# Dynamics of Agricultural Biotechnology

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# CONTENTS

**116** BANSAL, RK; WALIA, RK; BHATTI, DS. 1992. **Wood charcoal powder, a carrier of *Paecilomyces lilacinus* spores**. *Nematol. Mediterranea*, 20: 1, 5-7.

The suitability of wood charcoal powder as a carrier of *Paecilomyces lilacinus* for field application was studied in vitro. This carrier in low-density-polyethylene pouches could support up to 1 x 10 6 spores per g material for at least six months. The storage of charcoal packets at constant (28 degree C) / ambient (14-39 degree C) temperature or under aerated/non-aerated conditions did not influence the fungal spore viability.

**117** BERGER, RG; MEYER, S HADRICH; DRAWERT, F. 1990. **High productivity fermentation of volatile flavours using fungal cultures**. *Proceedings of the 11th International Congress of essential oils, fragrances and flavours*. (New Delhi: 11th: 1989: Nov. 12-16)/edited by SC Bhattacharyya, N Sen, KL Sethi. London: Aspect Publishing, p. 127-133.

**118** KELKAR, HS; SHANKAR, V; DESHPANDE, MV. 1990. **Rapid isolation and regeneration of *Sclerotium rolfsii* protoplasts and their potential application for starch hydrolysis**. *Enzyme and Microbial Technology*, 12: 7, 510-514; 18 ref.

A gentle rapid procedure for obtaining a high yield of *S. rolfsii* [*Corticium rolfsii*] protoplasts was developed. Optimum yield was obtained by incubating 50 mg of 24-h-old mycelium with 5 mg NovoZym 234 for 4 h in 1 ml maleic acid-NaOH buffer (0.05 M, pH 5, 30°C) containing 0.6 M KCl. High regeneration frequency (90-95%) of isolated protoplasts was obtained only when sucrose (0.6 M) was used as stabilizer. Isolated protoplasts were entrapped in calcium alginate gel, and the immobilized system was tested for saccharification of various starches. Activities of alpha-amylase, glucoamylase and pullulanase of free and immobilized protoplasts are tabulated against time. In batch operation, the immobilized system retained 57% of its initial activity after 3 cycles at 30° and pH 5.0.

**119** KHAN, TA; HUSAIN, SI. 1991. **In vitro studies on the toxicity of culture filtrates of different fungi on the growth of *Rhizoctonia solani***. *New Agriculturist*, 1: 2, 107-110; 11 ref.

In general, the culture filtrates of the 9 test fungi isolated from the rhizosphere of cowpea plants were inhibitory to the growth of *R. solani*. The reduction in mycelial wt of *R. solani* was directly correlated with the concn of the filtrate. Max. inhibition was obtained with a *Trichoderma viride* filtrate. *R. solani* filtrate did not significantly affect the growth of *R. solani*. *T. viride* and *Paecilomyces lilacinus* filtrates had significantly inhibitory and stimulatory effects, respectively, on the growth of *R. solani*.

**120** RAGHAV, R; SIVARAMAN, H; GOKHALE, DV; RAO, B SEETARAMA. 1989. **Ethanolic fermentation of cane molasses by a highly flocculent yeast**. *Biotechnology Letters*, 11: 10, 739-744; 7 ref.

A study of the comparative kinetics of standard *Saccharomyces uvarum* ATCC 26602 with *S. cerevisiae* Y-10 (an isolate) and a highly flocculent strain of *S. uvarum* in batch mode showed that both the isolate and the strain have more desirable characteristics than the standard strains for ethanol production from cane molasses.

**121** SUREKHA, M; REDDY, SM. 1992. **Effect of carbon and nitrogen sources on the production of penitrem B by *Penicillium aurantiogriseum***. *Folia Microbiologica*, 37: 1, 47-49; 9 ref.

The effect of different carbon and nitrogen sources on the production of penitrem B by P aurantiogriseum was studied. D-Xylose induced max. penitrem B production, while melibiose, glycerol, citric acid and succinic acid were poor substrates. Potassium nitrate, L-asparagine, sodium nitrate, glycine, DL-aspartic acid and L-tryptophan supported good production of penitrem B. Conversely zirconyl nitrate, barium nitrate, aluminium nitrate, acetanilide, 4-aminobenzoic acid, 4-nitrobenzoic acid and 4-nitroaniline were toxic and did not even support growth of the fungus.

## CYANOBACTERIA

**122** BISEN, PS; SHANTHY, S. 1992. **Biochemical characterization of glutamine synthetase from the diazotrophic cyanobacterium, *Anabaena doliolum***. *Current Microbiology*, 25: 2, 69-75.

