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CONTENTS

Will. ex Brid. *Australian Journal of Botany*, 38: 2, 177-184; 20 ref.

The protonema of *B. atrovirens* remains bud-free under ordinary cultural conditions on Nitsch's basal medium. Exogenously applied auxins (IAA, 2,4-D, NAA and beta-naphthoxyacetic acid) induced buds on protonemata whereas antiauxins (maleic hydrazide and TIBA) failed to do so. Morphology of the gametophores depended upon the concn of auxin in the medium. In general, normal leafy gametophores resulted at lower concn, and at higher levels of auxins morphology was adversely affected. Simultaneous application of benzyladenine and 2,4-D advanced bud formation as well as increasing bud number, but had no significant effect on the improvement of shoot morphology.

77 HAAPALA, O. 1984. **Chromosome structure and DNA sequence organization**. *Nucleus*, 27:1/2, 1-6.

In this survey, the occurrence of chromomeric loops and their interloop spacers is related to known data on DNA sequences, using results from a wide range of plant and animal species. It is suggested that these substructures have sequence-specific dynamic functions and have been conserved during evolution for this reason.

78 NILUFER H KARIM; ZAPATA, FJ. 1988. **Effect of stress on plant regeneration from anther culture**. *Proc. of the 1st Philippines Nat. Symp. on Tissue Culture in Agri. and For.* (UPLB: 1988: May 26-28).

79 PATANKAR, S; JOSHI, CP; RANADE, SA; BHAVE, M; RANJEKAR, PK. 1985. **Interphase nuclear structure in plants: role of nuclear DNA content and highly repeated DNA sequences in chromatin condensation**. *Proc. of the Indian Academy of Sciences, Plant Sciences*, 94: 4/6, 539-551; 58 ref.

The proportion of condensed chromatin in 23 species (mainly crop plants), determined by HCl-Giemsa banding and planimetry, varied from 14 to 77%. The amounts in picograms of different classes of DNA in each species were estimated; quantity of condensed chromatin was most highly correlated with amount of highly repeated sequences. This suggested that highly repeated sequences could be important in governing species-specific chromatin condensation in plants. The amount of DNA packaged per unit length of chromatin was also a determinant of interphase nuclear structure.

80 ROY, SK; ISLAM, MS; SEN, J. 1993. **Clonal propagation of *Elaeocarpus robustus* through in vitro culture**. *Inter. Plant Tissue Culture Conference*. (Dhaka Univ., Dept. of Botany: Dec. 19-21).

81 SEENI, S. 1990. **Micropropagation of some rare plants at the Tropical Botanic Garden and Research Institute, Trivandrum, India**. *Botanic Gardens Micropropagation News*, 1: 2, 16-18; 3 ref.

Methods and media are described which were used for tissue-culturing the orchids *Vanda coerulea* and *Renanthera imschootiana*, the medicinal species *Adhatoda beddomei*, *Commiphora mukul*, *Holostemma ada-kodien*, *Kaempferia galanga* and *Strychnos colubrina*, and the insectivorous species *Nepenthes khasiana*. Regenerated plants have so far been obtained with *Vanda*, *Adhatoda* and *Kaempferia*. Root tip squashes showed that there were no changes in chromosome number in the regenerated orchid plants although the systems used involved adventitious organogenesis. The medicinal plants appeared to have more specific media requirements than the orchids.

FUNGI

Aaspergillus

82 BALASUBRAMANIAN, A;BALASUBRAMANYA, RH; GITA, N. 1974. **Effect of benlate on the growth and radioactive (14 C) glucose assimilation by *Aspergillus carneus***. *Curr. Sci.* 43:18, 580-581.

83 BHATNAGAR, RK; AHMAD, S; MUKERJI, KG; VENKITASUBRAMANIAN, TA. 1986. **Nitrogen metabolism in *Aspergillus parasiticus* NRRL 3240 and *A. flavus* NRRL 3537 in relation to aflatoxin production**. *Journal of Applied Bacteriology*, 60: 3, 203-211; 38 ref.

