

## **Lysine Enriched Seed Storage Albumin Gene (*Fima1*) of Finger Millet**

A large number of people in India are suffering from several disorders and symptoms due to nutritional deficiency. One of the major reasons of these disorders is deficiency of essential amino acids (EAAs) in the daily diet. Lysine is very important EAA which is found to be rare in cereal proteins. EAAs such as lysine are responsible for absorption of calcium in our body. Collagen synthesis is highly dependent on the lysine content (proportion) in the amino acid pool. Absence or deficiency of lysine in the system hampers the collagen synthesis and body development. Synthesis of the nutrient carnitine is also dependent on the source of EAA lysine. Carnitine has the role in metabolizing fats and thus keeping bad cholesterol levels low. A number of biofortification strategies, transgenic crops, nutraceuticals etc. have been explored in order to deal with the nutrient deficiency problems. The nutrition biology was combined with the crop breeding art to improve the quality, quantity etc. The existing conventional breeding methods are tedious and time consuming. In the current research attempt, the concept and proposal of nutraceuticals is wonderful, where the novel product is considered to be taken directly in its purified form rather than from entire grain content.

Asis Dutta and coworkers have U.S. patent entitled seed storage protein with nutritionally balanced amino acid composition that relates to the cloning of seed specific AmA1 (Amaranth Albumin 1) protein rich in EAA (lysine content:7.5%) for producing transgenic plants with high nutritionally rich amino acids.

Identification of seed storage protein gene having 9% lysine in its amino acid composition from finger millet can be harnessed for nutritional quality improvement of other staple cereals lacking lysine as one of the essential amino acids. Besides, the gene can be employed for the development of nutraceuticals through genetic engineering and heterologous expression in bacterial system.

### **Advantages:**

1. Lysine (9.0%) is present in the amino acid sequence of FIMA1.
2. A total proportion of 40.5% essential amino acids are present in FIMA1.
3. All the 9 essential amino acids are present in the sequence of *fima1* as per WHO recommendations indicating high biological value of FIMA1.
4. Presence of alpha-amylase inhibitory domain and its role in slow digestion of starch in humans could be exploited for the inclusion in the supportive diet for diabetics and also for development of insect resistant plant transgenics.
5. The product would be great to prevent deficiency symptoms and disorders caused due to deficiency of lysine, an essential amino acid.
6. They will not harm human or any other non-target organism because they were isolated from edible materials.
7. They can be used safely under any condition without any risk or health hazards.
8. They can be manufactured even in small scale industry due to less expenditure.