SUMMARY

The microorganisms are endowed with a capacity to biosynthesis quite a large number of enzymes and other metabolites. A majority of the fungi possessed inherent capacity for elaboration of amino acid metabolizing enzymes constitutively. Twenty two isolates of Aspergillus and Penicillium molds were screened for production of L-arginase enzyme. Only two species i.e., Penicillium citrinum and P. spinulosum, exhibited potential for L-arginase production. The isolate P. citrinum, because of its better ability, was taken for further studies in this respect.
Cultural studies have shown that production of L-arginase by *P. citrinum*, though constitutive in character, was induced quite significantly by the substrate L-arginine, invariably. A w/v concentration of 0.5% of the L-arginine as a nutrient in the growth medium produced the best effect upon the quantitative production of this inducible enzyme.

The enzyme has specific activity of 3680 IU/mg on 15 fold purification with an over all recovery of 50% when purified by affinity chromatography. The pure enzyme preparation gave a single band profile on electrophoresis that confirmed its homogeneity.

This enzyme has been biochemically characterized in the following respects.

1. Molecular weight of 62,000 Da was obtained after Gel Filtration Chromatography.

2. The enzyme appeared to be a dimer with sub-unit molecular weight 31,000 Da obtained by SDS Polyacrylamide Gel electrophoresis.

3. The enzyme is specific for L-arginine as the substrate for its catalytic activity with Km of 9.1x10^{-3} M.

4. Temperature and pH optima for enzyme activity ranged
between 35-45°C and pH 4-9, respectively. However, pH 7.0 and temperature of 40°C were the best for its maximum activity.

5. L-arginine analogs such as, L-homoarginine, L-canavanine and L-lysine inhibit the enzyme competitively.

6. The L-arginase required Mn(II) as a cofactor for its activity, and besides Mn(II), only Fe(II) could enhance its activity any further. In this respect Cu(II) and Mg(II) acted as the strong inhibitors of enzyme activity in comparison to Zn(II) and Co(II) which were also inhibitory in effect.

7. The purified enzyme was able to check proliferation of the mouse myelomas (SP2/0 Ag. 14 and P3X. Ag8 . 653) and Chang Liver (Human) cell lines in vitro. The controlling effect was dependent upon the dose of enzyme applied, better effect was obtained in 100 IU/2 ml dose against mouse myelomas and 50 IU/2 ml dose against Chang liver cell line. The effect of the enzyme in retarding the cell proliferation was rather indirect as the enzyme brought about depletion in the amounts of L-arginine in the growth medium. It was a sufficiently strong evidence in favour of the hypothesis that relates with the amino...
acid depletion enzyme therapy as a possible approach in treating certain cancers.

On the strength of the data obtained during the course of these studies, it is worthwhile to examine this enzyme for its effect in in vivo state.