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FLUBENDIAMIDE INSECTICIDE RESIDUE EFFECT IN CARBOHYDRATES & CAROTENE CONTENTS ON OKRA FRUITS

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Abstract

A field experiments were conducted on okra crop (Variety: Pusa Sawani and Supper Green) at the Sam Higgnbottom Institute of Agriculture Technology and Sciences, Allahabad, during summer season in years 2010-11 and 2011-12 following recommended agronomic practices. The flubendiamide insecticide in/on okra fruits following application of Belt 39.35% SC formulation at 24(I_1), 48(I_2), 96(I_3) & 192(I_4), g a.i. ha^{-1} at three sprays applied an interval of seven day on okra plants using Knapsack sprayer. Water was sprayed in the control plot. Among two year study of okra fruits different levels of flubendiamide insecticide the maximum carbohydrate and carotene contents were noticed in I_4 (0.4%) followed by I_3 (0.3%). Among these varieties the maximum carbohydrate content (6.51mg) was found in Supper Green and the maximum interactions value of carbohydrate (6.71mg) was noticed in I_4V_2 followed I_3V_2, while minimum (6.15mg) was found in I_0V_1. The maximum carotene content was noticed in I_4 (0.4%) followed by I_3 (0.3%), among these varieties the maximum carotene (0.27mg) was found Supper Green and among the maximum interactions value of carotene (0.28mg) was noticed in I_4V_2 followed I_3V_2, while minimum (0.20mg) was found in I_0V_1. With Increased the concentration of flubendiamide insecticide respectively increase the value of total carbohydrates activity of okra plant.

Key words: *Abelmoschus esculentus*, Biochemical composition, residue, insects, okra, Flubendiamide insecticide.

Introduction

Okra (*Abelmoschus esculentus* Moench), known in many English-speaking countries as lady's fingers, bhindi or gumbo, is a flowering plant in the family malvaceae and genus *Abelmoschus*. The plant is cultivated in tropical, subtropical and warm temperate regions around the world. Okra is provides important source of protein, carbohydrates, vitamins, calcium, potassium, enzymes, and total minerals which are ofen lacking in diet of developing country (IBPGR, 1990). From nutritional point of view it is very useful genito-urinary disorders, spermatorrhoea and chronic dysentery (Nadkarni, 1927). It is medicinal value has also been reported in curing ulcers and relief from hemorrhoids (Adams, 1975). The crop is attacked by several insect pests among which shoot and fruit borer, *Earias vittella* (Fabricius) and *Earias Insulana* are most serious as it take upper hand by causing direct damage to tender fruits. Various strategies recommended controlling the pests, the use of insecticide has resulted immediate relief to crop and apparently benefited formers. For same reason the use of chemical is increasing rapidly and will continue in days to come until some reliable alternative control measures are developed. 95% populations of Asian countries are used insecticides. FlubendiamideN^2-[1,1-dimethyl-2(methylsulfonyl)ethyl]-3-iodo-N^1-[2-methyl-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl]-1,2 benzenedicarboxamide IUPAC-3iodo-*N'*-(2-mesyl-1,1-dimethylethyl)-*N*-{4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-*o*-tolyl}phthalamide and formula $C_{23}H_{22}F_7IN_2O_4S$ is introduced newly in India by Bayer Crop Science. However, insecticide chemical are not free from side effects. The major problem with the wide spread use of insecticides is the toxic hazards due to their residues on the treated products. The presence of insecticides

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residue in the food has aroused considerable anxiety both among public health authorities and public at large. It is therefore, necessary to estimate the quantities of the insecticides that are present in the food meant for human consumption. The flubendiamide causes toxicity to human beings, especially acute oral toxicity, acute dermal toxicity, acute inhalation, primary eye irritation, dermal sensitization. Besides, aforesaid studies the effect of insecticide on the quantitative parameters of crop plants attracted the global attention in the recent years. In the bhindi crop to suppress the insect pests chemical flubendiamide is widely use. It is due to the reason the present investigation pertaining to the doses and its residual effect in okra fruits have been chosen and also investigate biochemical composition of applicated okra fruits.

