CHAPTER – VI

SUMMARY AND CONCLUSION
The present study was designed to evaluate the nutritive value of *Alocasia indica* and its effect in growth and malnutrition. The experiment was conducted in three different phases.

**FIRST PHASE:**

**Nutrient analysis:**

The nutrient composition in terms of moisture, dry matter, organic matter, total ash, crude fibre, crude protein, nitrogen free extract, crude fat, total carbohydrate, energy value, mineral content and oxalic acid content were determined in the present investigation.

I. The percentage of moisture content, dry matter and organic matter in different parts of *Alocasia indica* viz.-roots, stem and leaves was found to be 86.64%, 94.96%, 84.06%; 13.36%, 5.04%, 15.94%, and 89.76, 91.94%, 94.66% respectively.

II. The percentage of total ash and crude fibre in different parts of *Alocasia indica*, viz roots, stem and leaves was found to be 10.18%, 8.06%, 5.34% and 10.38%, 20.22%, 10.82% respectively.

III. The crude protein content of *Alocasia indica* and its different parts was 11.02% in roots, 8.66% in stem and 6.52% in leaves, which is comparable with *Colocasia esculenta*.

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IV. Considerable amount of minerals like calcium, phosphorous, iron and iodine was found to be present in root, stem and leaves of *Alocasia indica* which were 0.79%, 1.68%, and 1.26% Calcium; 0.66%, 0.33% and 0.47%. Phosphorous; 0.06%, 0.07% and 0.3%, Iron; 6.37%, 3.42% and 2.92% Iodine respectively.

V. The crude fat of *Alocasia indica* was extracted by Soxhlet extractions using petroleum ether as solvents. The crude fat content was found to be 1.12% in roots, 0.11% in stem and 0.082% in leaves of alocasia indica.

VI. The total carbohydrate in *Alocasia indica* was calculated and found to be 78% in roots, 81.86% in stem and 87.88% in leaves.

VII. The energy value of *Alocasia indica* was determined by using Bomb Calorimeter and was found to be 3698 kcal, 3170 kcal and 3470 kcal per kilogram in roots, stem and leaves respectively.

VIII. *Alocasia indica* contains oxalic acid which was found to be 1.22%, 2.88%, and 3.7% in roots, stem and leaves respectively.

SECOND PHASE:

Use of *Alocasia indica* root powder in mice diet to evaluate growth performance:
I. Twenty one days old, 18 albino mice were selected from a group of 34 animals which were divided into three groups of six animals in each group on the basis of similar body weight. The animals were conditioned for one week prior to the experiment and were reared in cages individually with feeders and water.

II. Three iso-nitrogenous and iso-caloric rations were prepared such as - Control(C); Experimental- I (E1) and Experimental -2(E2). The Control (C) ration was prepared by using feed ingredients like maize powder, wheat bran, fish meal, soya bean meal and broken rice. E1 ration was prepared by using 10 percent broken rice and 10 percent _Alocasia indica_ powder, E2 ration was prepared by using 20 percent _Alocasia indica_ powder. The percentages of other feeds were also changed. These diets were fed to three groups of mice respectively.

III. The concentrate rations were analysed to find out its bio-chemical constituents namely-dry matter, organic matter, crude protein, crude fibre, ether extract, nitrogen free extract and total ash.

IV. The average feed intake by mice in different groups i.e. C, E1, E2 were 19.8, 11.9 and 18.4 gm/day respectively. There were significant differences between Control, Experimental-I and Experimental-I and Experimental-2 groups. But no significant differences were seen between Control and Experiment-2 groups.
V. The average total body weight gain was 12.98, 11.16, and 13.24 in C, E1, E2 groups respectively. All the groups showed almost similar gain in body weight.

VI. The overall feed conversion efficiency in C, E1 and E2 groups were 2.50, 2.46 and 1.94 respectively. There were no significant differences among the groups.

VII. The overall protein efficiency ratio in C, E1 and E2 groups were found to be 4.9, 5.4, and 6.9 respectively. Significant differences were observed among control group but no significant differences were observed among E1 and E2 groups.

VIII. The digestibility co-efficient of dry matter, organic, crude protein, ether extract, crude fibre and nitrogen free extract were determined among different groups. Significant differences were observed in digestibility of dry matter, organic matter and crude protein among all groups.

IX. The bio-chemical constituents of blood glucose and total serum protein of different groups were determined. Significant differences were observed among the groups in the initial values but not in the post feeding values.

X. Histopathological examinations were carried out at the end of the growth study. Gross abnormalities were not observed in kidney tubules among E1 group, but in E2 group, the kidney tubules showed diffused degeneration...
with occasional thickening of the granular capsules. However E₁ and E₂ groups showed mild degree of fatty changes. The sections of the stomach in the E₂ group show hyperplasia of the glandular epithelium. Mild fatty changes in both the experimental groups might be due to defective lipid metabolism or due to the presence of tannin in their diet.

THIRD PHASE:

Supplementation of *Alocasia indica* powder with other ingredients in human malnourished subjects to evaluate growth and development.

I. Supplementary feeding mixture was prepared by using *Alocasia indica* powder, skim milk powder and sugar and given to two groups of subjects namely Control (C) and Experimental (E).

II. Sensory evaluation was carried out for two products, where same ingredients with varying quantities were used. Significant differences were observed in product-I in taste and overall acceptability.

III. The incidence of clinical signs such as rough hair, paleness of the eyes, watering eyes, dental caries and phrynoderma decreased considerably in the experimental group after supplementation, in comparison with control group.

IV. The subjects in the control group had registered a mean height gain of 0.87 cm. The mean height gain in experimental group was found to be 7.92 cm
over a period of 120 days of food supplementation. The gain in height among different groups and pairs are significant at 5 percent level.

V. The mean weight gain by the subjects in the control group was found to be 0.43 kg. The subjects of the experimental group had registered a mean weight gain of 3.25 kg which is statistically significant among all groups and pairs.

VI. Among the bio-chemical constituents of blood, blood haemoglobin and total screen protein were determined. The mean haemoglobin levels recorded before and after supplementation by the experimental group were 11.66 g/dl and 12.99g/dl respectively while the control group had 12.06g/dl and 12.16g/dl during initial and after 120 days of supplementation respectively. Significant differences were observed among different groups and pairs.

VII. The mean total serum protein level in the experimental group before and after supplementation was found to be 6.33 g/dl and 6.99 g/dl respectively. While the control group registered 6.26g/dl and 6.32g/dl during initial period and after 120 days supplementation. There were significant differences among the experimental groups and pairs.

VIII. The mean intelligence level (I.Q) of the subjects in the experimental groups before and after supplementation was found to be 65.57 and 69.35 respectively. The control group registered 63.89 and 65.82 during initial
period and after 120 days of supplementation and these levels are statistically significant.

CONCLUSION:

Alocasia indica is an important easily available vegetable that can occupy a place in the Indian dietary. It contains considerable amount of nutrients like calcium, phosphorous, iron and iodine.

The quantum of protein and energy in Alocasia indica is much higher, which can be utilised for growth and development of small children. Alocasia indica also contains substantial quantities of crude fibres which are of great importance for healthy bowel habits. Hence it can be given to the malnourished group of children living in under developed and developing countries of the world. Not only that, it can be used as a nutritious food for people of all age group. However further study both in experimental animals and human beings is necessary to come to a definite conclusion.