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Analysis of Pesticides Residue on Brinjal before and after Dhavan by Manjistha Kwath and Sheerish Kwath

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Abstract: Ayurveda is an ancient science of India having Ashtanga (eight branches). Agadtantra (toxicology) is a specialized branch that deals with poisons. Most of the medicines mentioned in Agadtantra are herbal based. In the present scenario the living environment and life style of people have change a lot. There by the disease that caused due to poisoned environment has appeared in different forms and styles. It is not necessary that only direct intake of a poisonous materials lead to Dooshivisha Lakshanas. Brinjal (*Solanum melongena* L.) is an important widely consumed nutritious vegetable crop grown globally. The crop is infected with major diseases caused by fungi, bacteria, virus, mycoplasma and nematode that reduced the quality and market value of crop. Therefore Brinjal is sprayed with a number of pesticides for greater yield, ripening or storage.

Malathion ***50%EC*** pesticide is sprayed several times on Brinjal crop during cultivation, may get absorbed in the epicarp and pulp in moderate contamination level. The continuous consumption of such Brinjal vegetable even with moderate contamination level can accumulate in the receptor's body and may prove fatal for human population in the long- term. Therefore proper cleaning of these vegetables is required to nullify or reduces toxic residues of pesticide Malathion. Commonly used methods for cleaning this vegetable are washing with tap water, warm water, or salt water.

In Ayurveda, Drugs which act against toxic substances are called as *Vishaghana*. *Acharya Charaka* has listed 10 Vishaghana Dravyas, including *Manjistha and Sheerish* while describing *Vishaghana Mahakashaya* in *Sutra Sthana* 4th chapter *Shadvirechana*

So, the study was planned to observe whether the toxic residues of pesticide Malathion are nullified or reduced in the solution of Manjistha and Sheerish Vishaghana Dravyas.

Key Words: Manjishta Kwath, Sheerish Kwath, Dhavan, Brinjal, Malathion residue

Introduction: In the present scenario the living environment and life style of people have change a lot. There by the disease that caused due to poisoned environment has appeared in different forms and styles. Now a day people are more prone to various kinds of poisons including slow poisons in food as well as in environment. It is not necessary that only direct intake of a poisonous materials lead to *Dooshivisha Lakshanas*. But, Polluted air water land and increased faulty food habits, stressful life style, unpleasant feelings, continuous usage of any particular medications and even suppressions of urge can act as causes of *Dooshivisha*. Nowadays, the utilization of pesticides, fungicides, food colours, preservatives and cosmetics etc, are continuously increasing day by day which causes physical and mental hazards effect on human being.

Along with the green revolutions the farmers are using the pesticides, preservatives abundantly due to lack of knowledge. They are unaware of the biological and health related hazards of these poisonous chemicals and pesticides. These vegetables absorb some of the pesticides in the epicarp and pulp.

The concentration of various pesticide remained well below the established tolerances but continuous consumption of such vegetables even with moderate contamination level can accumulate in the receptor's body and may prove fatal for human population in the long- term. Brinjal is an important vegetable crop of subtropics and tropic with nutritional and Ayurvedic medicinal value. In India, it is cultivated in almost all states. Its varieties display a wide range of fruit shapes and colors, ranging from oval or egg shaped to long club-shaped. The fruits contain low in calories and fats, mostly water, some protein, fibre and carbohydrates. It is with ayurvedic medicinal property, useful to diabetic patients and also excellent remedy for liver complaints.

Brinjal (*Solanum melongena* L.) is an important widely consumed nutritious vegetable crop grown globally. It is native of India or major Asia and cultivated in India for last 4,000 years. It contains several amino acids, alkaloids, pigments, flavanoids and sugars. In Ayurveda, it is medicine used for cure of diabetic patients, liver complaints and to control serum cholesterol. Ethano-botanically it is used for cure of fistula, piles, stomach pain and burns. The crop is infected with major diseases caused by fungi, bacteria, virus, mycoplasma and nematode that reduced the quality and market value of crop that directly or indirectly affected the economy of market and crop producers. Therefore Brinjal is sprayed with a number of pesticides for greater yield, ripening or storage like endosulfon 35%EC, Fenvalarate 20%EC, lindane 6.5%EC, ***Malathion 50%EC***, profenofos 50%EC etc.

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Malathion pesticide is sprayed several times on Brinjal crop during cultivation, may get absorbed in the epicarp and pulp in moderate contamination level. The continuous consumption of such Brinjal vegetable even with moderate contamination level can accumulate in the receptor's body and may prove fatal for human population in the long- term. Therefore proper cleaning of these vegetables is required to nullify or reduces toxic residues of pesticide Malathion. Commonly used methods for cleaning this vegetable are washing with tap water, warm water, or salt water. Here arises the need of solvent which may nullify or reduces toxic residues from the fruits and vegetables by dissolving them during washing.

