Research Achievements (2007-2009)

282 wild mushroom collections have been identified upto generic level. A new species of Phaeomarasmius sp. has been identified which has a smooth stipe and pileus .

Five Hygrophoraceae members of Hygrophorus and Hygrocybe have been identified namely H.sordidus, H.leucophaeus, H.russula, H.cuspidatus and H.recurvatus.

Agrocybe sp.semiorbicularis, A. chaxingua, A.erebia, A.aegerita and a new unknown sp. of Agrocybe have been identified using traditional taxonomic and molecular methods.

Genomic DNA was isolated from 40 strains of Pleurotus spp. collected from AICMIP Centres and purified. RAPD data showed wide variations in the DNA profiles amongst different species.

Twenty three wild Pleurotusspp. were cultivated on wheat straw and sixteen species showed successful fructification.

Pleurotus sp. strain P-64 gave highest B.E. of 97 and 108% on wheat and paddy straw. Further two strains were high yielding for winter cultivation.

Five wild Pleurotuswere used for enzyme estimation mainly ligninolytic enzymes. Laccase, Manganese peroxidase and aryl alcohol oxidase were the main ligninolytic enzymes.

One wild collection of Agaricus spp. was domesticated and its DNA analysis was performed.

Two strains/hybrids of A.bisporus CM-12 and CM-15 were identified as high mushroom yielder.

Molecular variation and genetic identities were studied among 40 germ plasm strains of Agaricususing RAPD technique and by sequence analysis of 5.8S rRNA gene alongwith ITS regions. Strains ARP-230 and ARP-231 were identified as A. bitorquis.

ITS sequences of 31 strains obtained and the alignment showed interesting polymorphism. RAPD analysis revealed wide genetic variation amongst wild strains of A.bisporus.

Multiple sequence alignments of ITS regions showed two groups of strains in Pleurotus spp., first represented by P.sajor-caju and P.citrninopileatus carrying characteristic 10 bp deletion in ITS2 region, and other group consisting of P.florida and P.flabellatus species.

Under the yield evaluation trial of 20 C.indica strains for mushroom yield and quality four high yielding strains of milky mushroom (Calocybe indica) namely; OE-334, OE-343, OE-345 and OE-348 with 82.1, 64.5, 74.3 and 61.2% BE, respectively were identified.

Molecular characterization of 19 Calocybe indica strains revealed genetic variation with 8 RAPD primers.

An efficient method has been developed to extract lentinan from fruit bodies of Lentinula edodes (shiitake).

Restriction enzyme Alu-I could differentiate wild Flammulina spp. strains with F.velutipes, while no other restriction enzymes could differentiate both the strains.

The paddy straw spawn gave better performance than wheat straw spawn with respect to lower incidence of green mould in mushroom beds and higher yield in Volvariella volvacea. The addition of exact quantity of water and less thickness in tunnel helped in lower incidence of Coprinus in mushroom beds.

One strain each obtained from Bhubaneshwar and Thailand and 2 SSIs of parent strain OE-55 have been recorded to be distinct from other V.volvacea strains.

Cotton waste and cotton ginning mill wastes were identified as the superior substrate for paddy straw mushroom cultivation.

Strains OE-274 and BBH-1 of paddy straw mushroom performed exceedingly well on paddy straw + cotton ginning mill wastes.

The fruit bodies harvested from cotton waste were having highest level of protein, potassium and calcium in comparison to fruit bodies harvested from other substrates.

OE-12 and OE-1222 strains of paddy straw mushroom were observed to be highly susceptible to phorids and sciarids

Further improvement in cultivation technology of Ganoderma lucidum is in progress. Two mushroom growers have shown keen interest in cultivation of Ganoderma lucidum and one has already started pilot scale production.

Effect of different methods of substrate treatments on the productivity of Calocybe indica have been studied. Pasteurization proved to be the best method for substrate treatment for the cultivation of C.indica(milky mushroom)

Macrolepiota procera was successfully cultivated on synthetic short method compost.

Gibberellic acid, IBA and kinetin proved to be the best growth hormones for enhancing the mycelial growth of Agrocybe aegerita, Flammulina velutipes and Lentinula edodes respectively.

White button mushroom Compost was successfully prepared, omitting total indoor method (in phase-II tunnel), omitting phase-I in bunker, which was inoculated with Scylatidium thermophilum and Humicola insolens.

Indoor composting technique using hot process has been perfected.

Out of the large numbers of thermophilic fungi isolated, 3 strains of S.thermophilum and two strains of H.insolens could be confirmed based on molecular characterization. Further, 11 bacteria and 2 actinomycetes have also been isolated from compost samples.

Five thermophilic bacteria viz; Bacillus licheniformis, Bacillus cereus, Bacillus coagulans, Listeria monocytogenes and Paenibacillus polymyxa were isolated from A.bisporuscompost.

Highest cellulase activity was recorded in two of the compost microflora namely Sporotrichum thermophile followed by Scytalidium thermophilum.

Compost substrates mixed with Humicola insolens produced best compost in 10 days time.

Survey of different farms in HP, Punjab and Haryana revealed the widespread incidence of wet bubble, yellow mould, Sclerotium, brown plaster mould and ink caps. Sciarids, phorids and mites were common in most of the farms.

Detailed physiological studies of Sporendonema perpurescence and M.procerahave been conducted.

Studies on persistence of carbendazim in different mushrooms and its persistence after processing was studied.

Molecular characterization of V.fungicola, Papulasporaand 14 isolates of bacteria have been completed.

DNA fingerprinting of eight isolates of Dactylium and seven isolates of Mycogone was completed.

18 Bti. isolates have been tested against sciarids

Neem cake as basal ingredients @ 5.0% w/w was recorded to support faster mycelial colonization in compost along with low incidence of competitor moulds.

Studies on persistence of malathion and decamethrin in button mushroom revealed that the residues of malathion varied from 0.32-0.79ppm and decamethrin from 0.26-0.61ppm. Washing or boiling of fruit bodies resulted in reduction of residue level, boiling was most effective.

Molecular characterization of 15 isolates of Cladobotryum revealed the presence of only four species viz; C.aurantius, C.dendroides, C.mycophilum and C.asterophorumin India

Mushroom stipe cutting machine was fabricated at DMR workshop to trim the mushroom stipe.

Diffusion channel method was found to be the best method of storage of prolong the shelf life of button mushroom up to 12 days under refrigerated conditions.

Evaluating the role of pH, temperature and buffers of dyes declourization showed that pH 8.0, temperature of 170C and phosphate buffer supported highest dyes decolorization.

The presence of Nitrogen and Carbon source in liquid broth and agitated growth conditions stimulate the dyes decolourization by oyster mushroom mycelium.

Evaluation of recomposted SMS as manure in different amounts on vegetative growth and yield of tomato, brnjal and ginger was done. The use of aerobically recomposted SMS @ 30 tonnes/ha supported superior plant growth and yield in tomato and plant growth in brinjal. Further, mixing of aerobically recomposted SMS + Chemcial fertilizers enhanced yield and yield attributes of wheat in comparison to other treatments.

Twenty one training programmes on mushroom cultivation technology were

organized.

Organized Mushroom Mela on 10th September every year. Participated in various exhibitions. Provided advisory services to farmers and mushroom growers.

Scientists of the Directorate participated in live Phone-in programmes of

Doordarshan, Shimla to deliver talks on various aspects of mushroom cultivation.