cytokinins undergo sequestration and fluctuate during the course of leaf, fruit growth. The accumulation of cytokinin glucoside in *Picea* leaves during growing season may be converted to free base forms of zeatin and zeatin riboside when active growth is resumed[11]. It is of interest to note that the unidentified cytokinins of guava fruit[12] undergo such phenomenon and thus it is tempting to investigate the seasonal changes in cytokinin glucosides during fruit growth in guava.

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LEVELS OF ACID AND ALKALINE PHOSPHATASES IN DIFFERENT ORGANS OF UNINFECTED AND INFECTED *CHANNA PUNCTATUS*, FOLLOWING STARVATION.

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THE fish survive starvation effects by readjustment of their metabolic machinery and utilization of internal source of energy (metabolites). Attempts have been made in the past to study the different metabolites[1–4] during the starvation of fish, but relatively little work has been done on the role of enzymes. The present study includes an evaluation of the levels of acid and alkaline phosphatases in the different organs of uninfected and infected *Channa punctatus* following starvation.

C. punctatus, (81) procured from local market during March–April, were maintained in the laboratory under starvation for 35 days, changing the tap water of aquaria daily.

The fish were sacrificed after 0, 7, 15, 21, 28 and 35 days of starvation and the liver, gill, kidney and spleen of the uninfected, and the parasitized fish (infected with *E. heterostomum*), were preserved at 0°C in 0.25 M sucrose solution; 5% homogenate of liver and gill and 2% homogenate of kidney and spleen were used. All homogenates were centrifuged at 3000 rpm for 10 min and the supernatants were used as enzyme source. Activities of acid and alkaline phosphatases were determined by standard methods[5]. The results were statistically analysed using *t* test.

The levels of acid and alkaline phosphatase activities in different organs of starved uninfected and infected *C. punctatus* have been given in figures 1 and 2.

In the uninfected fish, acid phosphatase activity increase in liver, kidney, gill and spleen following starvation; this increase was statistically significant in all stages of sacrifice in all the tissues except in liver and gill on the 15th day; the levels of significance are different in all the four organs. Alkaline phosphatase activity, on the other hand, is significantly higher in gill alone on the 15th, 21st and 28th days of starvation.

In infected fish acid phosphatase activity increased, following starvation; in liver, gill and kidney, this increase was found statistically significant in the liver (in all stages), kidney (in all stages except on 28th day) and gill (on the 15th and 21st days). Alkaline phos-

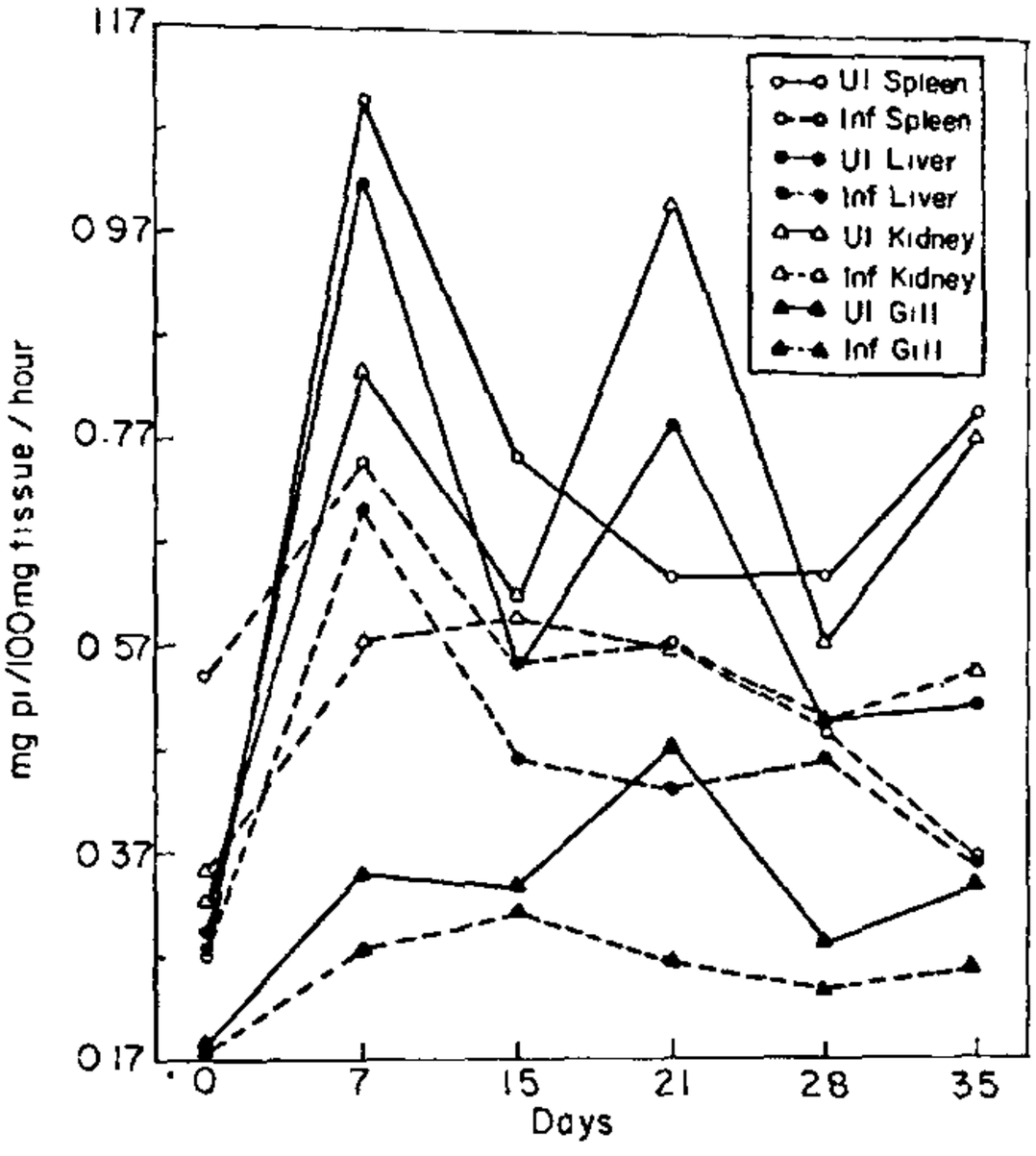

Figure 1. Levels of acid phosphotase in normal and parasitized starved *Channa punctatus*. UI: Uninfected, Inf: Infected.