The relationship between nitrogen assimilation, metabolism and aflatoxin formation was investigated using a toxigenic *A. parasiticus* isolate and a non-toxigenic *A. flavus* isolate. Ammonia from the medium was mainly assimilated via NADP-requiring glutamate dehydrogenase. During growth NAD-requiring glutamate dehydrogenase followed an inverse pattern of activity with respect to NADP glutamate dehydrogenase. Alpha-ketoglutarate, the product of NAD glutamate dehydrogenase, stimulated acetate incorporation into aflatoxins. Glutamine synthetase and ornithine transcarbamylase, both utilizing glutamate as substrate, were assayed under different growth conditions. An important regulatory role for glutamine synthetase is suggested. The metabolic route of asparagine utilization was also investigated. Both the known pathways, glutamate oxaloacetate transaminase and glutamate pyruvate transaminase, operated simultaneously.

84 BHATNAGAR, RK; AHMAD, SA; MUKERJI, KG; SUBRAMANIAN, TAV. 1986. **Pyridine nucleotides and redox state regulation of aflatoxin biosynthesis in *Aspergillus parasiticus* NRRL 3240**. *Journal of Applied Bacteriology*, 60: 2, 135-141; 21 ref.

Aflatoxin formation was highest in *A. parasiticus* cultures grown in sucrose-low salts medium followed by asparagine- and zinc-deficient media. The lipid content of the cultures followed an inverse pattern. The levels of oxidized nucleotides decreased with age under all culture conditions employed. Concn of NADPH peaked before the onset of aflatoxin biosynthesis. For each medium used, the estimated catabolite reduction charge was constant at all stages of growth whereas the anabolic reduction charge varied. A direct relationship between the level of extracellular ammonium ions and anabolic reduction charge was established. A high anabolic reduction charge was associated with increased lipid biosynthesis rather than aflatoxin biosynthesis.

85 BILGRAMI, KS; SINHA, KK; SINHA, AK. 1992. **Inhibition of aflatoxin production and growth of *Aspergillus flavus* by eugenol and onion and garlic extracts**. *Indian Journal of Medical Research, Section B, Biomedical Research other than Infectious Diseases*, 96: June, 171-175; 18 ref.

The efficacy of extracts of onion and garlic as well as eugenol against aflatoxin production by *A. flavus* was tested in liquid SMKY medium and in maize grains. Maximum inhibition of mycelial growth occurred with garlic extract (61.94%), whereas inhibition of aflatoxin production was highest (60.44%) with onion extract. *Eugenol* was most suitable for inhibiting aflatoxin production (60.35%) on maize grains.

86 KUMAR, S; PRASAD, G. 1992. **Efficacy of medicinal plant (*Andrographis paniculata*) extract on aflatoxin production and growth of *Aspergillus flavus***. *Letters in Applied Microbiology*, 15: 4, 131-132; 6 ref.

The efficacies of 4 different concn (3, 5, 8 and 10 mg/ml) of an aqueous extract of *Andrographis peniculata* were tested on growth and aflatoxin production by *Aspergillus flavus* in liquid SMKY medium. Maximum inhibition of aflatoxin production and growth of *A. flavus* was at 10 mg/ml (78.6% and 75.1% inhibition, respectively).

87 MALINI, R; MUKERJI, KG; VENKITASUBRAMANIAN, TA. 1984. **Effect of aluminium and nickel on aflatoxin production by *Aspergillus flavus***. *Folia Microbiologica*, 29: 2, 104-107; 24 ref.

Inclusion of aluminium in sucrose-asparagine-salts medium established an inverse relationship between aflatoxin and lipid production by *A. flavus*. At lower conc. aluminium stimulated aflatoxin production, whereas at higher conc. it stimulated total lipid production. Nickel at higher conc. resulted in an increase in total aflatoxin production. However, no definite correlation was observed between total aflatoxin and total lipid production when nickel was included in the medium.

88 PANDEY, A; RADHAKRISHNAN, S. 1992. **Packed-bed column bioreactor for production of enzyme**. *Enzyme and Microbial Tech.*, 14:6, 486-488; 23 ref.

