

# Influence of rhizobacterial inoculation on the growth parameters of ashwagandha

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Rhizobacteria from different medicinal plants viz., *Withania somnifera*, *Coleus forskohlii* and *Vinca rosea* grown in different parts of Tamil Nadu were isolated and characterized. A pot culture experiment was conducted at the Department of Agricultural Microbiology, Tamil Nadu Agricultural University, Coimbatore. The results revealed that the rhizobacterial inoculation positively influenced the germination, vigour index, shoot and root length, biomass, dry matter production, root and alkaloid yield of ashwagandha. Inoculation of *Azospirillum lipoferum*-AAs-11, *Azotobacter*-AAz-3, *Bacillus*-APb-1 and *Pseudomonas fluorescens*-APs-1 as combined inoculant recorded the maximum growth and yield of ashwagandha.

Key words : Ashwagandha, Growth parameter, Rhizobacteria

## INTRODUCTION

In India, the use of several medicinal plants to cure specific ailments is in vogue from ancient times. The indigenous systems of medicine namely Siddha, Ayurveda and Unani have been in existence for several centuries. The WHO has estimated that over 80 per cent of the world population meets their primary health care needs through traditional medicine (Lambert, 1997). The most important pharmacological use of ashwagandha is as adaptogen with antistress antioxidant, antitumor, anti-inflammatory, mind boosting and has rejuvenating properties (Singh *et al.*, 1990). Ashwagandha is presently cultivated in India under varied agro-climatic regions and soil types without much care on nutritional management. The major lacuna in the cultivation of ashwagandha is non availability of standard agrotechniques to increase the yield and quality. It is obvious that without clear understanding on the cultivation of ashwagandha, the use of various chemicals and inorganics may deteriorate the quality of the products. Novel solutions for plant growth enhancement are required to increase the yield and quality of ashwagandha and to reduce the burden on our resources and environment. The biofertilizers are ecofriendly and low cost technology and their application may play a major role in soil fertility, nutrient transformation, crop sanitation and sustainability. The rhizobiocoenosis is an important biological process that plays a major role in satisfying the nutritional requirement of these crops.

## MATERIALS AND METHODS

A pot culture experiment was conducted at the Department of Agricultural Microbiology, Tamil Nadu Agricultural University, Coimbatore (T.N.) to study the effect of combined inoculation of rhizobacteria on growth, yield and quality of ashwagandha (var. Jawahar 20). The rhizobacterial isolates viz., *Azospirillum lipoferum*-AAs-11, *Azotobacter*-AAz-3, *Bacillus*-APb-1 and *Pseudomonas fluorescens*-APs-1 were prepared as carrier based inoculants as described earlier and used for this study. The pots were filled with potting mixture (soil + sand + FYM) and the rhizobacteria treated seeds were sown at 25 seeds per pot and finally 5 seedlings were maintained. The experiment was conducted in completely Randomized Block Design with three replications.

Biometric observations like plant height, number of primary and lateral branches, leaf area, root length, root diameter, lateral roots, root fresh and dry weight, root yield and biochemical properties like total chlorophyll protein alkaloid content were recorded at 90, 120, 150 and 180 DAS.

## RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following sub heads :

### *Shoot length :*

Shoot length varied from 26.00 to 76.50 cm in various treatments at different growth stages. Among the single