction, Reproductive system defects, Cancers, Genotoxicity, Blood disorders. Kitchen gardening: organic manure that is prepared from utilizing the peels, egg shells, dry leaves as natural compost, manure it helps in an integrated farming that strives for sustainability enhancement of soil fertility and biological diversity etc. kitchen gardening is where edible things are grown such as vegetables around the house for household use. In my study I have grown some plants of vegetables such as lady finger, tomato, chillies, clusterbean, pumpkin and mint are all grown in the kitchen gardening which are free of pesticides. Which is very important part of good diet as they provide various nutrient for many body functions. (jallows et.al 2017)

The present Aim of the study is:

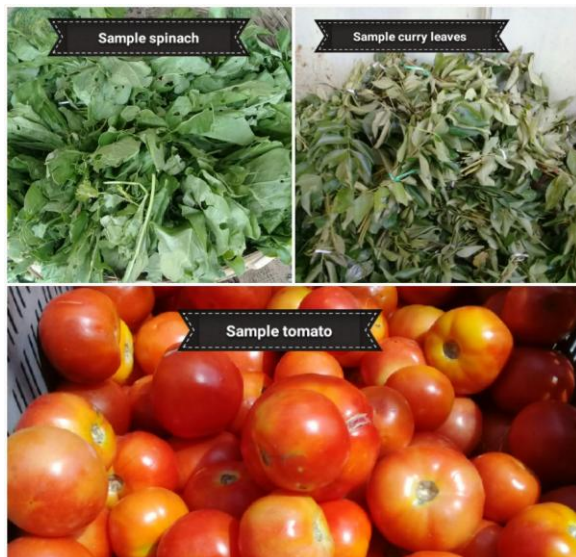
1. To study on the ill effect of pesticides on human health.
2. To detect the pesticide residues in commonly used vegetables.
3. To promote kitchen gardening.
4. To prepare biodegradable natural compost by utilizing kitchen waste.

II. MATERIALS AND METHODS

A. Procurement of material

For the present project study random sampling is done from the various markets in the twin cities of Hyderabad, local fields and markets (gudi

malkapur, rythu bazar) Depending upon the nature of the vegetation (size, shape, etc.), samples were mixed and enclosed. The addition of a small sachet of silica gel to the envelope helps to reduce the moisture content of the system. However, samples were provided to the analytical laboratory to check for possible coextractives, which could interfere with the analysis.



The QuEChERS method for pesticide residue analysis was introduced (Anastassiades et al) (2003), which provides high quality results in a fast, easy, an inexpensive approach. The most common techniques in modern multi-residue target pesticide analysis are gas chromatography, liquid chromatography coupled to mass spectrometry (GC-MS, LC-MS) and/or tandem mass spectrometry (GC-MS/MS, LC-MS/MS) with triple quadrupole mass analysers. The numerous methods available for pesticide analysis show the importance of this application and rapid pace of developments in analytical chemistry. (Lehotay et al., 2007).

III. PROCEDURE FOR ANALYSIS OF PESTICIDE RESIDUES IN TOMATO AND LEAFY VEGETABLES/CURRY LEAVES, SPINACH BY LC-MS/MS OR GC-ECD

A. Extraction

- Take 250g sample and crush / grind.
- Weigh 7.5g of the homogenized sample into a 50 ml centrifuge tube.
- Add 30ml acetonitrile to the sample centrifuge tube and homogenize the sample mixture at 14000-15000 rpm for 3 min.
- Add 3g of NaCl shake gently and centrifuge tube for 3 min at 2500-3000 rpm to separate the organic layer.
- Take 16 ml of organic layer into 50 ml tube having 9g of sodium sulphate and mix thoroughly.
- Take 8 ml of extract in to 15 ml centrifuge tube with 1.2 g of magnesium sulphate and 0.4 PSA and 40µg GCB(graphite carbon black)
- Vortex the mixture for 1 min. centrifuge it at 4000-5000rpm for 2 min.
- Transfer 1ml of the supernatant layer from filter it through PTFE filter (0.22µm) into LC vial directly for LC-MS-MS analysis.
- Take 2ml supernatant layer into 10ml test tube for evaporation using turbovap (low volume concentrator using gentle stream of nitrogen at 35°C
- **CALCULATIONS:**
- $\text{Residue } (\mu\text{g/gm}) = \frac{\text{Area of sample} \div \text{Area of standard} \times \text{conc of standard in } \mu\text{g/ml} \div \text{weight of sample (g)} \times \text{dilution factor}}$

B. Steps involve in the Preparation of Organic manure From Kitchen Waste

however food waste go to the garbage disposal a practice can be done to turned this waste product into something really usefull known as biodegradable natural organic compost by utilizing kitchen waste. To make the compost from kitchen waste are as follow:

Step1: collecting or keeping all raw vegetable and fruit peeling, over ripened fruits and vegetables, egg shell, plant dry leaves etc.