Wheat bran inoculated with *A. niger* (RRL isolate) was allowed to ferment at 30°C for 48 h in a bioreactor consisting of a horizontal glass cylindrical column of volume 930 ml with length:diameter ratio 3:1. Highest glucoamylase activity was obtained when the space loading was 0.35 g/cm3 and aeration 100 ml/min.

89 SHARMA, A; DESAI, SR PADWAL; NADKARNI, GB. 1985. **Possible implications of reciprocity between ethylene and aflatoxin biogenesis in *Aspergillus flavus* and *Aspergillus parasiticus***. *Applied and Environmental Microbiology*, 49: 1, 79-82; 13 ref.

A. flavus and *A. parasiticus* produced ethylene during early growth. The onset of toxin biosynthesis was marked by the absence of ethylene evolution. An ethylene-generatingcompound,2-chloroethylphosphonic acid, inhibited aflatoxin biosynthesis in vivo. It is suggested that this reciprocal relationship between the production of aflatoxin and ethylene may indicate the involvement of the latter in the regulation of aflatoxin biogenesis.

90 SRINIVAS, MRS; PADMANABHAN, S; LONSANE, BK. 1993. **Growth kinetics, alpha-galactosidase biosynthesis, and concomitant production of invertase by *Aspergillus niger* NCIM 839 in solid state fermentation system**. *Chemie, Mikrobiologie, Technologie Der Lebensmittel*, 15: 1-2, 41-46.

91 TIWARI, RP; MITTAL, V; SINGH, G; BHALLA, TC; SAINI, SS; VADEHRA, DV. 1986. **Effect of fatty acids on aflatoxin production by *Aspergillus parasiticus***. *Folia Microbiologica*, 31: 2, 120-123; 19 ref., 2 tab.

The effect of saturated and unsaturated fatty acids on aflatoxin production was studied in a synthetic medium. Aflatoxin production decreased (10-75%) in the presence of lauric acid and palmitic acid but the addition of

behenic and sebacic acid stimulated aflatoxin production by 125-541%. Linolenic and linoleic acids effected aflatoxin production and mycelium growth. A 34-fold increase in aflatoxin production was observed with 50 mM linoleic acid. An inverse relationship between aflatoxin production and mycelium mass, irrespective of the fatty acid, was observed.

92 TIWARI, RP; MITTAL, V; BHALLA, TC; SAINI, SS; SINGH, G; VADEHRA, DV. 1986. **Effect of metal ions on aflatoxin production by *Aspergillus parasiticus***. *Folia Microbiologica*, 31: 2, 124-128; 19 ref., 4 tab.

Iron, copper and cadmium salts decreased aflatoxin production to varying extents. The decrease observed with molybdenum, magnesium and manganese was dependent on salt concn. Cobalt and Zn salts stimulated aflatoxin production at all concn studied. Maximum increase in aflatoxin production was observed with zinc sulphate and sodium molybdate (655% and 519%). A negative correlation between aflatoxin production and vegetative growth of fungus was observed.

93 VENKITASUBRAMANIAN, TA; BHATNAGAR, RK; SARASWATHY, S; RAO, VB; SIVASWAMI, J. 1982. **Intermediary metabolism of *Aspergillus parasiticus* in relation to aflatoxin biosynthesis.** *Overproduction of microbial products*/edited by V Krumphanzl, B Sikyta, Z Vanek. London, UK: Academic Press, p. 153-165; 10 ref.

Bacillus

94 AFZAL, N; FIRDOUS, T; SHAH, FH. 1983. **Screening of isolated microbes for cellulase production**. *Pakistan Journal of Scientific and Industrial Research*, 26: 6, 379-380; 9 ref.

Cellulase production by organisms (*Bacillus*, *Penicillium*, *Streptomyces*, *Chaetomium* and *Trichoderma spp.*) propagated on agricultural wastes such as bagasse pith, wheat straw, rice straw and cotton seed hulls varied according to the organism and the substrate.

95 NILEGAONKAR, S; BHOSALE, SB; KSHIRSAGAR, DC; KAPADI, AH. 1992. **Production of 2,3-butanediol from glucose by *Bacillus licheniformis***. *World Jrn. of Microb. and Biotechn.*, 8: 4, 378-381.

