



RESEARCH NOTE

Effect of foliar sprays of water soluble fertilizer, growth regulator and micronutrients on yield and quality of soybean

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Abstract : A field experiment was conducted during *Kharif* seasons of 2012, at Mahatma Phule Krishi Vidyapeeth, Rahuri, dist. Ahmednagar to study effect of foliar sprays of water soluble fertilizer, growth regulator and micronutrients on yield and quality of soybean. Significantly higher grain yield (22.70 q ha^{-1}) and straw yield (21.00 q ha^{-1}) was obtained in treatment GRDF + foliar spray of 19:19:19 NPK 0.5 % + H_3BO_3 0.5 % + ZnSO_4 0.5 % at 30 and 40 DAS. Among the treatment highest protein content (38.54%) and oil content (19.14%) was obtained in treatment GRDF + foliar spray of 19:19:19 NPK 0.5 % + H_3BO_3 0.5 % + ZnSO_4 0.5 % at 30 and 40 DAS.

Key Words : Foliar spray, Soybean, Water Soluble fertilizer, Micronutrient, Growth regulator

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Integrated nutrient management by foliar sprays of fertilizer, Growth regulator and Micronutrient is most critical input for utilizing yield potential and enhanced quality of high yielding crop. Foliar sprays of fertilizers, micronutrients and growth regulators individually and in combination at critical growth stages overcome deficiency of particular nutrient, enhanced the photosynthetic efficiency, metabolic activity, pod development and reduce flower drop. Foliar spray should be given at optimum time, amount and proper way.

A field experiment was carried out during *Kharif* seasons of 2012, at research farm of Mahatma Phule Krishi Vidyapeeth, Rahuri, dist. Ahmednagar. The trial was conducted in Randomized Block Design with ten

treatment combinations replicated with three times with foliar spray of 19:19:19 NPK 0.5 per cent, ZnSO_4 0.5 per cent, H_3BO_3 0.5 per cent and NAA 50 ppm. The soil of experimental plot was clayey, low in available nitrogen, medium in phosphorus and high in available potash and deficient in zinc and boron. General recommended dose of fertilizer ($50:75:00 \text{ N}_2:\text{P}_2\text{O}_5:\text{K}_2\text{O}$ kg ha^{-1} + 5 t FYM ha^{-1}) was applied to all the treatments at the time of sowing. The foliar sprays were given at 30 and 40 days after sowing in all treatment. The treatments were T_1 - Foliar sprays of 19:19:19 NPK (0.5 %), T_2 - foliar sprays of ZnSO_4 (0.5 %), T_3 - foliar sprays of NAA (50ppm), T_4 - foliar sprays of H_3BO_3 (0.5 %), T_5 - foliar sprays of 19:19:19 NPK (0.5 %) + ZnSO_4 (0.5

Table 1 : Yield and quality of soybean as influenced by different treatment

Treatments	Yield (q ha ⁻¹)		Quality	
	Grain	Straw	Protein content (%)	Oil content (%)
T ₁ 19:19:19 (0.5 %)	21.00 (12.11)	20.10 (5.23)	35.71	18.40
T ₂ ZnSO ₄ (0.5 %)	20.30 (8.38)	19.70 (3.14)	35.44	18.10
T ₃ NAA (50 ppm)	20.70 (10.51)	19.90 (4.18)	35.56	18.20
T ₄ H ₃ BO ₃ (0.5 %)	19.80 (5.71)	19.40 (1.57)	35.41	18.00
T ₅ 19:19:19 (0.5 %) + ZnSO ₄ (0.5 %)	22.00 (17.45)	20.50 (7.32)	37.37	18.77
T ₆ 19:19:19 (0.5 %) + H ₃ BO ₃ (0.5 %)	21.75 (16.12)	20.40 (6.80)	37.11	18.63
T ₇ 19:19:19 (0.5 %) + NAA (50 ppm)	22.30 (19.06)	20.70 (8.37)	37.47	18.87
T ₈ 19:19:19 (0.5 %) + H ₃ BO ₃ (0.5 %) + ZnSO ₄ (0.5 %)	22.70 (21.19)	21.00 (9.94)	38.54	19.14
T ₉ ZnSO ₄ (0.5 %) + H ₃ BO ₃ (0.5 %) + NAA (50 ppm)	21.50 (14.78)	20.30 (4.71)	36.01	18.50
T ₁₀ Only GRDF	18.73	19.10	34.69	17.87
S.E.±	0.27	0.08	0.77	0.27
C.D. (P=0.05)	0.80	0.24	NS	NS
General mean	21.08	20.11	36.33	18.44

Note : (1) GRDF (50:75:00 N₂:P₂O₅:K₂O kg ha⁻¹ + 5 t FYM ha⁻¹) was uniformly applied from T₁ to T₁₀ treatments

(2) Foliar sprays were given at 30 and 40 days after sowing

(3) Figures in parentheses are shows percentage increase in the yield over the GRDF treatment

NS= Non-significant

%), T₆- foliar sprays of 19:19:19 NPK (0.5 %) + H₃BO₃ (0.5 %), T₇-foliar sprays of 19:19:19 (0.5 %) + NAA (50ppm), T₈-foliar sprays of 19:19:19 NPK (0.5 %) + H₃BO₃ (0.5 %) + ZnSO₄ (0.5 %), T₉- foliar sprays of ZnSO₄ (0.5 %) + H₃BO₃ (0.5 %) + NAA (50ppm), T₁₀- only general recommended dose of fertilizer. The net plot size was 3.6 x 3 m and planting distance was 30 x10cm. The yield obtained from each net plot was recorded and converted into hectare by multiplying the hectare factor. The protein content and oil content in soybean grain was estimated by using the Nuclear Magnetic Resonance (NMR) Spectrometer (Ramamurthi *et al.*, 1985) technique (Table 1).

Significantly maximum grain yield (22.70 q ha⁻¹) and straw yield (21.00 q ha⁻¹) was obtained in the treatment GRDF+ foliar sprays of 19:19:19 NPK (0.5 %) + H₃BO₃ (0.5 %) + ZnSO₄ (0.5 %) at 30 and 40 DAS. The lowest mean grain yield (18.73 q ha⁻¹) and straw yield (19.10 q ha⁻¹) was obtained in the treatment only GRDF. The grain and straw yield was significantly influenced due to different treatment. Foliar sprays of NPK fertilizer, micronutrient with growth regulator enhance photosynthesis, metabolic activity, formation of organic constitutes and their translocation from source to sink results in highest grain and straw yield. Similar results were also reported by Kalpana (2001) and Dixit and Elamathi (2007).

Protein and oil content in soybean grain was not significantly influenced by different treatment. The maximum protein content (38.54%) and oil content (19.14%)

was recorded in the treatment GRDF+ foliar sprays of 19:19:19 NPK (0.5 %) + H₃BO₃ (0.5 %) + ZnSO₄ (0.5 %) at 30 and 40 DAS. Heidarian *et al.* (2011) and Vahedi (2011) observed that protein and oil content in soybean is increased due to foliar spray of NPK fertilizer and micronutrient at critical growth stages over control treatment.

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