Materials and methods

Field Experiment: A field experiments were conducted on okra crop (Variety: Pusa Sawani and Supper Green) at the Sam Higgnbottom Institute of Agriculture, Technology and Sciences, Allahabad ,during summer season in years 2010-12 and 2011-12 following recommended agronomic practices. Plot size was 3.0 ×3.0 m^2 with spacing 60 × 30 cm. The experiment was conducted in a randomized block design using three replicates for each treatment. Certified seeds of okra Pusa Sawani and Spupper Green were sown. The seeds were soaked in to water for about 12 hours before sowing. Sowing was done on flat bed using 20kg seeds/ha. One seed per hill was sown at 30 × 15 cm. distance with the help of khurpi. The sprays of flubendiamide (39.35% SC) were applied at 24 (I_1 or 2%), 48(I_2or 3%), 96(I_3or4%) & 192(I_4 or 5%), g a.i. ha^{-1} at three sprays of flubendiamide were applied at an interval of seven day on okra plants using Knapsack sprayer. The first spray was made at the initiation of fruiting whereas the last spray at fruiting stage. Water was sprayed in the control (I_0 or 1%) plot. Okra were harvested, pooled together, packed in plastic bags and transported to the laboratory for processing. Carbohydrate contents in green fresh okra fruits sample were estimated by Anthrons reagent method as given by Yemm and Willis, 1954. Carotene content was estimated by the method (Jensen, 1978).

Results and Discussion

Carbohydrate content: The differences among the varieties, levels of flubendiamide on okra fruits the interaction was found statistically significant. The different levels of flubendiamide insecticide in carbohydrate contents on okra fruit was notice following table and fig-1 during 2010- 2011 and 2011-2012. In year 2010-2011 the different levels of flubendiamide insecticide the maximum carbohydrate content was noticed in I_4 (0.4%) followed by I_3 (0.3%). Among these varieties the maximum carbohydrate (6.63 mg) was found in Supper Green and the maximuminteractions value of carbohydrate (6.50mg) was noticed in I_4V_2 followed I_3V_2, while minimum (6.25mg) was found in $I_0V_1$and year 2011-2012the maximum carbohydrate content was notice in I_4 (0.4%) followed by I_3 (0.3%). Among these varieties the maximum carbohydrate (6.51mg) was found in Supper Green and the maximum interactions value of carbohydrate (0.71mg) was noticed in I_4V_2 followed I_3V_2,

Table 1: Influence of insecticide on total carbohydrate at different treatments during 2010-2011 and 2011-2012.

(Mg/100g)

Levels of Flubendiamides	2010-2011			2011-2012		
	Varieties		Mean (I)	Varieties		Mean (I)
	Pusa Sawani	Supper Green		Pusa Sawani	Supper Green	
I_0	6.25	6.53	**6.39**	6.15	6.61	**6.38**
I_1	6.28	6.55	**6.42**	6.18	6.63	**6.41**
I_2	6.30	6.57	**6.44**	6.23	6.66	**6.45**
I_3	6.33	6.61	**6.47**	6.29	6.69	**6.49**
I_4	6.36	6.63	**6.50**	6.31	6.71	**6.51**
Mean (V)	**6.30**	**6.58**		**6.23**	**6.66**	
	F-test	S. Em. (±)	C.D. at 5%	F-test	S. Em. (±)	C.D. at 5%
Due to Insecticides (I)	S	0.045	0.094	S	0.058	0.123
Due to Variety (V)	S	0.028	0.059	S	0.037	0.078
Int. (I x V)	S	0.063	0.133	S	0.083	0.174

Table 2: Influence of insecticide on carotene at different treatments during 2010-2011 and 2011-2012.

