Summary
SUMMARY

ISOLATION:

1) Totally fourteen species of *Aspergillus* were recovered from seeds of cereals, oil seeds, pulses and medicinal plants.

2) Blotter method supported more than agar plate method for isolation of maximum number of *Aspergilli*.

3) The quality and quantity of the *Aspergilli* were found to be variable with different crops and also varieties of the same crop. However, *A. niger* and *A. flavus* were found to be common irrespective of the above fact.

4) For the isolation of different species of *Aspergillus* the minimum, optimum and maximum pH values were found to be 3.5, 6.5 and 8.5 respectively.

5) Seeds plated at 10°C and at 40°C allowed minimum incidence of *Aspergilli*.

6) Among different disordered seeds, discoloured seeds yielded maximum species of *Aspergillus* in majority of crops.

7) *Aspergilli* do not indicate their prominent association with early age of the seeds in field but they increased gradually with the maturity of the seeds.
8) The seeds stored in tin boxes and polythene bags favoured multiplication of *Aspergillus* more than the seeds stored in gunny bags.

9) Use of thiram, Vitavax and neem seed oil were found to be best chemicals to control for the growth of *Aspergillus*.

10) Regarding the effect of seed extracts of different crops on growth, in case of *A. flavus*, *A. niger*, oil seeds supported poorly for growth and sporulation as compared to cereals and pulses. Similarly, among cereals only oat and among pulses lentil and winged bean seed extracts allowed poor growth of *A. niger* and *A. flavus*.

**PATHOGENICITY:**

11) While noting pathogenic nature of fourteen *Aspergillus* species against seeds of groundnut it was seen that all the species of *Aspergillus* except *A. sydowi*, *A. nidulans* and *A. chevalieri* with more or less degree caused seed rotting browning, necrosis, root rot blight and stunting in the plumule.

12) Among different varieties of groundnut, jowar and blackgram, *A. flavus* caused seed rotting in six varieties but not in two varieties of jowar. Similarly, there was no seed rotting in blackgram var. Sindkheda.
13) Percent inhibition of seed germination was found to be variable with varieties of groundnut, jowar and blackgram.

14) Infested seeds with *Aspergillus* species when plated on agar showed maximum damage while, at the same time they remain healthy in the soil. Some species of *Aspergillus* caused seed rotting in soil but not on blotter. Post germination seedling rot was found to be more severe on blotter and agar plates than on soil.

**BIODETERIORATION:**

15) Loss in seed weight due to different species of *Aspergillus* was found to be variable with the crops. Most of the species cause maximum loss in seed weight in case of blackgram, bajra and groundnut and while, it was less in neem seeds.

16) It was interesting to note that all the species of *Aspergillus* caused increase in ash content of infested seeds as compared to the control.

17) Utilization of protein from infested seeds was found to be significant due to all the species. However, this was very poor in case of neem seeds.

18) All the six species of *Aspergillus* showed ability to degrade fat contents of infested seeds.
19) Starch degradation ability was found to be variable among the species of *Aspergillus*. It was more in case of *A. flavus*, *A. niger* and *A. ornatus* and extremely poor in *A. sulphureus*.

**ENZYMES:**

20) All the fourteen species of *Aspergillus* produced amylase, all except *A. ornatus* produced lipase, all except *A. sydowi*, *A. nidulans*, *A. chevaleri* produced protease while only *A. flavus*, *A. niger*, *A. fumigatus* *A. terreus*, *A. versicolor* produced cellulases and only *A. flavus*, *A. niger* and *A. fumigatus* produced pectinase either adaptively or constitutively.

21) Regarding the effect of seed extracts on enzyme production sesame and groundnut proved to be superior for lipase production in both the species. Similarly, seed extracts of pulses proved inferior for protease production. Extracts of cereal seeds supported amylase production in *A. flavus* but not in *A. niger*.

22) Among nitrogen sources, Calcium nitrate, casein hydrolysate, peptone and amino acids, serine and cystine were found to be stimulatory for the production of enzymes.

23) Respiratory inhibitors, among fungicides thiram and vitavax proved inhibitory for enzyme production in *A. flavus* and *A. niger* but at the same time antibio-
tics at 100 ppm concentration did not show promising inhibition for enzyme production in both the fungi.

24) Regarding the influence of physical factors on enzyme production, pH 5.5 to 6.5, temp. 25 to 30°C and incubation period 6–8 days were found to be optimum conditions.

**PHYTOTOXINS**

25) Effect of culture filtrates on seed germination of different crops indicated that few species inhibited seed germination. While, other did not show any effect on seed germination.

26) Regarding the effect of culture filtrates on seed germination in different varieties, there was variation in the degree of inhibition with varieties in case of groundnut and blackgram.

27) The culture filtrates of some *Aspergillus* species produced either watersoaked lesions, chlorosis or necrosis in detached leaf surfaces of *Medicago sativa*.

28) Culture filtrates of some species caused, chlorosis, tip drying and stem necrosis in shoot cutting while, culture filtrates of *A. niger*, *A. sulphureus* and *A. ruber* caused wilting in the shoots of *Medicago sativa*. 
AFLATOXINS:

29) Totally 14 species of *Aspergilli* when screened for aflatoxin production only *A. flavus*, *A. fumigatus*, *A. terreus*, *A. ruber*, *A. versicolor* and *A. nidulans* showed positive tests.

30) Groundnut seeds were found to be best substrate for aflatoxin production than blackgram and jowar seeds.

31) Aflatoxin production was found both in liquid medium as well as on infested seeds.

32) Aflatoxin production was found to be suppressed in the presence of other fungal species of *Cladosporium*, *Chaetomium*, *Trichoderma*, *Fusarium* and a bacterium.

33) Thirteen isolates of *A. flavus* isolated from different crop seeds showed variations in their degree of aflatoxin production grown on seeds of different crops.

34) There was no aflatoxin production on 10th day of incubation but it was detected on 14th day and which increased with increase in the incubation period.

35) 25–30°C range of temperature was found to be favourable for aflatoxin production in *A. flavus*. 