

Quality Protein Maize, Specialty and other Corn types production technology

Other than grain, maize is also cultivated for various purposes like quality protein maize and other special purposes known as ‘Specialty Corn’. The various specialty corn types are quality protein maize (QPM), baby corn, sweet corn, pop corn, waxy corn, high oil corn etc. In India, QPM, baby corn and sweet corn are being popularized and cultivated by the large number of farmers. The brief summary of different type of specialty maize is as follows –

i. Quality Protein Maize

As more than 85 % of the maize is used directly for food and feed, the quality has a great role for food and nutritional security in the country. In this respect, discovery of Opaque-2 (O2) and floury-2 (F2) mutant had opened tremendous possibilities for improvement of protein quality of maize which later led to the development of “Quality Protein Maize (QPM). QPM which is nutritionally superior over the normal maize 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 sectors as well. Quality Protein Maize has specific features of having balanced amount of amino acids with high content of lysine and tryptophan and low content of leucine & isoleucine. The balanced proportion of all these essential amino acid 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 grain colours have been developed and released in India for their cultivation in different agro-climatic conditions across the country. The production technology of QPM is same as of normal grain maize except isolation as to maintain the purity of QPM, it should be grown in isolation with normal maize.

ii. Baby corn

Baby corn is a young finger like unfertilized cobs with one to three centimeter emerged silk preferably harvested within 1-3 days of silk emergence depending upon the growing season. It can be eaten raw as salad and in preparation of different recipes such as chutney, pakora, mix vegetables, pickles, candy, murabba, kheer, halwa, raita, Chinese preparations, etc. The desirable size of baby corn is 6 to 11 cm length and 1.0 to 1.5 cm diameter with regular row/ ovule arrangement. The most preferred colour by the consumers / exporters is generally creamish to very light yellow. Baby corn is nutritive and its nutritional quality is at par or even superior to some of the seasonal vegetables. Besides proteins, vitamins and iron, it is one of the richest sources of phosphorus. It is a good source of fibrous protein and easy to digest. It is almost free from residual effects of pesticides. It can be cultivated round the year therefore, three to four crops of baby corn can be taken in a year. Cost of cultivation of baby corn in India is lowest in the world therefore; India can become one of the major baby corn producing country. It has great potential both for internal consumption and export.



In general, the cultivation practices of baby corn are similar to grain crop except (i) higher plant population (ii) higher dose of nitrogen application because of higher plant population (iii) preference for early maturing single cross hybrid and (iv) harvesting within 1-3 days of silk emergence.

iii. Sweet corn

Sweet corn is one of the most popular vegetables in the USA, Europe and other developed countries of the world. It is a very delicious and rich source of energy, vitamin C and A. It is eaten as raw, boiled or steamed green cobs/ grain. It is also used in preparation of soup, salad and other recipes. It is becoming very popular in urban areas of country therefore, its cultivation is remunerative for peri-urban farmers. Besides green cobs the green fodder is also available to the farmers for their cattle. Generally sweet corn is early in maturity. It is harvested in 70-75 days during kharif season. Green cobs are harvested after 18-20 days of pollination during kharif but the duration may varies season to season. At the harvest time the moisture is generally 70 % in the grain and sugar content varies from 11 to more than 20 %.

Color: Sweet corn is generally dull yellow and white but dull yellow color is preferred.

Precaution: Its picking should be done in the morning or evening time. Green cobs should be immediately transported to the cold storage in refrigerated trucks to avoid the conversion of sugar to starch. It loses flavor if kept in high temperature after picking.

Sweet corn with high sugar content should not be planted when temperature is below 16°C.



iv. Pop Corn

Popcorn is one of the common snack items in many parts of the world, particularly in cities and is liked because of its light, porous and crunchy texture. The popcorn flour can also be used for preparing many traditional dishes.

It is consumed fresh, as it has to be protected against moisture absorption from the air. It is hard endosperm flint maize. Kernels of pop corn are very small and oval/round in shape. When heated at about 170°C, the grains swell and burst, turning inside out. Quality of pop corn depends on popping volume and minimum number of non pop corn.



v. Waxy corn

It is originated in China but largely used in USA. Grain gives wax-like appearance and having 100 % amylopectin starch. While in normal maize, the starch is nearly 30 percent amylose and the remaining 70 % is amylopectin. Waxy corn is mainly used for food and industrial purposes.

vi. High oil corn

Most of the normal maize lines have 3- 4 % oil content. In general, lines with more than 6 % oil are considered high oil lines. 95 % of the total oil is in the germ. When the oil percent increases the starch decreases. The wet milling industries are still in advantage with high oil content corn. In USA the high oil corn is cultivated on contractual basis and remunerative price is paid to the

farmers. In India its cultivation is not economical because it is not sold on premium basis. Generally in normal maize crop, 15-20 % population of high oil hybrids is used as pollen parent and there is detasseling of the normal corn plant. Due to xenia effect there is an increase of oil in normal maize and its cultivation is done in isolation. The corn oil has low content of saturated fatty acid and is considered to be one of the best quality cooking oil. In India more than 60000 tonnes of corn oil is made available for various uses.

vii. Fodder maize

Maize fodder can be used at any crop growth stage. Its quality is adversely affected after anthesis. To maintain the fodder quality the detasseling is advised to the farmers for better digestibility and palatability. By grazing this fodder to the milch cattle, their milk is increased. The tall, leafy and longer duration cultivars are most preferred for maize fodder cultivation. The cultivation of maize for fodder can be done round the year. Very high seed rate is used. Generally the farmers grow composite varieties or advance generation of hybrid seed which is economical to the farmers.

Table 3 Quality Protein Maize, specialty and other corn type cultivars

S. No.	Corn type	Cultivars
1	Quality Protein Maize	H*:HQPM 1 & HQPM 5 (all states of India), HQPM 7, Vivek QPM 9 (Peninsular India), C**: <i>Shaktiman</i> 1,2,3& 4 (Bihar)
2	Baby corn	H:HM-4, C: VL Baby Corn 1
3	Sweet corn	H:HSC1 for J&Kand HP C:Madhuri, Win orange, Priya
4	Pop corn	C: Jawahar, Amber, Pearl &VL pop corn
5	Fodder	C: African tall, J 1006 & Pratap chari-6

*H=hybrid and **C=composite