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STUDIES ON THE USE OF PESTICIDE AND FOOD SAFETY ENVIRONMENTAL FACTORS IN BANGLADESH

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ABSTRACT

Hossain SkH, Begum F, Tasnuva A, Alam AFMM (2017) Studies on the use of pesticide and food safety environmental factors in Bangladesh. *J. Innov. Dev. Strategy*. 11(1), 17-21.

A research program was conducted as to studies on the use of pesticide and food safety environmental factors in Bangladesh with the main objectives to i. identify the factors relating to pesticide environment interaction, ii. prioritize the food safety of plant protection in modern agriculture, and iii. assess the implementation intensity of IPM and ICM in the West Region of Bangladesh. The research areas covered Jessore, Comilla and Rangpur Agricultural Extension Regions (Division). The data as per objectives were collected directly from field level technical Officers through a pretested investigative question guide and supported by interactive user and stakeholder group discussion. The results showed the 51% respondents stated in favour of safety of the used pesticides. As an individual mean Spinosad was recommended by NARS up to 95% safe for the environment while organo-chlorine was stated by 31% of DAE. Response was highest in case of NARS by 59% and lowest by NGO 38%. As mean results Spinosad was stated to be safe by 68%, while Organo-Chlorine was 32%. The results analyzed as per regions show that synthetic pesticide score highest as 70% being unsafe, the bio-pesticide being lowest (31%). The result obtained on safe food of plant protection is given for table-3 and figure 3 and 4. Result shows that 82% Bio-Extract by NARS are safe for food item and 24% Chloropyriphos is safe for food item by NGO. Average grand mean was 47%, which indicate that general awareness is very less. The results indicated that NARS responded by 66% for Chloropyriphos, bio-extract pesticides being most safe 82% for food items.

Key words: pesticide, food safety, environment, organic agriculture, systemic pesticide, organo-chlorine

INTRODUCTION

Pesticides are commonly used on the food crops. We eat to control pests that may damage the crops during the production, storage or transport. Pesticide allows growers to increase the amount of usable food from each crop at the time of harvest. Pesticides may also improve the quality, safety and self-life of certain foods (Tomlin 2003). For consumers, this means access to wide variety of affordable foods grown locally or imported from the other states or country. The amount of pesticide that remains in or on food is called pesticide residue.

Food Security and Food Safety: As defined in the World Food Summit 1996, food security exist when all people, at all times, have physical and economical access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Rahman *et al.* 2005; Islam and Hoque, 2013). According to this definition the Bangladesh National Food Policy, 2006 categorized food security as enhanced food availability, increased food access by the food insecure and adequate supply of safe and nutritious food. Thus food safety is an inclusive aspect of food security.

Food safety became last decades very important for both governments, producers of food products and consumers as well. Food safety is considering mainly three types of hazards: (a) microbiological hazards; (b) physical hazards and (c) chemical hazards. However, most of the chemical hazards have long term health problems for the consumers of food products. Chemical products or contaminants can be of different nature e.g. residues of pesticides or other phyto-products applied during the production of crops, fruits and vegetables, production, environmental contaminants such as heavy metals or dioxins. In this group the allergens are considered as well. This are mostly natural food components e.g. proteins, which are provoking an allergic reaction with sensitive persons (Ali 2013). Problems with food safety can be very divers in Bangladesh. However, food safety must be differentiated from food quality. Food safety is the basic requirement for a food product. Consumers may not become ill from eating a food product. Food quality on the other hand, is also important as food safety.

In Bangladesh, most of the foodstuffs manufactured or processed, are unsafe for consumption or adulterated in varying degrees. This problem persists at every level of food from preparation to consumption. Food manufacturers, processors, restaurants fast food outlets and so forth are all involved in one way or another in this corrupt practice of adulteration. Foods are adulterated by using various harmful chemicals and toxic artificial colors on the one hand; and rotten perishables turning to be poisonous foods are stored sold and served to consumers in an unhygienic atmosphere on the other. This non-safety of food is contributing to the public health seriously with numerous diseases.

