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Effect of Different Levels of Bioneema and Nitrogenous Fertilizer on Bio Chemical Constituents in Tomato (*Lycopersicon esculentum Mill.*) C.V. Money Maker

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Abstract: A field experiment was conducted at AAI Allahabad during the winter season to study the effect of different levels of Bioneema and nitrogenous fertilizers on chlorophyll, phenol, ascorbic acid, acidity, total soluble sugar, reducing sugar lycopene and carotene, contents in tomato (Lycopersicon esculentum Mill.). It is evident from the results that there is no particular treatment, which has increased all the parameters simultaneously. The highest chlorophyll content recorded at B_2N_1 (225.76 mg L^{-1}) while total phenol found to be 280.0 mg/100 g when bioneema was not used. The ascorbic acids acidity total soluble sugar enhanced at B_1N_2 to the extent of 32.78 mg/100 g, 1.96, 6.2 and 7.00% respectively. The lycopene and carotene content remarkably increased at B_2N_2 over control.

Key words: Bioneema · urea · lycopersicon esculentum · constituents

INTRODUCTION

Phenolic compounds have been shown to play a key in the résistance of plant to diseases causing microorganisms. In additions Phenolic may also serves as protectants against leaves eating insect, increases in phenolic content in host plant and can also be brought about some organic amendment in the soil of seed treatments. The alkaloid nimbidin and thionemone in neem tree is reported to have antinemic action against nematode. These several report on the use of neem and its products against various diseases alarmed me to do research on tomato crop along with urea as the nitrogen source.

MATERIALS AND METHODS

The experiment was conducted at the research plot of agricultural biochemistry department during the winter season. The experimental soil was of alluvial in nature having available N 172 kg ha^{-1}, P 14 kg ha^{-1}, available K 218 kg ha^{-1}, OC 0.44% and soil pH 7.6. The factorial RBD designed was adopted. The levels of Bioneema were applied at the rate of 2 g pot^{-1}, 4 g pot^{-1} and 6 g pot^{-1} while N through urea as incorporated @ of 10.86 g m^{-2} pot^{-1} and 22.174 g m^{-2} pot^{-1}. The chlorophyll content was extracted from the leaves with cold 80%acetone v/v and estimated spectrophotometrically as suggested by Arnon [1]. Total phenol was estimated by following Folin Ciocaltau Reagent (FCR) method given by Bray *et al*. [2], TSS% by hand refrectrometer, carotene and lycopene by HPLC method. Ascorbic acid and reducing sugar were analyzed by titrimetric method.

RESULTS AND DISCUSSION

It is evident from the results presented in (Table 1) indicated that the highest chlorophyll content appreciably increased at B_2N_1 level whereas the lowest chlorophyll content declined to the extent of 188.522 mg L^{-1} at B_2N_0 where no fertilizers were incorporated. The phenol content recorded maximum at B_0N_1 (255.83 mg/100 g) but lowest phenol content declined in control because of the non-availability of N and bioneema to the plants. It is interesting to note that B_1N_2 of bioneema and urea remarkably promoted the ascorbic acid content (32.78 mg/100 g) while it narrowed down at B_0N_1 to the extent of 15.78 mg/100 g. Similarly the percent acidity in tomato fruits observed highest at B_2N_2 level (1.96%) while B_2N_1 recorded lowest % acidity (0.38). No particular trend in increasing and decreasing manner could be

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Table 1: Efficacy of different levels of bioneema and nitrogenous fertilizers on biochemical constituents in tomato

Treatments	Chlorophyll content (mg/100 g)	Total phenol (mg/100 g)	Ascorbic acid (mg/100 g)	Acidity (%)	Total soluble sugar (%)	Reducing sugar (%)	Carotene (mg/100 g)	Lycopene (mg/100 g)
B_0N_0	174.96	94.16	21.04	1.06	4.2	9.05	7.46	17.20
B_0N_1	182.48	255.83	15.78	0.95	5.2	10.90	10.32	19.52
B_0N_2	176.84	280.00	31.56	1.02	4.1	17.40	10.74	20.41
B_1N_0	129.81	231.66	23.67	1.20	3.3	18.50	11.31	20.67
B_1N_1	146.74	241.66	28.93	0.95	4.6	19.10	12.70	22.89
B_1N_2	191.89	170.83	32.78	1.42	6.2	7.00	15.40	23.77
B_2N_0	118.52	254.16	23.67	1.22	3.3	21.50	15.23	22.58
B_2N_1	225.76	109.16	26.30	0.38	4.1	12.00	17.20	24.27
B_2N_2	146.73	165.0	31.65	1.96	4.2	16.15	20.37	24.40
B_3N_0	141.09	142.50	28.93	1.19	4.7	24.50	13.18	23.70
B_3N_1	129.81	117.50	26.50	1.48	4.1	20.20	15.90	22.60
B_3N_2	122.28	145.83	18.44	0.78	5.4	25.50	12.60	17.84
CD at 5 %	7.45	8.54	4.827	23.74	50.40	18.96	1.897	0.3385

recorded. Like wise B_1N_2 level of bioneema and urea appreciably increased the total soluble sugar (6.2%) in fruit juices but it declined at B_1N_0 due to non-availability of N. In case of reducing sugar it tremendously increased with the rise in Bioneema and nitrogen at B_3N_2 level (25.50%) where as B_1N_2 level did not show any appreciable effect on reducing sugar. The lycopene and carotene contents recorded to be 24.40 and 20.37 mg/100 g, which is highest among other treatments over control. The increased in lycopene and carotene contents may be due to the biosynthesis of chlorophyll in to lycopene, which is affected by varying intensity of light and temperature. It may concluded from the results that bioneema (Neem product) @ 4 g plot^{-1} and nitrogenous fertilizers (Urea) @ 21.74 g plot^{-1} was found to be more economical and appropriate dose to enhances the biochemical parameter and reduced the ill effect of pathogens and nematodes in tomato plant which adversely influence these parameters. The above results are in conformity with Alam [3-5].

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