

Effect of *Azotobacter* on chlorophyll synthesis in onion

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SUMMARY

The present experiment was conducted at P.V.P., College, Loni (Ahmednagar) in 2009 to study the effect of *Azotobacter* on chlorophyll content in onion. Chlorophyll content in green leaves was studied at 15 and 30 days of sowing. Experimental study proved that synthesis of phytohormones was a time depending and differ from species to species of *Azotobacter*, which play an important role in chlorophyll synthesis.

Onion (*Allium cepa* L.) belongs to the family Alliaceae and is one of the most important commercial vegetable crops. However, India ranks first in area in the world. Major growing states are Maharashtra, Karnataka, TN, UP, AP, Bihar, Gujarat and Rajasthan. Maharashtra is the leading state in onion production. In variety of crops plants, there is need to standardize the parameters for *Azotobacter* to improve chlorophyll content in onion. Therefore, this research work was undertaken.

MATERIALS AND METHODS

Eight efficient isolates of *Azotobacter* were isolated from the rhizosphere of onion at different locations in Rahata Tahsil, Ahmednagar (M.S.). They were named as AZT-1 to AZT-8. Rhizosphere soil samples from field of onion were used for isolation of *Azotobacter*. Jenson's agar medium was used for isolation, cultivation and preservation of *Azotobacter*. Jenson broth was prepared and inoculated with eight strains and incubated for four days. Seeds of onion cv. N-53 (Nasik red) were dressed with above broth and sown in pots. Soil in the pots was sterilized by autoclaving at 15lb, 121°C for 20 minutes. Pots were watered regularly, seedlings uprooted at 15 and 30 days interval for the estimation of chlorophyll 'a', 'b' and total chlorophyll.

The leaves were washed to remove the dust particles, blotted to dry partially and cut in small pieces. 0.2 g leaf pieces were weighted

and homogenized in the mortar and pestle in 10 ml of 80% cold acetone. The homogenate was centrifuged at 5000 rpm for 5 minutes and the supernatant was transferred to 25ml volumetric flask. The residue was re-extracted with cold 80% acetone. The supernatant was mixed and the final volume was made to 25ml with cold 80% acetone. Chlorophyll 'a', chlorophyll 'b' and total chlorophyll was estimated by measuring the absorbance at 645 and 663 nm. Chlorophyll content was expressed in mg per g of fresh weight by using the formula (Arnonymous, 1949).

RESULTS AND DISCUSSION

After 15 and 30 days of sowing, maximum (0.020 and 0.022 mg/g) amount of total chlorophyll content was recorded in fresh leaves of onion which was treated with AZT-8, followed by AZT-2 (0.019 and 0.020 mg/g). Treatments AZT-3, AZT-5, AZT-6 and AZT-7 were proved moderate (0.016 and 0.017, 0.016 and 0.019, 0.015 and 0.019, 0.017 and 0.018). AZT-4 was least effective (0.01 gm/g) in respect of total chlorophyll content of fresh leaves of onion (Table 1). It was interesting to note that at 30 days, maximum amount of total chlorophyll was recorded in AZT-8 (0.022 mg/g) over the control Fig. 1 and 2. This indicates that it enhanced the chlorophyll synthesis and photosynthetic activity which was confirmatory with Hogue *et al.* (1999). The synthesis of chlorophyll pigments depends upon the leachetes secreted by *Azotobacter* inoculations

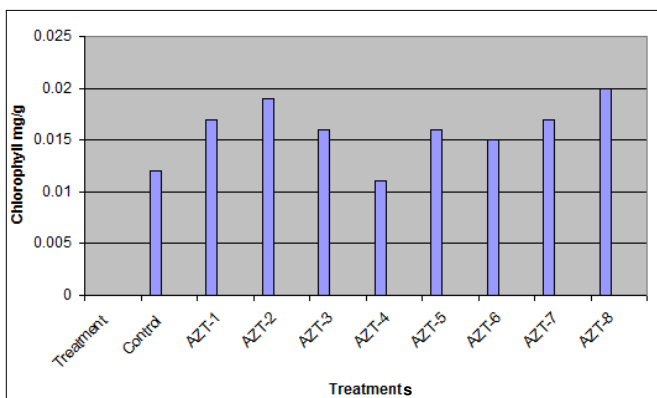
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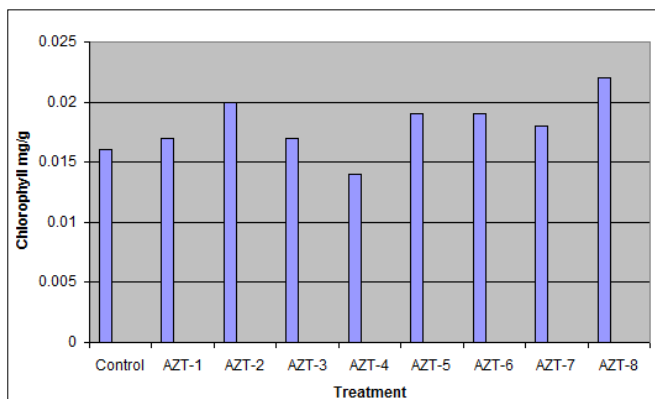
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Table 1 : Total chlorophyll content in different treatments

Treatments	Total chlorophyll (mg/g)	
	At 15 days	At 30days
Control	0.012	0.016
AZT-1	0.017	0.017
AZT-2	0.019	0.020
AZT-3	0.016	0.017
AZT-4	0.011	0.014
AZT-5	0.016	0.019
AZT-6	0.015	0.019
AZT-7	0.017	0.018
AZT-8	0.020	0.022

**Fig. 1 : Chlorophyll at 15 days**

in the form of growth hormones, therefore the above findings proved that the secreting hormones varied with species to species and were time dependent. From results it was concluded that AZT-2 and AZT-8 were effective at 15 days, however AZT-3 and AZT-4 were significantly effective at 30 days as per the findings of Khullar *et al.* (1978).

**Fig. 2 : Chlorophyll at 30 days**

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