Despite different reasons for this non-safety and adulterations of foodstuffs in Bangladesh, this study will concentrate on the regulatory failures to combat the current food safety problems persisting in the world including Bangladesh (FAO/WHO 2004; Badrie 2006). Food is a significant carrier for the considerable number

of diseases in the entire world. Bangladesh, a third world developing country of South Asia, is not an exception in this case. Consumption of unsafe food is a serious threat to public health in Bangladesh for last couple of decades. A survey conducted by the Institute of Nutrition and Food Science, Dhaka University, in early 1980s had revealed that inadequate diets and intake of adulterated foods are responsible for the malnutrition of 60 per cent of the people of Bangladesh.

MATERIALS AND METHODS

The methodology for the present study used system- wide approach, which involved wide- ranging and sequenced discussion with relevant stakeholders aiming to identify the frequency, category of pesticides as well as toxicity and bio& public health pesticide sprayed to control the pest of different crops & vegetables.

The study involves the use of:

1. Field survey through structured questionnaire
2. Formal and non-formal interviews through key informant interview (KII)
3. Collection of primary and secondary information, reviewing the available reports and
4. Physical field visit of the sampled area.

Variables:

A. Respondent:

1. DAE Agriculture graduate, Agriculture Diploma (District & Upazila Officers)
2. NARS Scientist of BARI and BIRRI (Dhaka head office and Regional station)
3. NGO Agriculture graduate/Agriculture Diploma (local & International).

B. Site: Jessore (Gangetic Alluvial), Comilla (Meghna Alluvial) and Rangpur (Tista Alluvial).

C. Pesticides: Synthetic, Spinosad, Organic and Bios.

The pest and pesticide selection and characterization were done as per BCPA (2016) specifications.

D. Sampling technique: Site selective Random Sampling technique will.

E. Sample size: Total 400 respondents are interviewed for data.

Questionnaire Guidelines:

A. Personal: 1. Name and Address 2. Profession 3. Qualification

B. Research Questions:

1. Which pesticide is most safe for national bio-environment in Bangladesh? (any two)
 - i. Organo-Chlorine
 - ii. Organo-Phosphate
 - iii. Spinosad
 - iv. Carbamide
 - v. Sulphamide
2. Which pesticide is most unsafe for national bio-environment in Bangladesh? (any two)
 - i. Chlorpyrifos
 - ii. Cypermethrin
 - iii. Bio- extract
 - iv. Lambda Cyhalothrin
 - v. Organics
3. What are food- safety points of plant protection materials? (any two)
 - i. Duration of residual effects
 - ii. Half life of the ingredient
 - iii. External removal of the residue
 - iv. Organic carbon bonds
 - v. Metabolic rates.

RESULTS AND DISCUSSION

The results obtained from the present studies on the use of Pesticide and Food Safety Environmental Factors in Bangladesh are mentioned here as per set objectives and outputs. The main objectives of research were to i. Identify the factors relating to pesticide environment interaction, ii. Prioritize the food safety of plant protection in modern agriculture, and iii. Assess the implementation intensity of IPM and ICM in the West Region of Bangladesh. The main variables were 3 Agricultural Regions (Division) and different categories of respondents.

Pesticide-Environment Interaction Factors

The research found on the pesticide-environment interaction factors are given in the tables 1 to 3. The results show that the mean grand response on the technical points was only 51%. It indicates that practical knowledge about the characteristics were low. As categorical respondent based findings it may be told that the respondent of the National Agricultural Research system was highest being 59%, being lowest for Non-Government Organizations (NGO) 38%. As safe product for the national bio-environment Spinosad scored highest as 68% which was internationally highlighted awarding Green proses (IRAC 5. 2012). It may be stated that the Spinosad is a biological pesticide having low toxicity level. Organo-chlorine products scored lowest as environmental safety was concerned.