In Ayurveda, Drugs which act against toxic substances are called as *Vishaghana*. *Acharya Charaka* has listed 10 Vishaghana Dravyas while describing *Vishaghana Mahakashaya* in *Sutra Sthana* 4th chapter *Shadvirechana Shatasritiya.*

हरिद्रामंजिष्ठा सुवहा सूक्ष्मैलापालिन्दी चन्दनकतक षिरीष सिन्धुवार
श्लेष्मातका इतिदषेमानि विषघ्नानि भवन्ति।। (च0सू0 4/11)

In this study *Manjistha* (Rubia cordifolia Linn.) *and Sheerish* (Albizzia lebbeck Benth.)Vishaghana Dravyas are chosen to test their anti-toxic properties to nullify or reduce the toxic residues of pesticide Malathion on Brinjal Vegetable.

Objective of the study:

To Analyse and compare the residues of pesticide Malathion on Brinjal before and after *Dhavan* by *Manjistha Kwath, Sheerish Kwath* and Tap water.

Materials:

The following vegetable was selected for the study.

1. Brinjal (vegetable)
2. Tap water Chemical formula- H2O
3. Manjistha-Kwath
4. Sheerish-Kwath

Methods:

Brinjal plants from the green house of Uttaranchal Ayurvedic College, Uttarakhand were taken. The first spraying of Malathion on Brinjal plants was applied during flowerings after cultivation. The 2nd and 3rd spraying of Malathion was applied in the interval of 10

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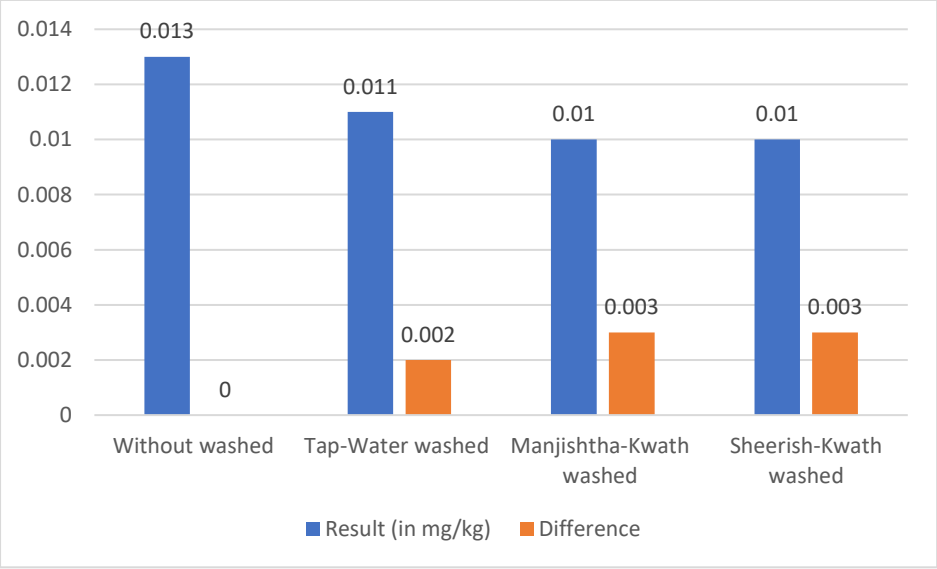
days after 1st spraying. After that next day Brinjal fruits were collected. The Experimental group was washed *Manjistha Kwath* and Sheerish Kwath and used for the study. Gas Chromatography was done on the washed samples to analyse the residue of Malathion in the samples.

Observation & Results

Table No. 1 Pesticide Residue Level of without washed, water washed, *Manjishtha-Kwath* and *Sheerish-Kwath* washed groups

Sr.	Group	Result (in mg/kg)	Difference
1.	Without washed	0.013	-
2.	Tap-Water washed	0.011	0.002
3.	*Manjistha-Kwath* washed	<0.01	0.003
4.	*Sheerish-Kwath* washed	<0.01	0.003

Graph No. 1 Pesticide Residue Level of without washed, water washed, *Manjistha-Kwath* and *Sheerish-Kwath* washed groups



It was observed that with the samples washed with *Manjistha Kwath* and *Sheerish Kwath* there was reduction in the values of Malathion making the levels of Malathion Below Desired Limits whereas Tap water wash only reduced the particulate matter to 0.011 thereby levels remaining in not acceptable limits.

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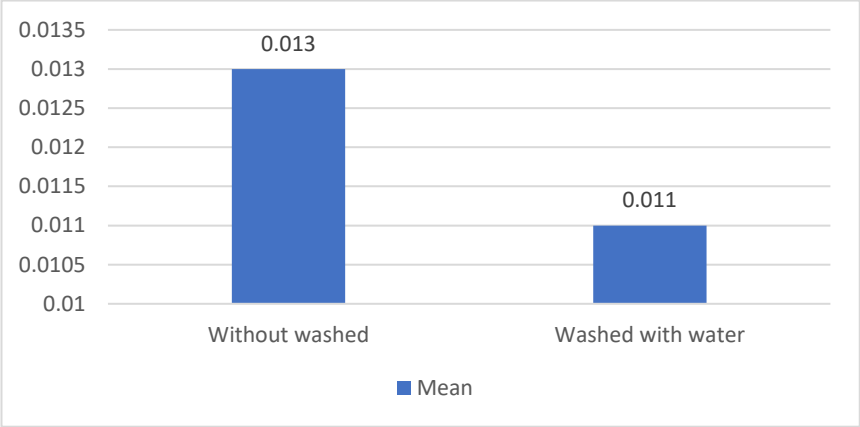
Table 2- Comparison of Mean pesticide residue level in between without washed and Tap-water washed groups

Sr. No	Group	Mean	% of change
1.	Without washed	0.013	0.2
2.	Washed with water	0.011	

Graph 2- Comparison of Mean pesticide residue level in between without washed and Tap-water washed groups



The mean pesticide residue level in without washed samples was found to be 0.013 mg/kg and at the same time the mean pesticide residue level after washed with tap water was found to be 0.011 mg/kg. The mean pesticide level was found less with tap water washed sample by 0.2%.