Culture of *B. licheniformis* was optimized in relation to pH (4-7), temp. (20-55°C), incubation period (1-4 days) and concentrations (% w/v) of glucose (0.5-10), peptone (0-2) and beef extract (0-2). Optima both for biomass DW and (sharper) for 2,3-butanediol production were: 72 h at 37°, pH 6.0, with 2% glucose, 1% peptone and 1% beef extract. Butanediol yield (theoretical maximum 50%) was 43.5% on initial glucose or 47% on glucose consumed - much higher than those reported for Klebsiella oxytoca (37%) and *B. polymyxa* (24%).

96 SHAH, NK; NEHETE, PN; SHAH, VD; KOTHARI, RM. 1989. **Isolation of a stable and high yielding alpha amylase mutant of *Bacillus subtilis***. *J. Biotechnology*, 11: 67-74.

Curvularia

97 BANERJEE, UC; VOHRA, RM. 1991. **Production of laccase by *Curvularia sp.*** *Folia Microbiologica*, 4, 36: 343-346.

98 NITHARWAL, PD; GOUR, HN; AGARWAL, S. 1991. **Effects of different factors on the production of cellulase by *Curvularia lunata***. *Folia Microbiologica*, 36: 4, 357-361.

Dermatophytes

99 KASINATHAN, C; KHULLER, GK. 1983. **Biosynthesis of major phospholipids of *Microsporum gypseum***. *Biochimica et Biophysica Acta*, 752: 2, 187-190; 26 ref., 2 tab.

The biosynthesis of major phospholipids of *M. gypseum* was examined by identification of different enzymes and incorporation of specific radioactively labelled lipid substrates. The presence of choline kinase and phosphatidylserine synthetase was demonstrated in this fungus, whereas ethanolamine kinase was absent. Phosphatidylcholine is largely synthesized through the cytidine pathway, whereas phosphatidylethanolamine appears to be synthesized by either phosphatidylserine decarboxylase or ethanolamine-exchange reactions.

100 SINHA, MANOJ; RAJAM, MV. 1992. **Control of zoopathogenic fungi in vitro by polyamine biosynthesis inhibitors**. *Indian Journal of Experimental Biology*, 30: 6, 538-540; 16 ref.

The effect of inhibitors of polyamine (PA) biosynthesis, alpha-difluoromethylornithine (DFMO), methylglyoxal bis (guanylhydrazone) (MGBG) and bis (cyclohexylammonium) sulfate (BCHA) on mycelial growth of 3 clinically important fungi (*Trichophyton mentagrophytes*, *Microsporum gypseum* and *Aspergillus flavus*) was examined in vitro. All inhibitors at concn 1-50 mM

produced inhibition of mycelial growth in all fungi tested in a dose-dependent manner. MGBG was the most effective inhibitor and *T. mentagrophytes* was the most sensitive fungus to all inhibitors followed by *M. gypseum* and *A. flavus*. It is suggested that control of fungal diseases in animals and humans with specific inhibitors of PA biosynthesis is possible.

101 SRIKANTHA, T; RAO, RAMANANDA G. 1984. **A method for isolation of protoplasts from dermatophytes**. *Journal of General Microbiology*, 130: 6, 1503-1506; 9 ref.

A method is described for isolation of protoplasts from dermatophytes, including *Microsporum canis*, *M. gypseum*, *Trichophyton mentagrophytes*, *T. rubrum*, *T. violaceum* and *Epidermophyton floccosum*, using Novozym 234. A simple technique of flotation in MgSO4 is used to separate protoplasts from the incubation mixture. Electron miroscopic studies confirmed the absence of cell wall material on these protoplasts. The recovery of DNA from protoplasts was higher than from mycelia.

Mycorrhizas

102 GOPINATHAN, S; RAMAN, N. 1992. **Indole 3-acetic acid production by ectomycorrhizal fungi**. *Indian J. of Experim. Biology*, 30: 2, 142-143; 18 ref.