Safe Pesticide for Environment:

The results obtained on the safe pesticide for environment are given in the Table 1 and figure 1. The results show that as per grand mean the response was only 51% which indicates awareness for actions are at the minimum level.

Table 1. Safe Pesticide for national bio-environment

Regions	Organo-Chlorine	Organo-Phosphate	Spinosad	Carbamide	Sulphamide	Mean
DAE	31	78	76	48	49	56
NARS	19	54	95	63	65	59
NGO	46	48	32	26	39	38
Mean	32	60	68	46	51	51

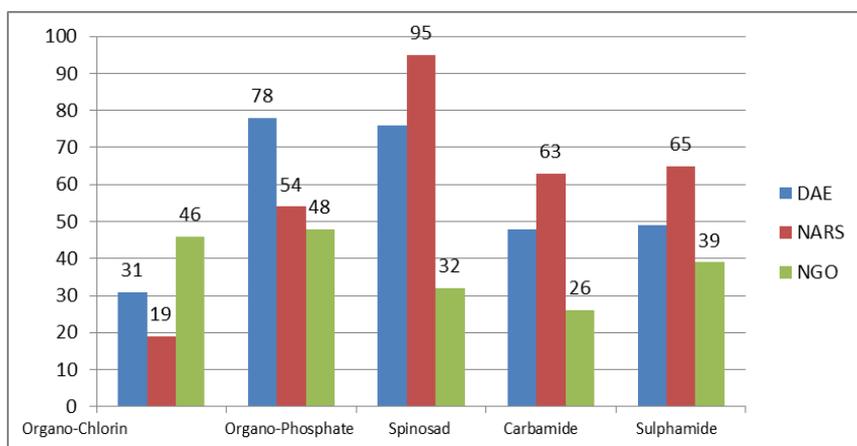


Fig. 1. Safe Pesticide for national bio-environment

As an individual mean Spinosad was recommended by NARS up to 95% safe for the environment while Organo-Chlorine was stated by 31% of DAE. Response was highest in case of NARS by 59% and lowest by NGO 38%. As mean results Spinosad was stated to be safe by 68%, while organo-chlorine was 32%.

Toxic for Environment:

The results obtained on the toxic pesticide for environment are given in the Table 2 and figure 2. Result shows that Synthetic is highest in Jessore 77% and lowest toxic statement was given for Bio-pesticide 23% as in Comilla. Average response, i.e. grand mean response was 45%, which indicate that the toxicity factors of currently apply pesticide are not effectively known to the user. Similar awareness factors were also fore stated by many researchers (Ali 2013) as regards food safety in Bangladesh.

Table 2. Pesticide is most unsafe for national bio-environment

Regions	Synthetic	Spinosad	Organics	Bio-pesticide	Mean
Jessore	77	41	34	25	44
Comilla	67	49	39	23	45
Rangpur	65	38	35	45	46
Mean	70	43	36	31	45

The results analyzed as per regions show that (Table 2 and figure 2) synthetic pesticide score highest as 70% being unsafe, the bio-pesticide being lowest (31%). These findings closely relate the bio-chemical compositions and precautions given by respective specialists (MacBean, 2012) in their recent Pesticide Manual and supplementary entries.

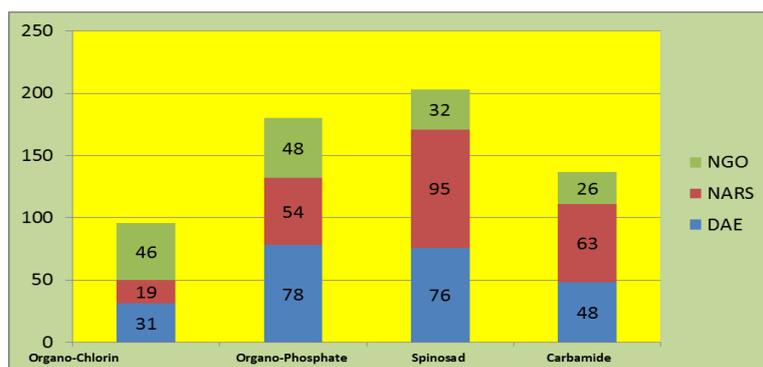


Fig. 2. Pesticide toxic for national bio-environment

Safe Food of Plant Protection:

The result obtained on safe food of plant protection is given for table 3 and figure 3 and 4. Result shows that 82% Bio-Extract by NARS are safe for food item and 24% Chloropyriphos is safe for food item by NGO. Average grand mean was 47%, which indicate that general awareness is very less.