In cyanobacteria the glutamine synthetase-L-glutamine-2- oxoglutarate aminotransferase (GS-GOGAT) pathway is the major ammonia-assimilating route. The GS of *Anabaena* doliolum was synthesized more under N2-fixing conditions, followed by ammonium, nitrate, and nitrite as nitrogen sources. The activities of both the glutamine synthetase, Mg2+-dependent biosynthetic and Mn2+-dependent gamma-glutamyl transferase were optimum at pH 7. The active site of the enzyme bears sulfhydryl (-SH) groups-, this was confirmed with the -SH group inhibitors, para-chloromercuribenzoate (pCMB) and N-ethylmaleimide (NEM). The biosynthetic and gamma glutamyl transferase activities showed specificity for the divalent cations, Mg2+ and Mn2+, respectively. The other divalent cations Co2+, Cu2+,

and Ni2+ were poor substitutes. This enzyme also required these divalent cations to stabilize its structure and function under extreme conditions such as high and low temperatures and urea denaturation. The glutamate analog L-methionine-D,L- sulfoximine, inactivated the enzyme, whereas the GOGAT inhibitor, azaserine, had no effect on the enzyme activity.

**123** GOYAL, DINESH. 1992. **A simplified method for screening and characterization of plasmid DNA in cyanobacteria**. *Journal of Microbiological Methods*, 15: 1, 7-15; 29 ref.

A simplified method of studying plasmid distribution in cyanobacteria involves direct agarose gel electrophoresis of heat-treated, ethanol-precipitated, plasmid preparations from the cleared lysates without ultracentrifugation. The method is sensitive and can be used to determine the number of different plasmid species and their molecular weights from the agarose gel patterns. The results compare well with those obtained by the CsCl-EtBr equilibrium density centrifugation technique.

**124** TREHAN, K; SINHA, U. 1982. **DNA-mediated transformation in *Nostoc muscorum*, a nitrogen-fixing cyanobacterium**. *Australian Journal of Biological Sciences*, 35: 5, 573-577; 11 ref., 4 tab.

Genetic transformation of an auxotrophic valine-requiring marker and a marker with resistance to p-fluorophenylalanine has been demonstrated in *Nostoc muscorum*. Transformation is primarily mediated by DNA and is insensitive to ribonuclease and proteinase. The kinetics of the frequency of transformation, which is dependent on the concentration of DNA, suggests a saturation phase. Transformants, though devoid of heterocysts, are able to grow in a medium lacking a combined nitrogen source.

**125** VENKATARAMAN, GS. 1985. **Molecular biology and biotechnology of cyanobacterial nitrogen fixation**. *Current Science*, 54: 11, 493-498; 68 ref.

## ALGAE, *SPIRULINA PLATENSIS*

**126** FATMA, T. 1990. **Effect of culture filtrate on growth of *Spirulina platensis***. *Current Science*, 59: 16, 797-798; 3 ref.

Seven levels of Spirulina culture filtrate were added to cell cultures of *S. platensis*. From the plots of absorbance against time it is deduced that the culture filtrate contains extracellular growth-stimulatory factors.

## BACTERIOLOGY

**127** BATISH, VK; GROVER, S; NEELAKANTAN, S. 1992. **Genetic improvement of lactobacilli and their application in food processing**. *Microbiologie, Aliments, Nutrition*, 10: 1, 1-9; 121 ref.

A review of recent developments in the genetic improvement of lactobacilli is presented under the headings: Plasmid biology of lactobacilli; Gene transfer in lactobacilli; Development of cloning vectors; Molecular cloning of *Lactobacillus* genes; and Future prospects for strain improvement. Current and future applications of lactobacilli in dairy & food industries are also discussed.

**128** DAVID, BP; PURUSHOTHAMAN, V; VENKATESAN, RA. 1993. **Comparison of molecular weight estimation techniques: bacterial plasmid DNA**. *Indian Journal of Animal Scinces*, 63: 11, 1146-1151.

**129** DHARMSTHITI, S; KRISHNAPILLAI, V. 1993. **DNA sequence conservation at the gene level in a conserved chromosomal segment in two *Pseudomonas species***. *Journal of Genetics*, 72: 1, 1-14.

**130** GANDHI, DN; NAMBUDRIPAD, VKN. 1981. **Antagonistic effect of cell free culture filtrate and isolation of antibiotic from *Lactobacillus acidophilus***. *Indian Journal of Dairy Science*, 34: 1, 98-101; 11 ref.

Sterilized skim milk was inoculated with *Lactobacillus acidophilus* R and incubated at 39°C for 24 h. The culture was then centrifuged and the supernatant Seitz filtered. Antibacterial activity was extracted from the filtrate with methanol and acetone followed by Sephadex G-25 gel filtration. The extract inhibited growth of *Escherichia coli*, *Micrococcus flavus*, *Staphylococcus aureus* and *Salmonella weltevreden*. The antibacterial activity was stable at low pH and resistant to heating at 100°C for 20 min; it can be stored at -25°C for 6 months without loss of activity.

**131** GARG, SK; MITAL, BK. 1992. **Genetics of antagonistic action and drug resistance in *Lactobacillus acidophilus***. *World Journal of Microbiology and Biotechnology*, 8: 2, 92-97; 70 ref.

*Lactobacillus acidophilus* has been recommended as a dietary adjunct because of its antagonistic action toward intestinal pathogens, and anti-carcinogenic and hypocholesterolaemic activities. Many *L. acidophilus* strains harbour plasmids and such strains generally produce bacteriocin(s). Resistance to antibiotics has also been shown to be linked with plasmids. Gene transfer and