



Influence of bio-fertilizer strains on sugarcane (*Saccharum* spp. hybrid complex) production

H.M. VIRDIA

ABSTRACT

A field experiment was conducted on heavy black soil at Regional Sugarcane Research Station, Navsari Agricultural University, Navsari (Gujarat) during 2003-04 to 2006-07 to evaluate the effect of various strains of *Acetobacter diazotrophicus* and other bio-fertilizers along with 75% of recommended N through fertilizer and the control on the productivity of sugarcane (*Saccharum officinarum* L.). Application of 100 % N of RFD induced the higher growth and yield attributes and yield of sugarcane over no N and 25% lower dose of N. The no nitrogen application treatments recorded lower growth and yield attributes and yield of sugarcane. All bio-fertilizer treatments along with 75% N of RFD remained equally effective. However, *Azotobacter* soil inoculation was more effective than *Acetobacter* strains under study.

KEY WORDS : *Acetobacter*, Bio-fertilizer, *Azotobacter*, Sugarcane

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INTRODUCTION

Sugarcane is the important source of sugar industries and it cultivated on large area in many countries. In India, sugarcane is grown through out the country except Jammu & Kashmir and Himachal Pradesh. In Gujarat sugarcane cultivation covers more than 2.00 lakh ha. Among this intensively it is grown under South Gujarat where large number of co-operative sugar factories are working and have canal irrigation.

Improved sugarcane yield can be attributed to high yielding varieties, use of synthetic fertilizers and better irrigation facilities. However, in recent years there is a growing concern world wide on issues such as reduction in cane production, excess use of irrigation water, excessive use of agrochemicals and how that affects soil fertility, quality of produce and the environment. Wide spread problems such as deterioration of soil fertility have caused concern all over. The idea of organic farming and sustainable agriculture is becoming popular. Biological agents will play an important role in the new environmentally safe strategies.

Sugarcane growers used high amount of fertilizers to their field even though the productivity has declined

due to mismanagement of fertilizer application and poor soil health. There is a need to focus attention on the biological approaches for keeping control over the fast deteriorating situation. This approach includes use of organics and bio-fertilizers to supply plant nutrients to the plants. Bio-fertilizers are best described as micro organisms which add, conserve various nutrients and make available to plant for management of land resources. Bacterial species viz., *Rhizobium*, *Azotobacter*, *Acetobacter*, *Azospirillum*, *Phosphobacterium* etc. is used as bio-fertilizer in various crops. Application of bio fertilizers reducing cost of cultivation, maintaining soil fertility and preserve soil nutrients.

Acetobacter diazotrophicus has been reported effective association for bacterial nitrogen fixation in sugarcane (Solayappan, 1995). This bacterium seems to be best adapted in the sugarcane environment and more efficient than the other existing nitrogen fixers in sugarcane fields. This has high nitrogen fixing efficiency in sugar rich atmosphere and can fix atmospheric nitrogen up to 30% sugar. Various species of these bacterium are available, locally isolated strains require testing for its effectiveness in the sugarcane growing region. Therefore, an experiment was designed to compare locally isolated *Acetobacter diazotrophicus* strains on growth and yield of sugarcane variety CoN-91132 under South Gujarat condition.

Correspondence to:

H.M. VIRDIA, Regional Sugarcane Research Station, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA