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Response of bio-fertilizer *Azospirillum* on growth and yield of fennel cv. RAJENDRA SAURABH

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ABSTRACT : The Experiment was conducted during 2007-2008 to 2009-2010 at experimental field of the Department of Horticulture, Tirhut College of Agriculture, Dholi, Muzaffarpur (Bihar). Combination of bio-fertilizer *Azospirillum* + inorganic nitrogen + FYM gave the better performance in comparison to alone application of bio-fertilizer *Azospirillum*, inorganic nitrogen, FYM and other combination. The combination treatment as soil application of inorganic N (100%) of RDF + *Azospirillum* @ 15 kg ha^{-1} + FYM – @ 5 t ha^{-1} (T_1) produced the maximum plant height (169.32 cm), number of branches per plant (9.36), number of umbels per plant (65.65), number of umbellets per umbel (49.42), number of grains per umbellets (46.14) and yield per plot (1.18 kg 7.2 m^{-2}) or per hectare (1.63 t ha^{-1}) and increased the yield 96.38 per cent over control followed by treatment (T_2) as soil application of inorganic N (75%) of RDF + *Azospirillum* @ 15 kg ha^{-1} + FYM – 5 t ha^{-1} *i.e.* plant height (156.00 cm), number of branches per plant (8.05), number of umbels (61.71), number of umbellets per umbel (43.72), number of grains per umbel (40.54) and yield per plot (1.04 kg 7.2 m^{-2}) or per hectare (1.45t ha^{-1}) and increased yield (74.69%) over control. The lowest yield (0.83t ha^{-1}) was recorded with control. The maximum net profit Rs.58, 200 ha^{-1} or benefit: cost (Rs.2.50) were calculated with treatment (T_1) inorganic N (100%) RDF + Azospirillum @ 15 kg ha^{-1} + FYM-5 t ha^{-1}.

KEY WORDS : *Azospirillum*, Organic (FYM), Inorganic nitrogen, Fennel, Economics

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Fennel *(Foeniculum Valgare* Mill) is a minor seed spices which belong to family Apiaceae. Fennel is a stout, tap rooted, aromatic herbaceous plant which usually grows to a height of 100-180 cm. The stem is glabrous slender and hollow at maturity with prominent parallel vein. The leaves are pinnately compound with sheathed petiole, partile leaf blade and alternate phyllotaxy. The inflorescence is a compound umbel with substended involucre of bracts and appears terminally on the plant. The plant is diploid and it has chromosome number 22 (2n = 2 x 11). The fennel fruit have peculiar aromatic and pleasant test. The aroma is due to the volatile oil content in seed. The volatile oil contains anethole, fenchone and manute quantity of pinene, comphene, diphentene etc. Fennel can be grown on a variety of soil, however, proper nutritional management is essential, as application of different nutrients was found to influence the growth, yield and quality of garlic (Wange, 1995). Use of organic manure along with inorganic fertilizers has been advocated by several workers. In view of the escalating cost of chemical fertilizers and due to their hazardous effect on soil, soil resources and human health, it is imperative to explore the possibility of supplementing chemical fertilizers with ecofriendly low cost input of microbial orgin like *Azospirillum*, *Azotobactor* and phospho bacteria. The microbial inoculants improve nutrient availability resulting in enhanced growth, yield and quality of vegetable crops, besides reducing the quantum of nitrogen and phosphatic fertilizers as reported by Gaur (1985), Musmade and Konde (1986), Gurubatham *et al.* (1989), Wange (1995), Chattoo *et al.* (1997), Thiiakavathy and Rammaswamy (1999) and Karuthamani *et al.* (1995). Keeping in view their significance present investigation was undertaken to assess the effect of bio-fertilizers *Azospirillum*, organic, and inorganic fertilizer alone and combination with bio-fertilizer *Azospirillum*, organic and inorganic under different level of organic manure and inorganic nitrogen on fennel regarding growth and yield in region of Bihar.