(Mg/100g)

Levels of Flubendiamides	2010-2011			2011-2012		
	Varieties		Mean (I)	Varieties		Mean (I)
	Pusa Sawani	Supper Green		Pusa Sawani	Supper Green	
I_0	0.20	0.23	**0.22**	0.19	0.24	**0.22**
I_1	0.21	0.25	**0.23**	0.20	0.24	**0.22**
I_2	0.23	0.26	**0.25**	0.22	0.25	**0.24**
I_3	0.25	0.27	**0.26**	0.25	0.26	**0.26**
I_4	0.26	0.28	**0.27**	0.26	0.28	**0.27**
Mean (V)	**0.23**	**0.26**		**0.22**	**0.24**	
	F-test	S. Em. (±)	C.D. at 5%	F-test	S. Em. (±)	C.D. at 5%
Due to Insecticides (I)	NS	0.0063	0.0133	S	0.0010	0.0021
Due to Variety (V)	S	0.0040	0.0084	S	0.0006	0.0013
Int. (I x V)	S	0.0089	0.0188	S	0.0014	0.0030

while minimum (6.15mg) was found in I_0V_1. The variation among the total carbohydrate was in the range (6.53 – 6.63 and 6.61 -6.71 m/100g) in Supper Green while it varied (6.25 – 6.36 and 6.15 – 6.31 m/100g) in Pusa Sawani during 2010- 2011 and 2011-2012. The significant difference was found among these treatments, but in a range. Total carbohydrates content in the okra fruits were increased with increasing levels of flubendiamide. (Goodwin and Mercer, 1972) reported that pigments particularly chlorophyll 'a'and 'b' play an important role in the biosynthesis of carbohydrate. Chlorophyll 'a', 'b' and total chlorophyll, reducing sugar, non-reducing sugar and total sugar continuously increased by the application increasing levels of flubendiamide then total carbohydrates also increase. The result is well supported by Singh & Abidi, 1991; Devlin and Witham, 1986; Hoster and Marschner, 1986.

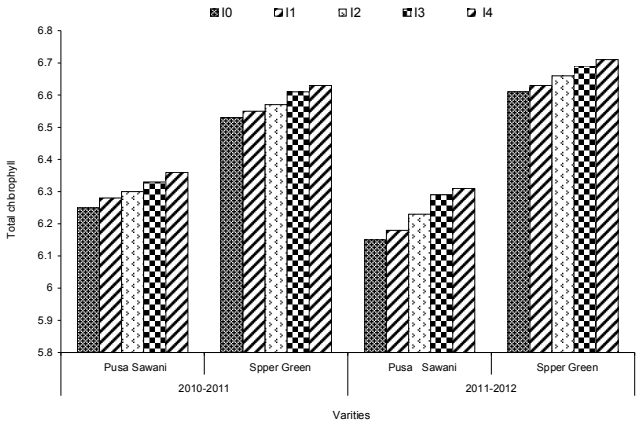

Fig 1: Influence of insecticide on total carbohydrate at different treatments during 2010-2011 and 2011-2012.

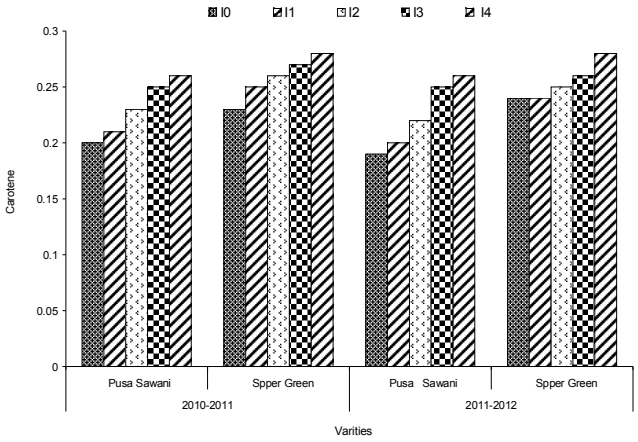

Fig 2: Influence of insecticide on carotene at different treatments during 2010-2011 and 2011-2012.