Table 3. Food Safety of Plant Protection in Agriculture

Regions	Chloropyriphos	Cypermathrin	Bio- extract	Lam Cyhalot	Mean
DAE	40	33	51	42	42
NARS	53	59	82	68	66
NGO	24	36	49	32	35
Mean	39	43	61	47	47

The results of the Table 3 indicate that NARS responded by 66% for Chloropyriphos, Bio-extract pesticides being most safe 82% for food items.

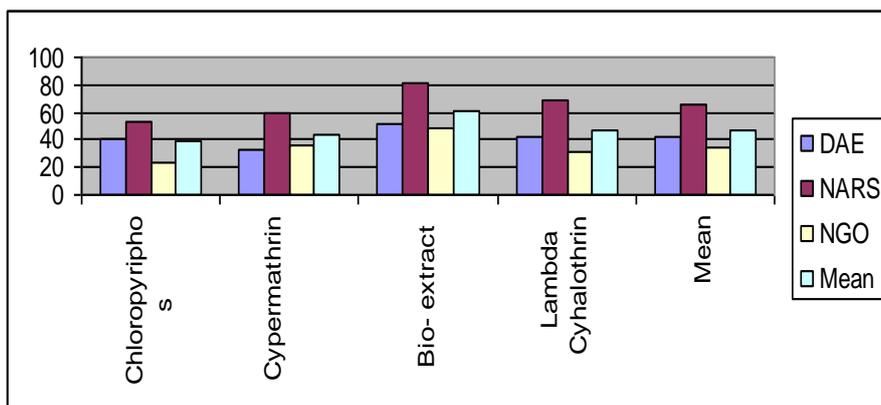


Fig. 3. Safety of Food in Plant Protection

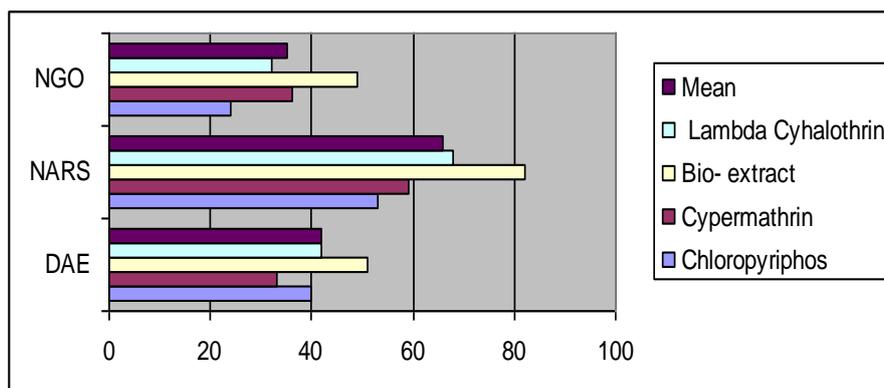


Fig. 4. As per pesticide type

CONCLUSION

It may be concluded from current studies and thus recommended that the awareness of safe pesticide for environment now exist at the minimum level. So direct actions should be done on food safety following IPM at the field level food production program. Products like Spinosad (spinosyn) should be encouraged for environmental safety as agricultural pesticide to improve the public health concerning food safety. So they should state the environmental problem more precisely. Research and Development work should be done by DAE in addition to NARS. Every pesticide company should have individual training program on their products as the precaution and to follow GOOD AGRICULTURAL PRACTICES or GAP for ensuring food and environmental safety.

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