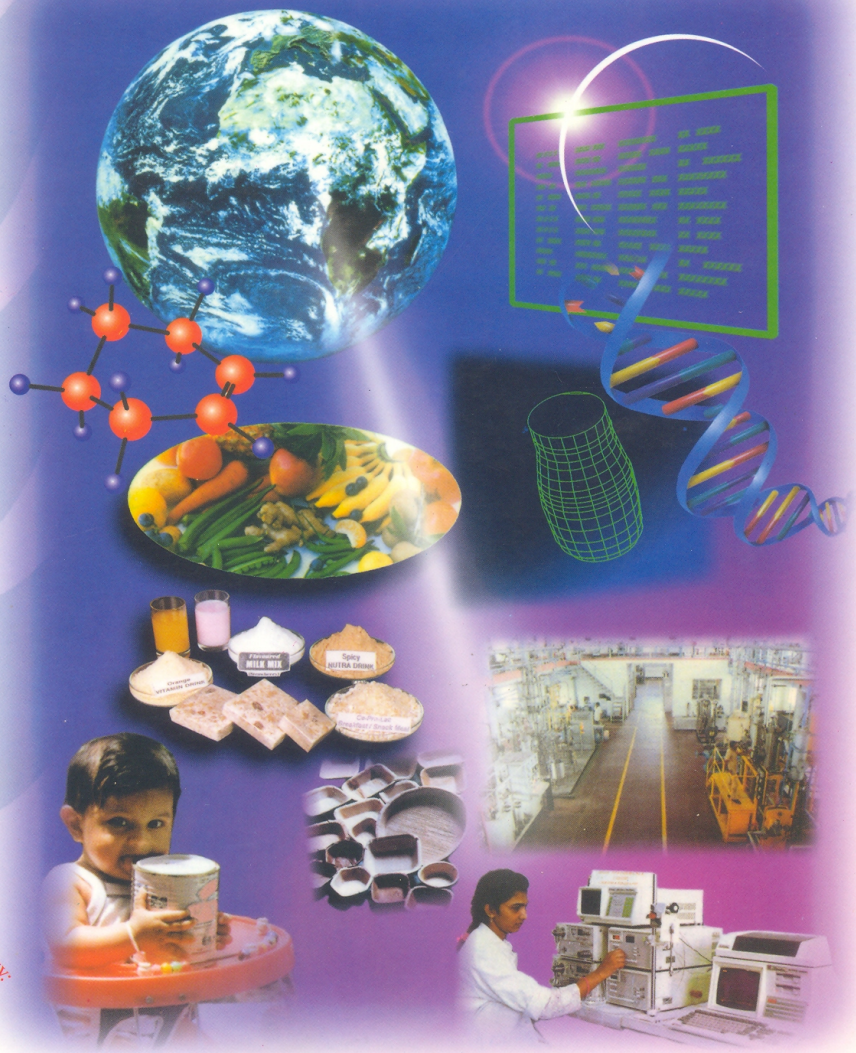
IFCON 98

4th INTERNATIONAL FOOD CONVENTION

23-27 NOVEMBER 1998 MYSORE INDIA

POSTER ABSTRACTS



Trends in Food Science & Technology: Global Perspective

ORGANISED BY:

ASSOCIATION OF FOOD SCIENTISTS & TECHNOLOGISTS (INDIA)

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DEFENCE FOOD RESEARCH LABORATORY, MYSORE.

FOURTH INTERNATIONAL FOOD CONVENTION

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ABSTRACTS OF POSTER PAPERS

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CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE, MYSORE,

