



Effect of biofertilizers and nitrogen on growth, yield and quality traits in knol khol (*Brassica oleracea* L. var. GONGYLODES)

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ABSTRACT

An experiment was conducted in Randomized Block Design at Vegetable Farm Main Campus Chatha, Jammu during 2006-07 and 2007-08 to study the effect of biofertilizers *Azospirillum* and *Azotobacter* and nitrogen on growth, vegetable yield and quality of Knol-khol cv. KING OF MARKET. *Azospirillum* inoculation significantly increased growth, yield and quality characters over control. The inoculation of *Azotobacter* also recorded better performance. Both the bacterial inoculants responded to all levels of nitrogen with an increase in growth, yield and quality parameters as compared to control. However, better results were obtained by the application of 75% of chemical nitrogen along with both the inoculants, thereby a saving of 25% chemical nitrogen application during both the years of study. However, the application of *Azospirillum* along with 75% chemical nitrogen proved better than *Azotobacter*.

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Key words : Knol khol, Biofertilizers, Nitrogen, *Azospirillum*, *Azotobacter*

The excessive use of chemicals on vegetable crops has reduced the population of beneficial micro-organisms present in the soil especially to control insect pests and to improve the fertility. This necessitated supplying them artificially. Many of such organisms known to fix atmospheric nitrogen thereby cutting down the quantity of nitrogenous fertilizers to be used for raising good crops. Application of *Azospirillum* and *Azotobacter* inoculants in vegetable crops has been of much significance because they not only fix atmospheric nitrogen but also produce growth promoting and antifungal substances (Pandey and Kumar, 1989). Significant improvement in growth, yield and quality of vegetables with respect to bio-fertilizer application has been reported in various crops. The ability of the *Azospirillum* and *Azotobacter* to proliferate in the rhizosphere suggests their ability to improve the nutrient availability to plants and can supplement the expensive inorganic and organic fertilizers (Navale and Wani 2004). However, no work has been done so far on Knol-khol in Jammu region on this aspect. Keeping this in view, the experiment was conducted to study the effect of inoculation of *Azospirillum*, *Azotobacter* and nitrogen individually and their interactions

on Knol-khol crop.

MATERIALS AND METHODS

The trials were conducted during *Rabi* seasons of 2006-07 and 2007-08 at the experimental fields of Division of Vegetable Science and Floriculture SKUAST-Jammu. Soil of the experimental plots was loamy in texture, neutral (7.4) in soil reaction, low in organic carbon (0.14dsm⁻¹), low in available nitrogen (222.13kg/ha) and medium in phosphorous (13.57 kg/ha) and potassium (161.37kg/ha). Bio-fertilizer treatments included B₀ (no bio-fertilizer), B₁ (*Azospirillum*) and B₂ (*Azotobacter*). Nitrogen was applied at four levels N₀ (no nitrogen), N₁ (50% R.D.F), N₂ (75% RDF) and N₃ (100% RDF). These 12 treatments were tested in Randomized Block Design with three replications. The recommended dose of fertilizer included 100:50:50 kg NPK/ha. The full dose of P and K was applied as basal dose before planting while nitrogen dose was applied in 2 equal splits *i.e.* half at the time of planting and half after 20 days of planting. Carrier based inoculants procured from Division of Plant Pathology SKUAST-Jammu were used as seed inoculants (500g/ha), seedling treatment (2kg/ha) and soil treatment (2.5 kg/ha). The