EFFECT OF BIOFERTILIZERS ON *Jatropha curcas* L. UNDER TROPICAL CONDITIONS

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SUMMARY

Jatropha curcas L. is a biofuel plant which substitutes the fossil fuels. A study was conducted to investigate the effects of Jatropha seeds inoculated with Vesicular arbuscular mycorrhizal (VAM) fungi, *Azospirillum, Azotobacter* and Phosphate solubilizing bacteria (PSB) at various combinations. The biofertilizer treated seeds were tested under field conditions and seedlings were uprooted at 30, 60 and 90 days. Combined microbial inoculations resulted in the significant increase of root and shoot length, shoot and root tolerance index, fresh and dry weight of shoot, root and leaves and leaf area of all treated plants compared to control. After 120 days, chlorophyll contents, total soluble sugars, free amino acids and total protein were analyzed and the results indicated that the plants inoculated with *Azospirillum* + *Azotobacter* + PSB +*VAM fungi* showed the significant increase. Morphological and biochemical contents of Jatropha plants were significantly increased by the effect of combined biofertilizers compared to either individual biofertilizer or control. Biofertilizers accelerated the assimilation of nutrients to the plants.

Key words : Jatropha curcas L., VAM fungi, Azospirillum, Azotobacter and Phosphate solubilizing bacteria (PSB).

atropha is a shrub or small tree, and it grows up to 6 m • height with spreading branches and stubby twigs (Dehgan, 1984). It belongs to the family Euphorbiaceae and it grows as a tropical thorn and can be grown in areas of low rainfall and problematic soil. Interspecific hybridization has been attempted between different species of Jatropha with a limited success (Dehgan, 1984 Sujatha and Prabakaran, 1997). Possible uses of Jatropha plant parts, such as leaves are used as anti-inflammatory agents and the latex are believed to have anticancerous properties, which contains the alkaloids such as Jatrophine, Jatrophone, Jatropham and Curcain (Duke and Ayensu, 1985). Bark, fruits, leaf, root and wood have also been reported to contain HCN (Watt and Breyer - Brandwijk 1962). Tannins and dyes are obtained from Jatropha bark. Jatropha seeds have been used as economically important products such as biodiesel, illuminators, edible oil, soap production, other cosmetics, medicinal uses, lubricant, biopesticides, animal feed and organic fertilizers. The seeds have been used in oil, press-cake and biogas production and in controlling breeding in guinea pigs (Makonnen et al., 1997; Staubmann et al., 1997). Whole plant is used for erosion control, living hedge, shelter plant for other crops and it is used in rodant repellent and folk medicinal uses, in the treatment of cancer, antiseptic, cough, diarrhoea, dysentery, fever, gonorrhea, inflammation, jaundice, paralysis, pneumonia, stomach ache, tooth ache, syphilis, tumors, ulcers and yellow fever.

Accepted : May, 2008 Inoculation of *Glomus intraradices*, *G. geosporum*, Azospirillum brasilense and Phosphate solubilizing bacteria combination could be used for the production of healthy and vigorously growing seedlings (Muthukumar et al., 2001). Dual inoculation of AM fungi and PSB might be stimulated the plant growth and better than inoculation with individual organism (Kim et al., 1997). Similar effect also reported for AM fungi, Azospirillum inoculations in some plant species (Pacovsky et al., 1985 and Pacovsky, 1989). No report is available on the interaction between Azospirillum, Azotobacter, Phosphate solubilizing bacteria (PSB) and Vesicular Arbuscular Mycorrhizal (VAM) fungi on the growth and development of Jatropha plants. Inoculation with Azospirillum, Azotobacter, Phosphate solubilizing bacteria (PSB) and Vesicular Arbuscular Mycorrhizal (VAM) fungi could enhance the growth of the Jatropha seedlings in nurseries. Hence the present study was undertaken to evaluate the synergistic effects of indigenous VAM fungi, PSB, Azospirillum and

MATERIALS AND METHODS

Jatropha.

Plant material and Bioinoculants :

Jatropha seeds were collected from the Forest College and Research Institute, TNAU, Mettuppalayam, Tamil Nadu, India. Biofertilizers like *Azospirillum*, Phosphate solubilizing bacteria mixed with carrier based material were collected from biofertilizer production unit, Trichy Division, Tiruchirappalli and *Azotobacter*, vesicular arbuscular mycorrizhae (VAM) fungi mixed with carrier based material were purchased from the Stan's

Azotobacter on the growth and biochemical changes in