and

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and

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FOOD MICROBIOLOGY

F-01 CO-DEGRADATION OF 3-CHLOROBENZOATE AND PHENOL BY DEFINED MIXED BACTERIAL CULTURES

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Phenolic and chloroaromatic compounds are detected as contaminants of ground water. Microbial treatment of effluents containing halo and non-halo aromatics often pose problems due to biochemical incompatibility. Defined mixed cultures of *Pseudomonas aeruginosa 3mT* (a potent degrader of 3-chlorobenzoate, 3-CBA) and *Pseudomonas* sp. SOPC-5 (a degrader of phenol through meta-pathway) *or Pseudomonas* sp. SPC-2 (degrader of phenol through ortho-pathway) showed the ability to degrade 3-CBA and phenol, simultaneously. More than 95% of 2mM 3-CBA was degraded within 24h by the former (3mT + SPC-2) while 75% was degraded by the latter. Equimolar concentrations of 1, 2, 4 and 6 mM of 3-CBA and phenol were effectively degraded within 48, 48, 72 and 96h, respectively by the co-culture of strain 3mT and SPC-2, with the release of stoichiometric amounts of Cl-. However, when the concentrations of 3-CBA and phenol were 2:4, 2:8 and 2:16 mM, 0.44, 1.0 and 1.3 mM, respectively of the former still remained undegraded even after 72h and vice-versa when phenol 3-CBA ratios were 2:4 and 2:8, residual phenol of 0.3 and 1.2 mM was observed whereas the compounds in higher concentrations were completely degraded. Change of inoculum ratios of 1:1, 1:2 and 2:1 of the two strains did not show any adverse effect.

F-02 IMPROVED DEGRADATION OF MONONITROPHENOLS BY AN ACCLIMATISED BACTERIAL CONSORTIUM

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Nitroaromatic compounds used as pesticides and in explosives are found to pollute drinking water. A bacterial mixed culture capable of utilizing o-, m- or p-nitrophenol (o-/m-/ p-NP) as a sole source of energy was isolated by enrichment of contaminated soil sample with a view to develop treatment technologies. The degradation ability of the bacterial consortium improved on acclimatation by successive passages through media containing o-, m- and /or p-NP. The acclimatised consortium consisted of 9 distinct bacterial strains belonging to *Pseudomonas and Sphingomonas*. Up to 210 mg/L of m- and p-NPs were mineralized by the consortia acclimatised, with m- and p-NPs within 168 and 144h, respectively. The consortium acclimatised with o-NP, however, could degrade only low concentrations of o-NP (10mg/ L), while the consortium induced with either m- and p-NPs or mixtures of all 3 isomers could degrade 50-100 mg/L of o-NP within 72 h. The degradation rates of MNP isomers were in the order: p->m->o-NP. p-Cresol was the best inducer of the catabolic pathways of all the 3 isomers of MNP, followed by phenol, besides m- and p-NPs. o-NP, o- and m-cresols and acetate were poor inducers. Mesophilic temperatures (20 to 30°C) and near neutral pH (6.0 to 8.0) were most favourable for the degradation of MNPS. Degradation of m- and p-NP occurred in mineral medium without nitrogen source, as well as in sterile tap water indicating that nitrogen in the compounds is used as nitrogen source.

F-03 IMPROVED MINERALIZATION OF LINDANE BY A MICROBIAL CONSORTIUM ON ACCLIMATATION

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Lindane (gamma-hexachlorocyclohexane) is the most extensively used organochlorine pesticide in India. Being recalcitrant, the residues of this compound accumulate in the environment and enter the food chain, ultimately reaching human body and causing health hazards. A microbial consortium that can utilize lindane as the sole carbon and energy, source was isolated by a novel two stage enrichment technique. The culture thus obtained could degrade 10 and 25 ppm of lindane within 7-8 and 9-10 days. respectively with the release of about 60-65% Cl^-. Cl^- release of 88 and 53% from 10 ppm lindane were observed under shaking and stationary conditions, respectively, after 14 days. The consortium also exhibited the ability to degrade alpha-HCH. On acclimatation by repeated passage through mineral medium containing increasing concentrations of lindane, the rate of degradation improved significantly and could mineralize 25, 50 and 100 ppm of lindane within 24, 36 and 48h, respectively, with the release of 100% Cl^-. Mesophilic temperature (25-35° C), near neutral pH (6.0-7.5) and aerated conditions were most favourable for the degradation of lindane. The acclimatised consortium contained 9 bacterial strains belonging to *Pseudomonas* group and a fungus, *Fusarium* sp. All these strains could mineralize lindane individually, but only up to 10 ppm.