Differences in the levels of IAA synthesis from L-tryptophan and in biomass production were observed among 8 mycorrhizal fungi. A positive correlation was recorded between IAA level and mycelial growth. IAA synthesis and mycelial biomass were max. at 30 d of incubation. *Pisolithus tinctorius* and *Laccaria laccata* produced the highest amounts of IAA.

103 SINGH, SN. 1990. **Biotechnology for mass production of VA mycorrhiza inocula.** *Current trends in mycorrhizal research: Proceedings of the National Conference on Mycorrhiza*. (Hisar: 1990: Feb 14-16)/edited by BL Jalali and H Chand. BAIF Development Research Foundation, Pune, India. p. 80-86.

Following a discussion of the objectives of the BAIF Development Research Foundation in developing and applying appropriate technologies for increasing agricultural productivity, the results are presented with *Glomus spp.* on various crops grown in different substrates and the processing of the resulting vesicular arbuscular mycorrhizal inoculum for distribution.

104 SULLIA, SB. 1991. **Mycorrhizal biotechnology for improvement of crop plants**. *Fungi and biotechnology: Recent advances*/edited by HC Dube. New Delhi: Today & Tomorrow's Printers and Publishers, p. 113-118; 28 ref.

Attempts to improve crop plants by artificial inoculation with specific VAM fungi to increase phosphate uptake, nitrogen uptake and disease resistance are reviewed. Problems in growing VAM in culture media in the lab. and the production of inoculum in soil or in suitable host plants are considered. This paper was presented at a symposium on Fungi and biotechnology held in Bhavnagar, India in Oct. 1989.

Rhodotorula

105 GHOSE, TK; CHOTANI, GK; GHOSH, P; SAHAI, V. 1987. **Bioreactor operating strategies for microbial lipids from carbohydrates**. *Annals of the New York Academy of Sciences*, 506, 459-467; 7 ref.

Preliminary tests on 3 yeast strains showed that, for lipid production, *Rhodotorula glutinis* was more efficient than *Rhodosporodium torulloides* [*Rhodosporidium toruloides*] or *Lipomyces lipoferus*. This species was cultured in molasses-based media in 5-, 30- and 150-litre fermenters. In batch tests, the sugars in the medium at concentrations 80-120 g/litre were completely consumed in 50 h; increasing the sugars concentration to 140 g/litre gave maximum lipid productivity but incomplete conversion of fermentable sugars. Continuous fermentation of a substrate containing 100 g sugars/litre at dilution rate 0.024 h-1 resulted in high productivity of lipid (0.49 g litre-1 h-1) but only 81.2% conversion. Fed-batch fermentation with exponentially increasing rate of feed addition led to lower lipid productivity (0.25 g litre-1 h-1) but 98% conversion. The choice of technique depends on economic conditions.

106 PRAPULLA, SG; JACOB, Z; CHAND, N; RAJALAKSHMI, D; KARANTH, NG. 1992. **Maximization of lipid production by *Rhodotorula gracilis* CFR-1 using response surface methodology**. *Biotechnology and Bioengineering*, 40: 8, 965-970.

This study attempts to maximize the lipid production using response surface methodology. Levels of nitrogen, carbon, and inoculum were chosen as factors. Results indicated that inoculum level was very important in lipid production, followed by carbon and nitrogen levels. At higher levels of inoculum, the strain was found to be more tolerant to higher concentrations of sugar, and significantly increased lipid production was noticed. Through the fitted models of second order, as per RSM, carbon at 10.24%, nitrogen at 0.37 g/L, and inoculum at 20% level resulted in max. biosynthesis of lipids.

Rizhobium

107 BALASUBRAMANYA, RH; PATIL, RB. 1980. **A simple and economic medium for mass production of rhizobium and azotobacter**. *Indian J. Explt. Biol.* 18: 10, 1204-5.

108 SARDESHPANDE, JS; BALASUBRAMANYA, RH; KULKARNI, JH; BAGYARAJ, DJ. 1977. **Protozoa in relation to *Rhizobium* S-12 and *Azotobacter chroococcum* in soil**. *Pl. Soil*, 47: 75-80.

