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International Journal of Plant Sciences, **Vol. 3 No. 2 : 477-479 (July, 2008)**

Interaction between GA_3 and CCC on yield and quality of sweet potato

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(Accepted : May, 2008)

SUMMARY

The effect of GA_3, CCC and their interactions were studied on yield, reducing sugar and starch content of sweet potato. Spraying of GA_3 and CCC influenced yield of sweet potato irrespective of concentrations. The combined effect of GA_3 and CCC resulted in better performances than their individual effects. GA_3 at 500 µg/ml plus CCC at 1000 µg/ml was the best combination in increasing the yield of tubers. Reducing sugar and starch content were also increased by GA_3 and CCC compared to the control. In single treatment, GA_3 500 µg/ml and CCC 1000 µg/ml were the optimal concentrations for reducing sugar and starch content of the tubers.

Key words : GA_3, CCC, Sweet potato, Reducing sugar content, Starch content.

In tuber crops sweet potato occupies an important position in India. It is an important starchy vegetable crop in tropics and sub tropics. It is mainly grown as one of the supplementary food crops to meet the requirements of carbohydrates and also to provide raw materials for manufacture of starch, alcohol, lactic acid, butanol, vinegar etc. The calorific value of sweet potato is 1140 cal/kg against 840 cal/kg of potato (Ghosh and Nair, 1988). Sweet potato is a rich source of starch, a good source of energy and average source of vitamins and minerals (Bradbury and Holloway, 1988). Of late the potential of sweet potato for various industrial purposes has been recognized (Komaki, 1996 and Tan, 1996). The response of plant growth regulators in increasing the growth and yield has been recognized in many vegetable crops (Muthoo *et al*., 1987; Singh and Yadav, 1987; Singh *et al*., 1989; Singh *et al*., 1990). The role of GA_3 in enhancing growth and productivity of crops have been established in many crops (De-La Guardia and Benlloch 1980 in sunflower, Ray and Choudhury, 1981 in rice, Mulge *et al*., 1998 in onion and Khan *et al*., 2002 in mustard). Cycocel (CCC), a growth retardant interferes with many metabolic activities including yield (Indira *et al.,* 1984 in *Coleus*, Srivastava *et al.*, 2001 in chickpea, Bora, 2002 in pea and soybean). As the crop can adapt to diverse environmental conditions there is lot of scope for improving the yield and quality parameters of sweet potato by the application of growth regulating chemicals. Therefore, the present investigation was undertaken to assess the response of sweet potato to GA_3 and CCC and their interactions.

MATERIALS AND METHODS

The experiment was laid out in randomized block design with three replications. The soil was sandy loam (P -6.7). Sweet potato (cv. PUSA SAFED) was procured from Assam Agricultural University, Jorhat. The recommended package of agricultural practices were followed. Vine cuttings of 20 cm length were planted at a spacing of 30 cm on the beds of 30 cm height. Plants were irrigated as and when necessary. GA_3 and CCC (100, 250, 500 and 1000µg/ml each) was applied as foliar spray. GA_3 was sprayed on 30 DAP and CCC on 38 DAP. Reducing sugar and starch content of the tubers were estimated by Nelson Somogyi's method (1952) and Anthrone's method, respectively.

RESULTS AND DISCUSSION

The tuber yield of sweet potato was greatly enhanced by the application of both the PGRs. The combinations of both elicited further increase of the yield (Table 1). Highest yield was recorded as 613 q/ha at the combinations of $GA_3$500 µg/ml plus CCC 1000 µg/ml.But when treated alone, the concentration of GA_3 500 µg/mland CCC 1000 µg/ml the yield was reduced 455.2 and 472.5 q/ha, respectively. This combination exhibited an additive effect for all the yield attributes. Increased yield by the application of GA3 and CCC was also reported by Naidu and Swamy (1995). Srivastava *et al*. (2001) and Khan *et al.* (2002).

Growth regulators also increased the reducing sugar and starch content of the tubers. Combinations of GA_3 and CCC were more effective in reducing sugar and starch content than single applications. At the optimal combination concentrations of GA_3 500 µg/ml with CCC 1000 µg/ml reducing sugar content was estimated as 2.53 per cent. But when applied singly, GA_3 at 500 µg/ml and CCC at 1000 µg/ml recorded reducing sugar as 1.17 and 1.67 per cent, respectively. In combinations with the

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