Step2: putting all the kitchen waste and dry leaves in plastic bucket or bin with holes for aeration, put all the kitchen waste and put layer of soil and sprinkled some water. So, that it get decomposes fastly by the presence of micro organism.

Step3: After 2-3 days mix it properly so that it get mixed and start decomposing it changes its texture and appearance and it also produces odour

Step4: The process of compost will be complete with in 30-40 days, it totally gets decomposes and ready to use as organic compost. Thus, composting help the plant to get nutrient from soil



III. RESULTS AND SUMMARY

pesticide residues in analyzed samples: The levels of pesticides residues in vegetable and green leafy vegetables the sample was determined. Pesticides residue were detected as bifenthrin, alfa cypermethrin, acetamiprid, acephate, chlorantraniliprole, methamidophos etc. The QUECHERS multi residue extraction followed by gas chromatography electron capture detector or liquid chromatography tandem mass spectrometry LC-MS/M.

Multi residue in analyzed sample: Vegetable and green leafy sample containing residues. The samples were contaminated with more than four to five pesticide residues and were found in most frequently in spinach and curry leaves and the sample for tomato are found to be as free of pesticide.

Results of sample: The most common pesticides detected in the sample were as acetamiprid, acephate, chlorantraniliprole, methamidophos, bifenthrin, alfa cypermethrin.

A. Effect of pesticides that are found in vegetable and green leafy which are analysed

1. Bifenthrin Effect

Bifenthrin is an insecticide to target fire ants, aphids, worms, gnats, moths, beetles, midges, mites, fleas and flies. It is used in orchards, nurseries, agricultures. It is excessively used on crops, corns etc. It is moderately toxic for both humans and animals. The bifenthrin also act as carcinogenic. The symptoms that are associated with the exposure to bifenthrin compounds include eye and skin irritation, irritability to touch, abnormal sensation, sensation of tingling, or creeping on skin, numbness, headache, dizziness, nausea, vomiting, diarrhoea, salivation, and fatigue. At very high levels of exposure, muscle twitching and fluid accumulation in the lungs may also occurs.

2. Alfa cypermethrin effect

It is an active form of pyrethroid insecticide that is commonly used to detect sucking insects such as moths, weevils, caterpillars and mites. Likewise, the insecticide is used to control bollworm, budworm and green mirid as well as cutworms, aphids and wireworms. It is mainly applied to the crops such as Cucumber, leafy vegetables, barley, wheat, rye, oats, tomato, triticale, mung beans, sunflower, bale, sweet corn, soy, cotton, sorghum etc. The symptoms are like neurotoxicity, acute toxicity, hypersensitivity, muscle paralysis, dizziness, creeping on skin etc. The hazards of this chemicals are to

contaminate water, aquatic ecosystem, that are highly toxic to the birds and other insects

3. Acetamiprid Effect

It has been as classified as a pyridylmethylamine insecticide, and is described as white to pale yellow crystalline solid appearance. This chemical was first introduced in the year 1995 in Japan and which is used to control of pests such as aphids, thrips, mirids and spider mites as well as white flies etc. The synthetic insecticide is commonly applied to various crops such as Green leafy vegetables, citrus fruits, apples, pears, grapes, cotton, ornamental plant and flower. Acetamiprid primarily targets the central nervous system and may cause dizziness, headache and sedation as well as agitation, seizures and coma, it may also leads to headache, dizziness, seizures, hypertension and even death.

4. Acephate Effect

It is an insecticide that belongs to the organophosphate group of chemicals. It is usually used as a foliar spray against sucking and chewing insects, such as leaf Lepidopterous larvae, sawflies, and thrips on fruits, vegetables, potatoes, sugarbeet, vines, rice, hops, ornamentals, and greenhouse crops like peppers and cucumbers it can also causes cramps, diarrhea, respiratory problem, tightness in chest, seizures, loss consciousness. It can also damage fertility or the unborn child.

