

Effect of integrated nutrient management on saffron yield and soil fertility

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ABSTRACT

The results of a field experiment conducted on upland soils to study the effect of different fertility management practices on saffron yield, nutrient content and soil fertility in a rainfed soil for two years (2006-2007) at K.D. Research Station, Old Airport Srinagar revealed that saffron responded to organic manures when used in integration with inorganic fertilizers. An additional saffron yield was realized with different organic manures plus inorganic fertilizers over control. The highest saffron yield was recorded with the application of 90 kg N ha⁻¹ in conjunction with 60t FYM ha⁻¹ plus *Azotobacter* inoculation; the increase was 57% over control. The combined application of fertilizer N, FYM and *Azotobacter* sustained the productivity even at lower rate of fertilizer N application. The highest N, P and K content was also recorded with the application of N₉₀F₆₀A₁P₁₀₀F₆₀PSB, and K₁₂₀F₆₀V₈ treatment, respectively. Moreover, the soil organic carbon, available N, P and K content increased with the application of fertilizer N, P and K alone and in conjunction with organics (FYM, Vermicompost or PSB) compared with control.

Key words : Integrated Nutrient Management, Saffron, yield, Soil properties, Organic fertilizers.

The crop is grown from times immemorial in Pampore belt with blanket fertilizer application not taking into account integrated nutrient management and balanced supply of nutrient. Balanced nutrition involves systematic exploitation of potential of soil source, chemical fertilizers, bio fertilizers and organic manures. Injudicious use of high analysis chemical fertilizer results in deficiency of nutrients and decline in organic carbon. However, when manures and bio fertilizers were applied in conjunction with chemical fertilisers for efficient growth of crop, decline of crop yield was arrested and gap between actual and potential yield was bridged to a large extent (Singh *et al.*, 2001).

Use of chemical fertilizers may not keep pace with time in maintenance of soil health for sustaining productivity. Growing concern about the sustainability of saffron coupled with increasing price of chemical fertilizers had led to renewed interest in organic manuring. Incorporation of organic manure along with fertilizer affects the amount and distribution of organic N fraction considerably in soil (Santhy *et al.*, 1998). As saffron is usually grown under rainfed conditions maximum loss of N through volatilization occurs and nitrogen use efficiency along with its recovery is very meagre.

Sustainable productions at higher levels become possible only when factors' leading to continued maintenance of soil health was adequately taken care of. Therefore, the present study was undertaken to study the yield of Saffron and uptake of nutrients as well as soil chemical properties.

MATERIALS AND METHODS

A field experiment was conducted at the K.D. Research Station, Old Airport Srinagar for 2 years during 2006 and 2007 to study the effect of different fertility management practices on saffron. The experiment was conducted in a randomized complete block design replicated thrice. The treatments of the experiment were Nitrogen, Phosphorus and Potassium with three levels each (0, 45, 90 kgN/ha, 0,50,100kgP/ha and 0,60,120kgK/ha), FYM @ 0,30 and 60t/ha, Vermicompost @ 0 and 8t/ha and Bio fertilizers (*Azotobacter* and PSB). Initial status of soil with respect of nutrients like Available nitrogen, phosphorous and potassium was found in lower range. Organic carbon was also found in lower range with mean value of 0.4%. pH was found in slightly acidic range with an average value of 6.16. Soil texture was clayey loam with a high plasticity. The soil samples were analyzed for various physico-chemical properties like particle size distribution by International Pipette method as described by Piper (1966), pH and electrical conductivity in 1:2.5, soil: water suspension using a glass electrode pH meter and conductivity as described by Jackson (1973), organic carbon by the wet digestion method of Walkley and Black (1934). The available nitrogen content was determined by alkaline-KMnO₄ method (Subbiah and Asija, 1956), available phosphorus content as per Olsen *et al.* (1954) and the available potassium content by flame photometry (Stanford and English).

RESULTS AND DISCUSSION

Saffron yield:

The yield of saffron increased significantly due to