

## **Leaf protein concentrate: A potential Micronutrient supplement**

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### **Abstract**

Every leaf contains proteins, which may vary in composition & concentration, depending on the plant genome. Proteins are must for the proper growth & development of all the living beings. A simple technique for the isolation of crude protein has been described in the present paper. The isolated protein may be used as a supplement to our diet without much expenditure of money & *sans* side effects.

**L**eam protein concentrate, popularly known as LPC, is a novel food, produced from green leaves. It is good source of micronutrients like Iron, Calcium, Magnesium, Vitamin A, Vitamin E and Niacin. LPC is one of the novel foods that recently came into being for its high nutritive value and easy availability. The main merit of LPC compared to the other novel foods, is its simple technique and cost effectiveness and high nutritive value, thus solving the purpose of the undernourished population to a great extent, in the countries, where the need for improved nutrition is the greatest<sup>1</sup>.

### *Technique of preparation :*

Leaf in the plant is attributed to its quality of protein synthesis. Forage crops yield maximum amount of protein as well as some other pertinent nutrients. This quality of leaves in the forage crops can be well utilized for

obtaining these nutrients human diet. The method is very simple and the equipments used in the process, can range from Meat Mincer to the Mixer Grinder. On a trial basis 1 Kg of quantity is the best to start with and this yields 25 gm. concentrate. It is easy to extract 40 to 60% of the protein from different types of leaves specially the locally grown such as Carrot, Amaranth, Bengal Gram, Potato, Soya, Drumstick, Fenugreek, Neem etc. Processing of LPC is required at industrial level but is usually not practiced at house level. LPC is obtained by means of simple mechanical process which involves pulping the leaves<sup>6</sup>. Method involves the following simple steps:-

1. The vegetable is washed (after first cutting the off the roots) and then pulped by passing it through the Mincer or Chopper, technically this process refers to the Cell Rupture.
2. The pulp is then collected and strained through

a cotton cloth to separate the liquid pulp from the crushed fiber.

3. The liquid pulp is then placed in a container of water heated on a low flame, after 2 to 3 minutes the liquid splits into curds and whey.
4. The liquid is then left to cool and then strained to collect the curd; this is Leaf Protein Concentrate (LPC).
5. The coagulated curd is then gently washed in the cloth and with clean water and left to drain.

#### *Nutritive Value :*

The Nutritive Value of LPC is well acknowledged by the nutritionists word wide, LPC supplies considerable amount of micro-nutrients like Iron, Calcium, Vitamin A and some of the B Vitamins other then protein. (Table-1)

Table-1. Nutrients provided by 20 Gms of LPC (Sources:Study carried out by New Hope, 2006)

S.N.	Nutrients	Amount provided by 20 gms. of LPC
1.	Protein	3 gms
2.	Vitamin A	5,825 I.U
3.	Vitamin E	1 I.U.
4.	Niacin	1 mg
5.	Calcium	440 mg
6.	Magnesium	17 mg
7.	Iron	12 mg

The amount of nutrient supplied by LPC varies and depends on the leaves. Soft lush and darker leaves give greater of nutrients.

#### *Therapeutic applications :*

Studies have confirmed role of LPC in reducing the incidence of Folic Acid and Iron deficiency anemia. Feeding experiment with Chicks, Mice, Pigs and Rats show that LPC is safe and can be used as nutritional supplement.

Experiment on human subjects too showed good nitrogen retention, improved growth rate, appetite and mental alertness, improved growth rate, appetite and mental alertness. LPC was also revealed to be an effective means of raising blood hemoglobin level. In the other trial on children, LPC was also found helpful in curing the Vitamin A deficiency syndrome such as Cheesy or Foamy patches or white blobs on Conjunctiva. LPC being a good source of Protein and Nitrogen also plays a significant role in regulating normal growth (i.e. gain in height and weight) if administered in the diet<sup>6</sup>.

#### *Role of LPC in combating micronutrient deficiencies :*

Poverty is one of the main reasons of Malnutrition and this situation always comes along with several micronutrient deficiency diseases like anemia, night blindness, deformed bone structure and related growth disorders. Empty calorie or lack of quality "Nutritious" food owing to ignorance, too contributes to such situation though socioeconomic status remains the major reason. Recent health surveys by various national and international agencies have clearly indicated that these deficiency diseases are quite prevalent among the majority of population, in the developing countries<sup>2</sup>. Surprisingly both the urban and rural areas

have been affected. Under this given scenario LPC forms a perfect supplement (5 gms.) in the diet by bringing marked improvement in micronutrient and protein intake of the subjects<sup>3,4</sup>.

*Suggestions :*

In spite of LPC's High Nutritive Value, Easy Availability and Cost Effectiveness, the "Acceptance" remains a big problem because of its dark and unattractive color. Further research is needed to develop this process to give a more attractive and presentable food to make it more popular. LPC should be introduced in the child's diet gradually so that the child develops a taste for LPC and gets benefited by its nutritional aspects<sup>1</sup>. Mother's participation in promoting and incorporating LPC in the common food item and strong pre introduction both at the community as well as individual level must be focused, for the overall health benefits of LPC.

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