

FARMERS' PERCEPTION ABOUT PESTICIDE USE ON KARALA (*Momordica charantia*) PRODUCTION REGARDING ENVIRONMENTAL SAFETY AT COASTAL RAMPAL UPAZILA BANGLADESH

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ABSTRACT

The coastal area of Bangladesh usually faces a lot of natural hazards and the farmers of this particular region have faced many problems. Hence, the current study was under taken to find out the situation of farmers perception concerning about detrimental effects of pesticide on environment. Uses of pesticide have always been a vital concern for environment as well as in agriculture. Investigating farmers' understanding of handling pesticide and their residues is very important in order to reduce human factors that negatively affect agricultural and environmental safety. One hundred and fifty farmers were randomly selected for the study. Our results revealed that 59% farmers had education at primary level. During interview it was found that the participants had been cultivating karala/bitter gourd since 18 years. They were using seven different types of pesticides among which Shobicron 425 EC (93%) frequently with an interval of 7-15 days. All most every farmer maintained the safety period at an average level (8-15 days) before harvesting karala after applying insecticides. Most of the farmers discarded the empty packages and bottles through buried them underground. While spraying pesticides they followed different types of health/safety principles/regulations, among the enlisted 5 types of measures mask use was mostly common but paid little attention to smoking. It is concluded to develop a more targeted agricultural extension program, extension organizations and policy makers should focus on these factors, in that case will be more responsive concerning the adverse effects of pesticides which is friendly for sustainable agricultural production as well as sustainable environment.

Key words: pesticides, farmers' perception, sustainable environment, Rampala upazila.

Introduction

Environment and agriculture have forever been inter-linked. Agricultural production is depended on the environmental resources. Due to industrial and agricultural emission world's environment is slowly degrading which may cause serious damage to lives on earth and this is very alarming situation for all of us. Beside industry it has been an established fact that agricultural sector is also polluting environment on a local, regional and global basis. Pesticide, an agricultural input was introduced in Bangladesh in 1957 and mainly DDT (dichloro-diphenyl-trichloroethane) and BHC (also known as gamma-hexachlorocyclohexane / γ -HCH/gammaxene/Gammallin/and sometimes incorrectly called benzene hexachloride) were used in farmer level free of cost by the government until 1973. Next, the pesticides are becoming very popular to farmers. In 1974 the subsidy was reduced to 50% and completely withdrawn in 1979 (Islam, 2000). In 1979-80, the Government of Bangladesh transferred the trade-in pesticides (import, production and marketing) to the private sector. However, pesticide use in Bangladesh has increased from 758 tones in 1960; 3028 tones in 1980 and more than 19,000 tones in 2000 (Hasanuzzoha, 2004). The consumption of pesticides around the world has also increased rapidly in the last fifty years, due to believing that growth is likely to increase by pesticide, especially in developing countries (Yudelman *et al.*, 1998). The use of pesticides has been recognized and accepted as an essential ingredient in modern agriculture for the control of pests that damage crops. It is used not only to improve crop production technology also to deliver quality products. But the concern is that most of the farmers in our country are illiterate and unable to read and understand the written instructions of the label. So, the irrational use of pesticides and the sale of vegetables before safe days may cause health disorder of human (Kabir *et al.*, 1996). Distinction and excessive use of

pesticides are causing many problems, pesticide resistance, poisoning, danger to non-target organisms etc. (Guan-Soon, 1990). Residence problems have therefore become quite alarming, due to the continued and uncontrolled use of very persistent pesticides in agricultural and public health programs. The occurrence of pesticide residues in food is therefore viewed with great concern. It is known that the populations of developing countries carry a heavy burden of pesticides in their bodies World Health Organization (WHO, 1990). For the protection of consumers and the environment, many developed countries have set a maximum residue limit (MRL) for crops and an acceptable daily intake (ADI) for food products (Anon. 1993). When the ADI is exceeded then the Food and Agriculture Organization (FAO)/WHO recommendations level can be dangerous for the consumer. But in fact, there is limited study and research information about the pesticide quality control system in Bangladesh. Apart from the fact that systematic research has not yet been carried out, there are no confined guidelines to be used the pesticides in the farmer's field or at a farm level. The objectives of this study are: to investigate farmers' perception level about the use of pesticides for karala (very common and quite popular dishes in Bengali cuisine) production and the adverse effects of pesticides on environment at Coastal Rampal Upazila in Bangladesh.

Materials and Methods

The current study was conducted with three aspects: exclusive characteristics of the karala growers, analysis of the different dimensions of the use of pesticides and obstacles together with indications to ensure the safe environment for karala cultivation in coastal Rampal Upazila Bangladesh. The duration of the investigation was November 2018 to May 2019. Karala growers, who used pesticides as a pest control measure, were selected as the study's respondent. A total of 150 farmers were randomly selected for the study. The face-to-face interview with the farmers was conducted with the help of a structured and pre-tested questionnaire about the aspects namely, i) age, ii) educational level, iii) farm size, iv) agricultural experience, v) monthly income, vi) use of insecticides for karala production, vii) spraying periods, viii) use of ingredient, ix) harvest after insecticide spray (days), x) use of personal protective equipment (PPE), xi) effectiveness of insecticides, xii) obstacle and xiii) correct instructions to ensure the safe and secure environment. In addition, books, magazines, online documents, research reports, articles and newspaper articles on and related to the use of pesticides in cucurbit are being studied for a better understanding and management of environmental degradation caused by pesticides use in Bangladesh. This study has also performed few Focus group discussions (FGD). Ten FGDs took place at the research locations. Finally, the analyzed data was combined, presented as a table and included in the manuscript.

