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Studies on clonal variation of sugarcane varieties

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SUMMARY

Sugarcane is an important commercial crop, grown primarily for sugar and cultivated throughout the tropics and subtropics on variety of soils. Among the sugarcane diseases, red rot take heavy toll of crop both in terms of yield and juice quality. The scope for developing completely red rot resistant variety becomes further limited. Several somaclonal variants from well established cultivars have been isolated with good yield, high sucrose and resistance to diseases. For this, tissue culture techniques could be used as an additional tool for sugarcane improvements (Heinz *et al.*, 1977; Liu, 1984). For *in vitro* screening of calli of the varieties *viz.* CoC-671, CoC-92061 and Co- 86032 were used against the pathogen. The tissue culture technique as suggested by Jimenez Gonzalez *et al.* (1990) were used. It was found that 3.00 mg 2,4-D/l induced highest percentage of callus (83.90%) with a shortest duration (13.08 days). MS medium containing 2.00 mg BA/l + 0.50 mg NAA/l exhibited highest percentage of shoot regeneration (84.80%) in quickest succession (13.16 days). With respect to growth regulator tried treatment combination of ¼ MS medium – 5 mg NAA/ l+7 per cent sucrose exhibited highest percentage of rooting (84.30%) within a short duration of 6.79 days in all the varieties.

Key words : Sucrose, Sugarcane, Redrot, Regulator, Clonal.

Sugar is the most important product of sugarcane, various byproduct serve as industrial material. It is used for the preparation of compost (Bagasse + Trash), molasses and pressmud. Bagasse is used as fuel in the sugar industry and also raw material in paper industry. The crop is propagated vegetatively through setts and rate of conventional multiplication is very slow. Moreover, pathogens keep on accumulating generation after generation which reduces yield and quality and in due causes there will be varietal decline also (Gosal *et al.*, 1998). About more than 150 diseases of sugarcane have been reported from India (Agnihotri,1983).

From the available reports, it is clear that, the red rot of sugarcane caused by *Colletotrichum falcatum* went is serious and destructive disease and the pathogen affects the crop right from planting to harvest stage. Thus, the effective management of this disease is most important in the present day context for increased sugar production. The sugarcane variety CoC-92061 is having the potential of high sugar recovery and cane yield. As a result, the variety has become very popular and cultivated exclusively in larger area in northern Karnataka. But in recent years the red rot disease caused by *C. falcatum* has assumed economic status and caused severe damage to the extent of about 25-30 per cent loss to Sugar factories. So, the variety is highly susceptible to red rot disease. As a result the variety has to be developed as a resistance through tissue cultural techniques. However, there is a lacuna on the information regarding resistance under *in vitro* condition.

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MATERIALS AND METHODS

The present investigations were conducted during 2002-03 at the "Tissue culture laboratory" of the Karnataka Institute of Applied Agricultural Research (KIAAR), Sameerwadi, Bagalkot, Karnataka.

Plant material:

The setts of three popular sugarcane genotypes *viz.*, CoC-671, CoC-92061 and Co-86032 were collected from Karnataka Institute of Applied Agricultural Research (KIAAR), Sameerwadi, Bagalkot, Karnataka.

Explants:

Young (3 to 4 month old), healthy, immature spindle leaves free from insect pest and diseases were colleted from three varieties (CoC-671, CoC-92061 and CoC-86032) of standing crop raised in KIAAR, Farm and they were used for culturing. They were surface sterilized with 70 per cent ethanol for one minute and thereafter with 0.1 per cent mercuric chloride solution for three minute followed by repeated washing with sterile distilled water. One explant was cultured per test tube and incubated under good fluorescent right intensity (7200^0 k) with photoperiod of 16/8 hours light/dark regime.

Nutrient media:

The nutrient media used in the studies were MS