109 SHETTY, KS; BALASUBRAMANYA, RH; PATIL, RB. 1975. **Nitrogen addition to the soil/plant system through legume/rhizobium symbiosis**. *Current Research*, 5:?,?.

Trichoderma

110 SANDHU, DK; KALRA, MK. 1985. **Effect of cultural conditions on production of cellulases in *Trichoderma longibrachiatum***. *Transactions of the British Mycological Society*, 84: 2, 251-258; 29 ref.

The production of cellulase components which include FP activity, CM-ase and beta-glucosidase on carboxymethyl cellulose (CMC) was investigated. The relative distribution of cell free and cell associated enzymes varied with the age of the culture. The opt. pH of the medium for synthesis of enzymes in extracellular, cytosol and cell debris associated states was between 4.5 and 5 with opt. temp. being 27°C. Maximum production of cellulolytic activities in the culture filtrate was achieved with medium supplemented with 1% lactose.

111 SANDHU, DK; BAWA, S. 1992. **Improvement of cellulose activity in *Trichoderma***. *Applied Biochemistry and Biotechnology*, 34/35, 175-183.

112 SANDHU, DK; BAWA, SONYA; BAGGA, PS. 1989. **Optimization of protoplast production from *Trichoderma harzianum***. *Indian Journal of Experimental Biology*, 27: 2, 180-181; 8 ref.

High yields of protoplasts were obtained when 10 mg of 16-h-old *T. harzianum* mycelium was treated with Novozym 234 (3mg/ml) for 18h (28°C) in potassium phosphate buffer (pH 6) and 0.6 M KCl as a stabilizer.

Venturia inaequalis

113 REVATHI, R; LALITHAKUMARI, D. 1993. **Isolation and characterization of mitochondrial genome of *Venturia inaequalis* (wild and Baycor-in-vitro-resistant mutants)**. *Zeitschrift Fuer Pflanzenkrankheiten Und Pflanzenschutz*, 100: 5, 482-487.

A method for the isolation and analysis of mtDNA of wild and various Baycor-resistant mutants of *Venturia inaequalis* was described. Restriction digestion of mtDNA exhibited typical banding patterns in wild and mutants. The restriction profile of the wild strain was quite different from that of the mutant strains and the molecular mass also differed. The approximate molecular mass of the mtDNA of the wild strain was 34.8 kb and that of its mutants was 43.9 kb (adapted) and 42.6 kb (EMS).

114 REVATHI, R; LALITHAKUMARI, D. 1993. ***Venturia inaequalis*: a novel method for protoplast isolation and regeneration**. *Zeitschrift Fuer Pflanzenkrankheiten Und Pflanzenschutz*, 100: 2, 211-219.

A procedure for efficient isolation and cell wall regeneration of protoplasts from *Venturia inaequalis* is described. Protoplasts were obtained from mycelia using digestive enzyme mixture containing pectinase, cellulase, beta-glucuronidase, chitinase and novozym 234 with different osmotic stabilizers. Conditions for protoplast release including mycelial age, enzyme combination and choice of osmotic stabilizer have been standardized and conditions for high regeneration frequency of protoplasts have also been determined.

Other fungi

115 ANNAMALAI, P; LALITHAKUMARI, D. 1991. **Isolation and regeneration of protoplasts from mycelium of *Drechslera oryzae***. *Zeitschrift fur Pflanzenkrankheiten und Pflanzenschutz*, 98: 2, 197-204; 20 ref.

A method is described for isolation of viable protoplasts from the mycelium of *D. oryzae* (*Cochliobolus miyabeanus*) and their regeneration. A combination of enzymes consisting of cellulase, pectinase [polygalacturonase], beta-glucuronidase and chitinase was effective in releasing protoplasts. Optimization of factors affecting protoplast release showed that the opt. mycelial age was 36 h, the opt. incubation time was 3 h and that sucrose-mannitol (0.6 mol/litre) was the best osmotic stabilizer both for protoplast release and for regeneration. Protoplast yield was up to 2 X 105/g mycelium, and the regeneration rate was >47%. Regenerating protoplasts produced hyphal tubes directly.

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+,