5. Chlorantraniliprole Effect

This insecticide act as receptor which may even leads to the muscle contraction. It should be applied at the state of insects, during egg hatching. It is in the colour of white crystalline and it is supplied as concentrate or suspension of water dispersible granules. Its over exposures may leads to eye irritation, respiratory irritation.

6. Methamidophos Effect

It is an active form of organophosphate insecticide which is leading to mortality, intoxication when inhaled, absorbed through eyes and skin. Skin absorption causes muscles twitching, blurred vision, weakness, fluctuating of heart rates, coma, cessation of breathing. Intoxications are experienced by paralysis, neurological problems etc

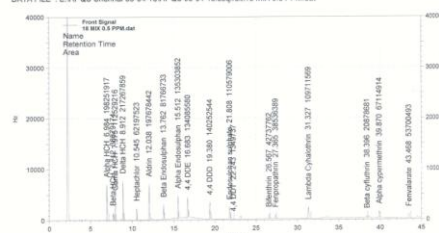
B. Results of sample curry leaves

In the sample of curry leaves the pesticide residue such as bifenthrin (0.0472 mg/kg) alfa cypermethrin (0.2679 mg/kg) are found by using GC-ECD technique.



AINP ON PESTICIDE RESIDUES HYDERABAD CENTRE

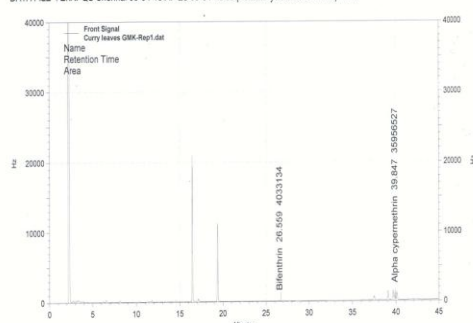
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Front Signal Results Peak Number	Name	Retention Time	Area
1	Alpha BCB	6.994	139251917
2	Beta BCB	7.712	388719174
3	Gamma BCB	7.975	512529216
4	Delta BCB	8.912	217267859
5	Heptachlor	10.545	82197523
6	Aldrin	12.039	197678442
7	Beta Endosulphan	13.762	81746733
8	Alpha Endosulphan	15.512	335303852
9	4,4 DDE	16.683	134085588
10	4,4 DDD	18.380	140325344
11	Endosulphan sulphate	21.808	110379006
12	4,4 DDT	22.243	1349737
13	Bifenthrin	26.567	42737762
14	Fenpropathrin	27.365	38536369
15	Lambda cyhalothrin	31.327	109711348
16	Beta cyfluthrin	38.396	20878681
17	Alpha cypermethrin	39.870	67114914
18	Fenvalerate	43.468	53700493
Totals			1762821391

AINP ON PESTICIDE RESIDUES HYDERABAD CENTRE

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Front Signal Results Peak Number	Name	Retention Time	Area
1	Bifenthrin	26.559	4033134
2	Alpha cypermethrin	39.847	35956527
Totals			39989661

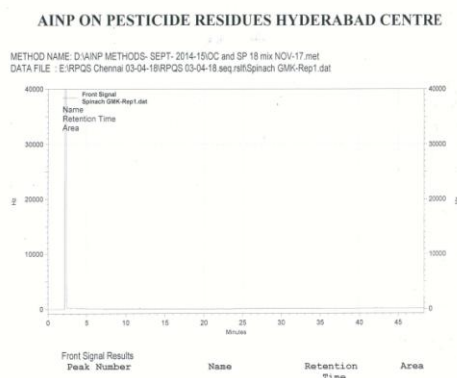
C. Results of sample spinach

In the sample spinach pesticide such as acetamiprid(0.0388mg/kg),acephate(2.8276mg/kg),ch lorantraniliprole(0.4556mg/kg),methamidophos(0.118 mg/kg) are found by using LC-MS/MS technique.



