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Nutrient omission in Bt cotton affects soil organic carbon and nutrients status

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Studies carried out at the University of Agricultural Sciences, Dharwad, India, in medium black soils assessed the effect of nutrient omission in Bt cotton and its effect on the soil organic carbon (SOC) and available nutrients at the end of second consecutive year of nutrient omission. The study also assessed the extent of contribution of the macro and micronutrients towards seed cotton yield. The experiment consisting 11 treatments omitting a nutrient in each treatment including an absolute control without any nutrients was conducted in a Randomised Block Design with three replications. Cotton crop sufficiently fertilized with macro and micro nutrients (165 : 75 : 120 NPK kg ha-1 and 20 kg each of CaSO4, and MgSO4, 10 kg of S, 20 kg each of ZnSO4, FeSO4 and 0.1 per cent Boron twice as foliar spray) was taken as a standard check to assess the contribution of each nutrient in various nutrient omission treatments. Soils of each treatment were analysed initially and after each crop of cotton for SOC and available nutrient status.

Results indicated that the SOC decreased after each crop of cotton in absolute control where no nutrients were applied (0.50 % to 0.38 %) and also in the N omission treatment (0.50 % to 0.35 %). But there was no significant impact of omission of P, K and other nutrients on soil organic carbon. Soil available N, P and K in the soil were reduced as compared to the initial soil status after first and second crop of cotton in the respective treatment where these nutrients were omitted. The soil available N, P and K were reduced to the extent of 61 kg ha-1, 7.1 kg ha-1 and 161.9 kg ha-1 in the respective nutrient omission treatment at end of second crop of cotton as compared to the initial status of these nutrients in the soil. This might be due to the mining of these nutrients from the soil nutrient pool with out addition of these nutrients extraneously. The nutrient status of N, P and K remained almost similar in omission of other nutrients. Omission of N, P and K also reduced the seed cotton yield by 41, 9.3 and 27.3 per cent respectively. Reduction of cotton yield with omission of other nutrients was meager.

It is concluded that rate of reduction in SOC, and cotton yield is more pronounced with omission of N than P and K from the regular fertiliser schedule to Bt cotton in medium black soils. However, omission of secondary and micronutrients had least effect on the soil nutrient status and seed cotton yield.