Table 3- Comparison of Mean pesticide residue level in between without washed and *Manjistha Kwath* washed groups

Sr. No	Group	Mean	% of change
1.	Without washed	0.013	0.3
2.	Washed with *Manjistha Kwath*	0.01	

Graph 3- Comparison of Mean pesticide residue level in between without washed and *Manjistha Kwath* washed groups

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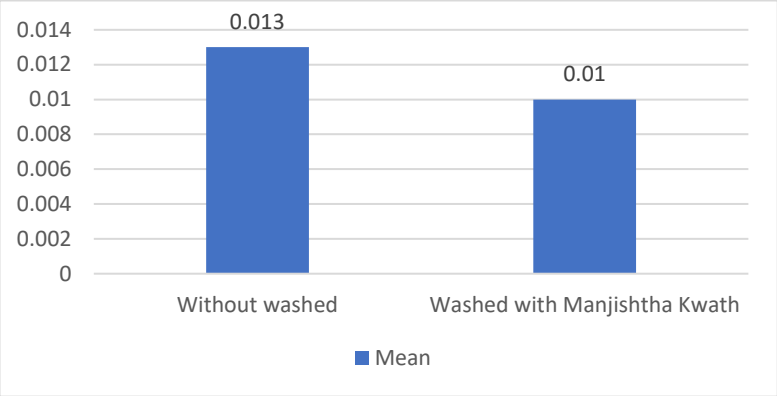
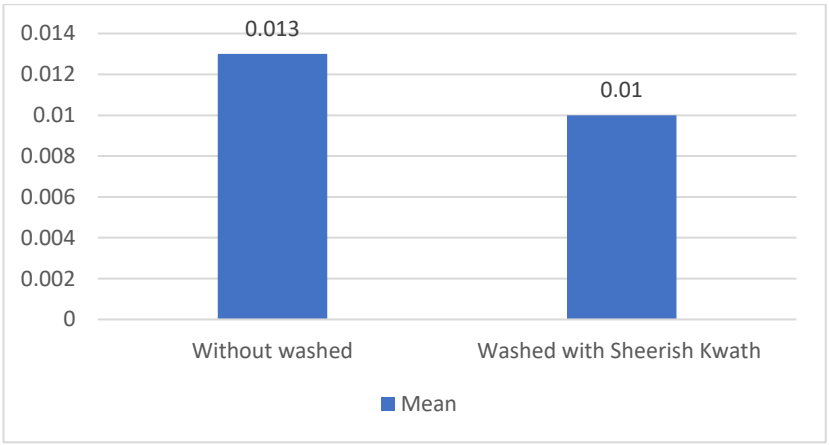


The mean pesticide residue level in without washed samples was found to be 0.013 mg/kg and at the same time the mean pesticide residue level after washed with *Manjistha-Kwath* was found to be <0.01 mg/kg. The mean pesticide residue level was found less with *Manjistha – Kwath* by 0.3%.

Table 4- Comparison of Mean pesticide residue level in between without washed and *Sheerish Kwath* washed groups

Sr. No	Group	Mean	% of change
1.	Without washed	0.013	0.3
2.	Washed with *Sheerish Kwath*	0.01	

Graph 4- Comparison of Mean pesticide residue level in between without washed and *Sheerish Kwath* washed groups



The mean pesticide residue level in okra washed in tap water was found to be 0.013 mg/kg and at the same time the mean pesticide residue level after washed with Sheerish - *Kwath* was found to be <0.01 mg/kg. The mean pesticide residue level was found less by 0.3% with *Sheerish - Kwath*.

Conclusion

The complete study has brought the following conclusions:

- The Malathion pesticide residue level was found on brinjal was 0.013 mg/kg as found through the Gas Chromatography study.
- *Manjistha-Kwath* reduces the concentration of Malathion to levels Below Desired concentrations (<0.01) making it safe for use.
- *Sheerish-Kwath* also reduces the levels of Malathion below the desired levels (<0.01) making it safe for use.
- The Study also reveals that Tap water reduces the concentration of pesticide residue of Malathion but only up to 0.011 mg/kg which does not make it fit for consumption.
- Comparison b/w *Manjistha Kwath* washed sample and *Sheerish Kwath* washed sample there was parallel response of the trial drug.

Results

Both the drugs (*Manjistha* & *Sheerish*) reduce the concentration of Malathion pesticide to the below desired level (<0.01) making it safe for use.

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