Carotene Contents: The differences among the varieties, levels of flubendiamide on okra fruits the interaction was found statistically significant. The different levels of flubendiamide insecticide in carotene contents on okra fruit was notice following table and fig-2 during 2010- 2011 and 2011-2012. In year 2010-2011 the different levels of flubendiamide insecticide the maximum carotene content was noticed in I_4(0.4%) followed by I_3(0.3%). Among these varieties the maximum carotene (0.28mg) was found Supper Green and the maximum interactions value of carotene (0.27mg) was noticed in I_4V_2 followed I_3V_2, while minimum (0.20mg) was found in I_0V_1 and year 2011-2012the maximum carotene content was noticed in I_4 (0.4%) followed by I_3(0.3%). Among these varieties the maximum carotene (0.28 mg) was found Supper Greenand the maximum interactions value of

carotene (0.27 mg) was noticed in I_4V_2 followed I_3V_2, while minimum (0.1mg) was found in I_1V_1. The variation among the carotene was in the range (0.23-0.28 and 0.24-0.28 mg/g) in Supper Green while it varied (0.20-0.26 and 0.19-0.26 mg/g) in Pusa Sawani during 2010-2011 and 2011-2012 respectively. The significant difference was found among these treatments, but in a range. Carotene content in the okra fruits were increased with increasing levels of flubendiamide. The results are in agreement with Singh and Abidi, 1991; Rouchand *et al.,* 1982.

Conclusion

Two varieties namely Pusa Sawani and Supper Green were studied to assess flubendiamide insecticide residue and Protien, methionine, typtophan and lysine content in continuously 2010-2011 to 2011-2012. It revealed that in both the varieties and during both the year of experimentation. Carbohydrate and carotene content in the okra fruits were increased with increasing levels of Flubendiamide. Result statistically significant but in range, thus it is concluded that both the varieties were having better control of insects and maintaining quality parameters at I_1 level of Flubendiamide application. The biochemical composition both varieties during both the year of investigation have been improved. Thus, it is recommended that I_1 level of Flubendiamide was best for control of insects and less content of residue was also obtained in this doses. Supper Green variety is the best of protein, lysine, methionine & tryptophan contents as compare to Pusa Sawani.

Referances

Adams C.F. (1975). Nutritive value of American foods in common units, *U.S.* Department of Agriculture, *Agric Handbook,* **(425)** : 29.

Devlin R.M. and F. H. Witham (1986). Plant physiology, *CBS Publishers Delhi,* **(4)** :140-141.

Goodwin T.W and E.I. Mercer (1972). Introduction to Plant Biochemistry. *Pargomon Press Oxford, New Yark, p*.82.

Hoster and Marschner (1986). Mineral Nutrition of higher Plants. *Academic Process Press London,* **(1)** : 221.

International Board for plant Genetics Resource IBPGR (1990). Reported on international workshop on Okra. Genetic resources held at the *National bureau for plant Genetic Resources, New Delhi, India. IBPGR, Rome.* **(5)** : 52-68.

Jensen A.(1978). Chlorophyll and Carotenoids. In; Hellebust, A and J. S.Crargic (eds.) Handbook of phytological methods, *Cambrige Univ. Press, London,* PP.56-70.

Nandkarni K.M. (1927). Indian Meteria Medica. Nadkarni and Co Bombay.22

Rouchand J., M. Chantal and A.M. Joseph (1982). Effect of soil treatment with the insecticides chlorofenvinphos and coverin the culture with plastic film the provitamin 'A' content of early caroots. *J. Agric. Food Chem.,* **(30)** : 1036-1038.

Singh R. and A.B. Abidi (1991). PhD thesis in Biochemistry on residual effects in okra fruits*, N.D. University Faizabad,* **(1)** : 25-89.

Yemm E.W. and A.J. Willis (1954). The estimation of carbohydrates in the plant extract by anthrone reagent. *J. Biochem.,* **(57)** : 508-514.