SUMMARY

Aspergillus umbrosus Bainier and Sartory is one of the unique species among the Aspergilli. From its morphology it is evident that in its conidial apparatus much abnormalities of structural development and differentiation exist. In this respect it has a great resemblance to "Cladosarum", a well known mutant of A. amstelodami.

The organism is characterized by a very slow growth, scanty sporulation, never producing conidial chains, and secretion of a pigmented exudate in its medium of growth. The present isolate was obtained from the spermosphere of chilli seeds. It could be isolated from the environment on potato dextrose agar medium. During laboratory isolations this fungus had exhibited good antagonism against certain contaminants in its culture plates.

Because of its peculiar morphology, stressed growth, and strong antagonism, it was selected for detailed physiological investigations in this work.

The results of cultural studies made with nutritional amendments have conclusively defined the best culture medium for the growth, sporulation, and elaboration of the antagonistic principle. The constitution of the defined culture medium is:

- D-mannitol 30.0 g
- KNO₃ 15.0 g
- L-arginine 5.0 g
- MgSO₄·7H₂O 0.25 g
- KH₂PO₄ 5.0 g
- FeCl₃ Trace
- Distilled water 1000 ml
In respect of other environmental conditions it was found that *A. umbrosus* possessed good tolerance to acidic pH with the range being pH 3.5 - 5.5. It was functional only at temperatures of 26-30°C, and was not tolerant for temperatures beyond 35°C, effects of shaking, vitamins, plant growth hormones, and trace elements were adverse for the organism.

Studies of its nutritional physiology have suggested that it preferred to utilize the carbon source other than glucose via pentose phosphate pathway. Glucose of the medium was metabolized via EMP. It was not able to assimilate amino acid as sole source of N which showed that it lacked specific transport system for the amino acids. However, the growth promoting effects of the amino acids, L-arginine and L-aspartic acid in combination of the nitrate-nitrogen positively suggested for a synergistic action of these amino acids upon utilization of the nitrate nitrogen. Proper scientific effects need to be investigated for this. The culture and some secondary metabolites of *A. umbrosus* were antagonistic or antibiotic for some fungi and gram-positive bacteria. Production of the antibiotic principle was accompanied with that of the dark brown pigmented exudate. In UV-scans, the spectrophotometric analysis of the *A. umbrosus* antibiotic compounds showed resemblance with cephalosporin, but differed very much from penicillin.

*A. umbrosus* is thus a useful fungus from the considerations of its peculiar morphology and biological potentials.