D. Results of sample tomato

The sample tomato are found to be free of pesticide



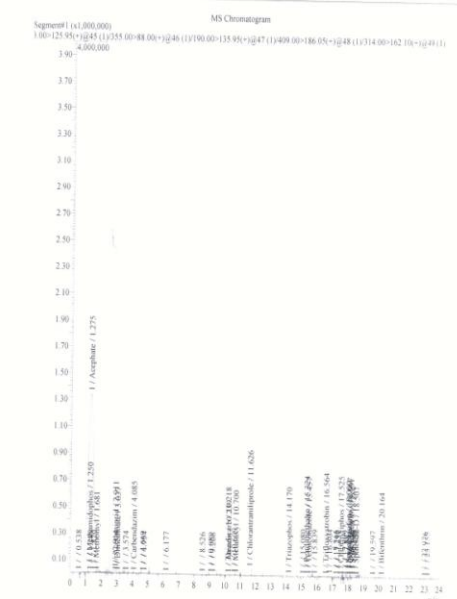
LC-MS/MS

AINP ON PESTICIDE RESIDUES, HYDERABAD CENTRE

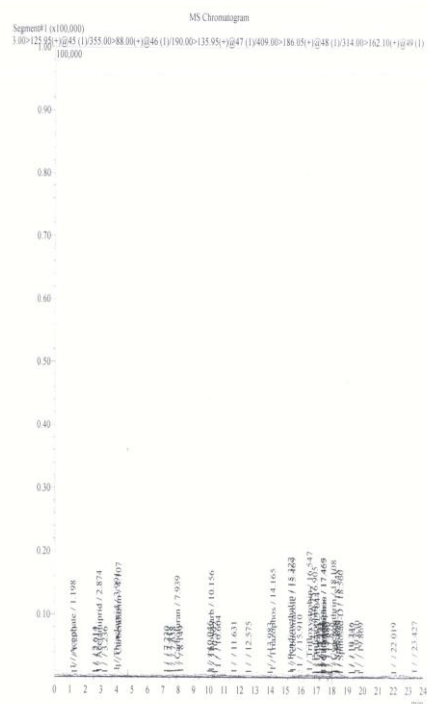
AINP ON PESTICIDE RESIDUES, HYDERABAD CENTRE

Sample Information	
Acquired by	ANP ON PESTICIDE RESIDUES
Sample Name	SPN-GMK
Injection Volume	5
Data File	SPN-GMK.fcd
Method File	MIX METHOD FEB-2018.icm

Sample Information	
Acquired by	: AINP ON PESTICIDE RESIDUES
Sample Name	: TOM-GMK
Injection Volume	: 5
Data File	: TOM-GMK.fcd
Method File	: MIX METHOD FEB-2018.icm



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E. Promoting kitchen gardening

The plants are grown such as lady finger, pumpkin, cluster beans, red chillies and mint without the use of pesticides, utilizing biodegradable kitchen compost.

IV. DISCUSSIONS

This study shows the evidence of the presence of pesticide residue in vegetables and green leafy in Hyderabad. Imidacloprid a systematic neonicotinoid insecticide used to control various pest of vegetable and green leafy and it is the most commonly detected pesticide. Although imidacloprid is classified as moderately hazardous this pesticide has been associated with human neurotoxicity pesticide that are classified as highly hazardous are bifenthrin, alfa cypermethrin, acetamiprid, acephate chlorantraniliprole, methamidophos etc. were detected in the sample which were analyzed in the lab.

Nevertheless, continuous consumption of food product even with the moderate pesticide contamination may have negative consequences on human health in long term pesticide can accumulate in the tissue of organism as they are not easily soluble. From the results it is plausible that farmer were not following proper precautions with regards to the use of pesticide in appropriate dosages and at standard pre harvest intervals. The high pesticide level in some of the samples would suggest that there pesticide have been used indiscriminately, which could lead to health problems not only to the farmers but also to the general consumers.

V. CONCLUSION

This study investigate the levels of pesticide residue in commonly used vegetable and green leafy in Hyderabad. The result indicated the samples were contamination above the MRL the observed levels of

pesticide residue pose a potential health risk to consumers. Therefore to reduce this risk, kitchen gardening can be promote organic farming can be done at the backyards or at the terrace of the home in this way the ill-effect of pesticide can be reduced and one can lead a healthy life by having their own organic food. The residues are causing serious health problems such as cramps, diarrhea, respiratory problem, tightness in chest, seizures, loss consciousness. It can also damage fertility or the unborn child, muscles twitching, blurry vision, weakness, fluctuating of heart rates, coma, cessation of breathing. Intoxications are experienced by paralysis, neurological problems and many more health problems.

ACKNOWLEDGEMENT

I would like to thank and gratitude to all those people who have helped immensely in the successful completion of research work and making it a valuable experience, my special thanks goes to my principle Mr. MAZHER UDDIN FAROOQUI, I would also like to express my sincere gratitude to my guide Dr. ASHLESHA PENDLI Ph.d (Assistant professor) Ms. ZOYA NUREEN, (Head of the department, Assistant professor) of Anwarul uloom college Mallepally, Hyderabad.

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