ABCOFAGRI.COM

ABCofAgri Publish code: ABCAG269811A

Publish date: 26th September 2018

Quality protein maize for improving the nutritional status

Himanshu Raj[1], Anjna Rani Minz[2] and Satish Kumar Pandey[3]

1. Himanshu Raj , Senior Research Fellow, ICAR-IINRG, Namkum, Ranchi
2. Anjna Rani Minz, Mangement Trainee, Food Corporation of India, Ranchi
3. Satish Kumar Pandey , Senior Research fellow, ICAR-IINRG, Namkum, Ranchi

Maize (Zea mays L.) is the third major cereal crop in the world after wheat and rice and is used for both livestock feed and human consumption. Maize contribute 15% of the world's protein and 19% of the calories derived from food cops. Pregnant women, lactating mothers, and young children are particularly the most affected. In India, maize is the third important food crop after rice and wheat. At national level the area under this crop is 9.43 million ha, production 24.26 million tonnes and productivity is 2583 kg/ha. In Jharkhand it is cultivated over 0.2569 million ha production 0.517 million tonnes and productivity 2012 kg/ha (Annual report maize, 2016). To alleviate malnutrition, protein content in maize by increasing Quality protein maize which is nutritionally superior over the normal size is the new dynamics to signify its importance not only for food and nutritional security but also for quality feed for poultry, piggery and animal sector as well. Quality protein maize has specific features of having balanced amount of amino acids with high content the prolamine (zein) fraction in the maize endosperm. With its high content of carbohydrates, fats, proteins, some of the important vitamins and minerals, maize acquired a well deserved reputation as a poor man's nutricerra for millions of people in developing countries. Cereals proteins, however, have poor nutritional value for monogastric animals, including humans, because of reduced content of essential amino acids such as lysine tryptophan and threonine. From the nutritional point of view lysine is the most limiting amino acid in the maize endosperm protein followed by tryptophan. The need to genetically ameliorate the poor nutritional value of cereals grains such as maize has been recognized for a long time.

of lysine and tryptophan and low content of leucine and isoleucine. The balanced proportion of all these essential amino acids in quality protein maize enhances the biological value of protein. The biological value of protein in QPM is just double than that of normal maize protein which is very close to the milk protein as the biological value of milk and QPM

proteins are 90 and 80% respectively. Whereas it is less than 50% in normal maize protein. There are 9 QPM hybrids of different color had been developed and released in India. The production technologies is same as normal grain maize except isolation as to maintain the purity of QPM, it should be grown in isolation with normal maize.

The QPM research was started long back during 1970's, but gained momentum during 1990s with continuous breeding efforts on development of high yielding hard endosperm modified Opaque-2 maize germplasm by International centre for maize and wheat improvement (CIMMYT). The Directorate of Maize Research (DMR), New Delhi developed first QPM composite variety Shakti-1 with 0.63 per cent tryptophan in the year 1997. The QPM research gained further momentum by launch of National Agricultural Technology Project (NATP) on QPM in 1998 by ICAR. Rajendra agricultural university (RAU), Pusa during 2001 released first QPM three way cross hybrid Shaktiman-1 and first QPM single cross hybrid, Shaktiman-2 during 2004. Choudhary charan singh Haryana agricultural university (CCSHAU), Karnal released another QPM single cross hybrid, HQPM-1 which is the first yellow grain QPM single cross hybrid released for its cultivation across the country. Later in the series of QPM, Shaktiman-3 and Shaktiman-4 released by RAU, Pusa in 2006. In 2007 another QPM single cross hybrid HQPM-5 from CCSHAU, Karnal was released for cultivation. Further two new single cross QPM hybrids i.e. HQPM-7 from CCSHAU, Karnal and Vivek QPM-9 from Vivekanand parvatiya krishi anusandhan shala (VPKAS), Almora has been identified during 2008. Opaque -2 (o2) is a natural recessive mutation in the transcriptional activator conditioning negative expression of zein protein.

The QPM has got special distinction among the cereal due to presence of high amount of lysine and tryptophan, therefore QPM can be utilized for diversified purposes in food and nutritional security. It is also useful in fulfilling the protein requirement of different sections of society to prevent malnutrition. QPM with high carbohydrates, fats, better quality protein, some of vitamins and minerals, it is nutritious feed for poultry, livestock, swine, fish, etc. Use of QPM as feed leads to early development of broilers, save energy and feed and also extra cost on lysine and tryptophan.

The nutritious product developed from QPM can replace fancied and highly priced industrial foods. These products can be developed in villages and thus could be a great source of rural entrepreneurship QPM based rural industries has a wider scope for employment generation and rural prosperity.

……