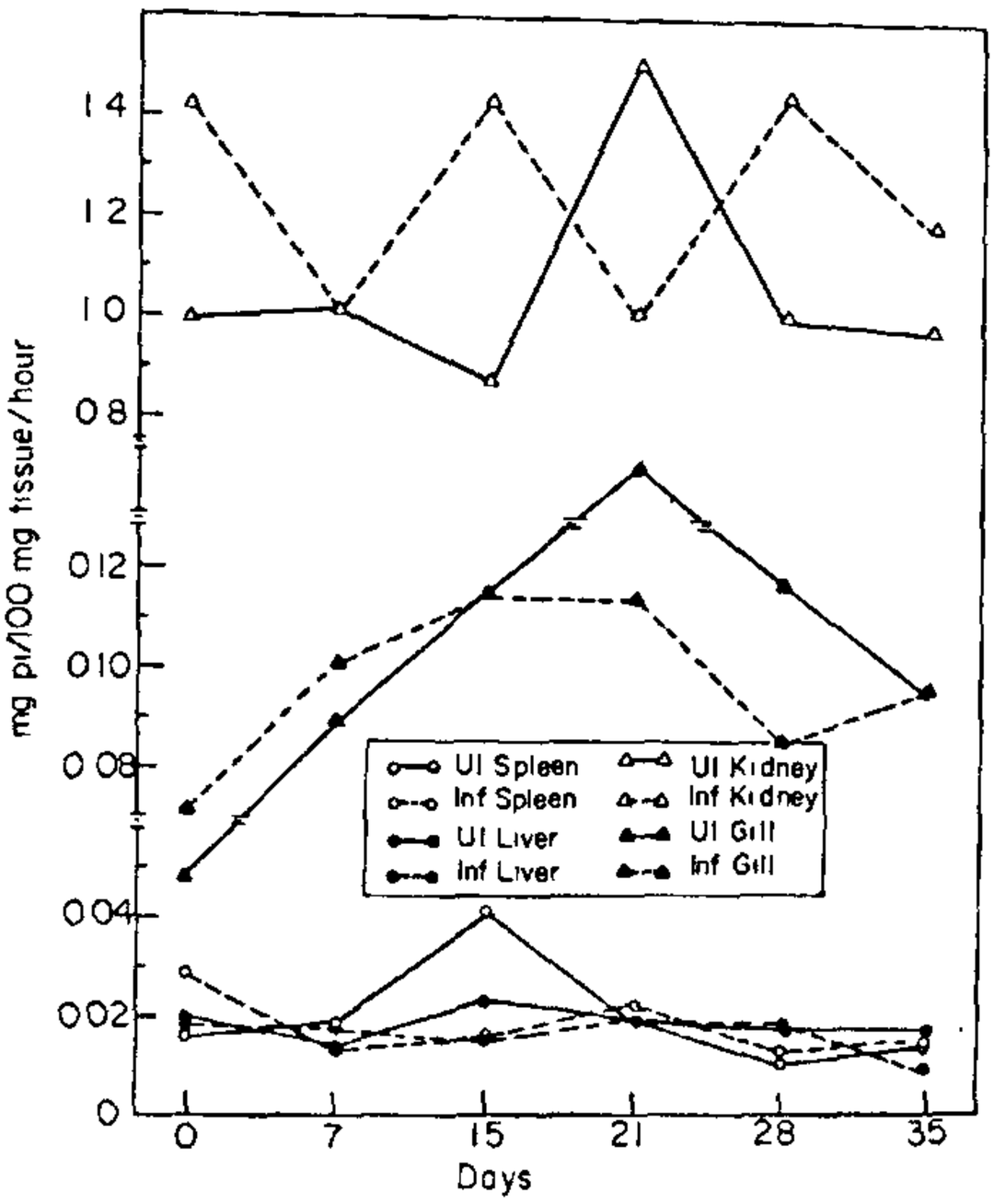

Figure 2. Level of alkaline phosphatase in normal and parasitised starved *Channa punctatus*. UI: Uninfected, Inf: Infected.

phatase significantly increased following starvation, only in gill on 21st day.

Increase in the levels of acid and alkaline phosphatases in the different organs have been more marked in the uninfected than in the infected starved fish.

Acid phosphatase is a lysosomal enzyme[6]. Lysosomal enzymes being associated with degradative processes, their higher activities are often correlated with greater turnover of molecules[7]. Increased activity of acid phosphatase in liver, kidney, gill and spleen of fishes during starvation is correlated with the increased catabolic activity, more so, in uninfected starved fishes (figure 1).

The sudden increase in acid phosphatase activity (figure 1) at 7th day of starvation in both uninfected and infected fish suggesting a metabolic readjustment so as to be able to endure a prolonged period of starvation. Further, the rise in activity of alkaline phosphatase in gill alone of both uninfected and infected fish (figure 2) suggests an increased active uptake of ions through gills during starvation[8].

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