SUMMARY

1. A systematic screening of 15 soil samples collected from different parts of West Bengal (India) and 12 samples of rotten fruits such as oranges, pears, guavas, apples and bananas, has resulted in the isolation of 60 fungal cultures showing different pectolytic activities. Amongst these 60 fungal cultures only 2 strains are able to produce the pectolytic enzymes in considerable amount. During studies on the production of pectinases in 2 different media by the 2 selected isolates, a fungal culture (A_{45}) has been finally selected as the most potent organism.

The fungal culture (A_{45}) has been identified as strain of Aspergillus niger JU.

2. The optimum cultural conditions for the production of the pectinases by the organism were pH 4.5, period of incubation-7 days, temperature - $30^{o}C$ and volume of inoculum - 0.5 ml suspension containing 5×10^{3} spore per 30 ml medium. The shake flask process is superior to stationary culture process in giving higher yield of the enzymes in a shorter period of time indicating that adequate aeration is essential for optimal yield of the enzymes.

3. Studies on the effect of carbon sources on the production of pectolytic enzymes by A. niger JU indicate that

pectin at a level of 4 percent gives maximal yield of the enzymes.

Investigations on the effect of nitrogen sources on the production of pectinases indicate that the organism A. niger JU utilizes both the inorganic and organic nitrogen sources for growth and enzyme production. Among inorganic nitrogen sources ammonium nitrate gives the optimal yield on the 7th day while the maximal yield of the enzymes is obtained with peptone as the nitrogen source on the 6th day of fermentation. Organic nitrogen sources are, however, superior to inorganic nitrogen sources in giving maximal yield of the enzymes.

The level of pectolytic enzymes in the fermentation broth reaches the maximum value when C/N ratio of the medium is 10.

4. During the studies on mineral requirements of the strain A. niger JU for the production of pectinases it has been observed that the salts K_2HPO_4, $MgSO_4.7H_2O$, KCl and Na_2SO_4 and $CaCl_2.2H_2O$ are required in concentrations of 0.20%, 0.025%, 0.05%, 0,05% and 0.022% respectively while trace elements like Fe, Zn, Mo and Cu are required in amounts (µg/ml) of 1.0, 0.8, 4.0 and 1.0 respectively. The optimum concentrations of inorganic salts for growth of the organism and enzyme production are different.

5. Investigations on the effect of some growth factors and metabolic inhibitors on the production of pectinases indicate that yeast extract in 0.75% concentration has got stimulatory effect on both the enzyme production and cell synthesis while methylene blue in the level of 0.025 mM concentration strongly activates the synthesis of pectinases. The suitable medium selected as a result of the present study consists of : Pectin - 4%, peptone - 1.5%, yeast extract - 0.75%, K_2HPO_4 - 0.2%, $MgSO_4.7H_2O$ - 0.025%, KCl - 0.05%, Na_2SO_4 - 0.05%, $CaCl_2.2H_2O$ - 0.022%, $FeSO_4,7H_2O$ - 0.0005%, $ZnSO_4.7H_2O$ - 0.0004%, $Na_2MoO_4.2H_2O$ - 0.001%, $CuSO_4.5H_2O$ - 0.0004% and Methylene blue - 0.025 mM (pH 4.5). The medium yields 230 units of pectinases per ml.

6. Studies on the metabolic changes during the fermentative production of pectinases in a selected medium by A. niger JU show that the rates of production of pectinases, utilization of galacturonic acid (free and combined) and different forms of nitrogen, acid production and cellular growth are greatly accelerated between the period of 48-144 hrs. The rapid growth of cells during this period may account for enhanced utilization of pectin and peptone from the medium.