Results and Discussion

Exclusive characteristics of the growers related to karala cultivation: This study looked at age, educational background, farm size, agricultural experience and monthly income related to Karala cultivation (Table 1). The majorities of farmers (60 and 59%, respectively) were adults and lower educated, while about 24% and 11% were in secondary and higher secondary levels respectively (Table 1). The study found that farmers interviewed had been mainly engaged in karala cultivation since 18 years ago and they nearly landed to 55 decimal and the majority 31 decimal. The investigation also showed that growers achieved higher income (31.67 000 Tk), although the majority was within the lower limit.

Environmental aspects of pesticide application on karala: The study comprehensively describes the various environmental aspects of the use of pesticides in karala, and found that they used seven different types of pesticides, often using Shobicron 425 EC (93%) with an interval of 7-15 days (Table 2). They maintained the safe period at an average level (8-15 days) before harvesting the karala after applying the insecticides. It is somewhat safe for human consumption. But before concrete conclusion, remaining analysis is essential. The bad sign is the use of higher doses that must be immediately minimized, and the consultation of Department of Agricultural Extension (DAE) is greatly appreciated. After using insecticides, they safely discarded the empty packages and bottles, usually buried underground. While spraying using pesticides, they followed different types of health/safety principles/regulations, as illustrated

in Table 2. Among these 5 types of measures, the most commonly used mask and paid little attention to smoking.

Table 1. Exclusive characteristics of the growers related to karala cultivation

Indicator	% of respondent farmers	Range	Mean	SD
Age				
Teens (12-18 yrs)	19	18-72	42.00	6.71
Adults (18+ yrs)	60			
Elderly (65+ yrs)	21			
Level of education				
Illiterate (no education)	0	4-12	8.6	0.91
Primary (class I-V)	59			
Secondary (class VI-X)	24			
Above secondary (>class X)	17			
Farm area for karala (decimal)				
Small (0.00-15.00 decimal)	10	10-55	31.5	5.47
Medium (16.00-30.00 decimal)	58			
Large (above 30.00 decimal)	32			
Farming experiences (yrs)				
Short (0.00-10.00 yrs)	20	6-25	17.8	6.01
Moderate (11.00-20 yrs)	49			
Long (above 20.00 yrs)	31			
Monthly income ('000' Tk.)				
Bottom (up to 25)	50	15-56	31.67	3.68
Middle (26-50)	31			
Top (> 50)	19			

Table 2. Environmental aspects of pesticide application in karala

Sl no.	Line items of pesticide application	Expression
1	Insecticides use in karala	Shobicon 425 EC (93%), Procrem (88%), Vertimat (65%), Sumithion 50 EC (19%), Omite (16%), Sevin dust (13%) and Thiovit Jet (11%)
2	Interval of application	7-15 days
3	Harvesting after applying of insecticides	8-15 days
4	Rate/acre	450-600 ml
5	PPE use/precautions followed while applying of insecticides	Use of mask (92%), Spray to wind direction (73%), Wearing of full shirt (53%), No eating (17%) and No smoking (11%)
6	Disposal system of empty packet/bottle	Buried in soil (93%) and burning (7%)
7	Effect of insecticides on karala yield	Increased
8	Satisfaction on insecticides use	Yes (87%), No (13%)
9	Obstacle in insecticides use	Costly (91%), non targeted (9%)
10	Recommendations	IPM techniques (53%), use of perching (47%), cheap rate (43%), use of quality seed (27%) and cleaning the field (19%)

In addition, the study examined some general obstacle for using the insecticides in vegetables, particularly karala cultivation. In most cases, respondents said that the pesticides are so costly and some cases those are not effective/non-targeted (Table 2). They have desired to reduce the cost. More appropriately they are interested to follow integrated pest management (IPM) techniques. The farmers' perceptions on Perching in the studied Rampal upazila also took under considerations. The farmers of Rampal use the Perching just after concept received from DAE office of Rampal. Now they use and enjoy the benefits of Perching. Farmers of Rampal are known as Eco-friendly farmer. They also gave consent to use the quality seed and keep clean the field for avoiding excess infestation of insect/pest in Karala field.

IPM is an effective and environmentally friendly approach to pest management (Kabir and Rainis, 2015), and important to the continued development of alternative pest management strategies (Pretty and Bharucha, 2015). IPM techniques protect the natural enemies of pest insects and aid in the restoration of ecosystem activities (Naranjo *et al.*, 2015).

Conclusion

The study examined only theoretical views of environmental aspects of the use of pesticides for karala production. It was one of the in-depth conceptual studies on environmental aspects in karala cultivation at coastal Rampal Upazila Bangladesh. But analytical research is necessary for the final conclusion for safe vegetable consumption sustainable environment management in Bangladesh.

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