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Scientific Methods of Processing of Baby Corn to Prevent Post Harvest Losses

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Baby corn is a young finger like, unfertilized cobs of maize. It is a special type of maize with 2-3 cm emerged silk preferably harvested within 1-3 days of silk emergence. It is used as nutritious vegetable for human consumption. It is delicious, decorative and rich in vitamins and minerals besides a good source of easily digestible fibrous protein. Its nutritional quality is at par or even superior to some of the seasonal vegetables. It is most safe vegetables to consume as it is almost free from residues of pesticides as the young cob is wrapped up with husk. It may be consumed directly as salads or after preparation of large number of value added products. It is a potential crop to generate income and employment for the rural youth and women, India can be a potential export country due to low cost of production. One and a half decades ago, this crop was originally introduced in the Aterna village in the Sonepat region of Haryana. Along with Aterna, nearby Manoli, Khurampur, Bhaira, Jaati, and Sersaha villages have also been transformed into lush baby corn fields. Nowadays, raising baby corn provides work for the villages, and some farmers have developed into successful businesspeople. Baby corn is a short duration crop of 60-70 days. Also it requires less water and other inputs compared to paddy, cultivation of baby corn has proved profitable for farmers under paddy-wheat cycle. The post harvest management and quality standards play a greater role in successful marketing of baby corn. After harvesting of baby corn the profit from the produce largely depends on the quality, safety and market competitiveness. It includes various tasks like harvesting, dehusking, grading, packaging, shipping, processing, storage, meeting quality standards, and labelling. It is an organic food that is devoid of pesticide and chemical residues as it is protected by green husk sheaths.

Harvesting:

After harvest, baby corn must be rapidly de-husked needs to be kept in areas with sufficient ventilation and shade. Additionally, it shouldn't be stacked up outside throughout

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the day. When dehusking the baby corn, thin knives with a pointed end should be used to lightly slit its length. After that, cleave the larger end of the baby corn with knives and de-husk it along ear slits, being careful not to harm the interior spikes. After thoroughly removing all silk, clean baby corn should be placed in ventilated containers like carton boxes or net plastic baskets. The boxes must be kept in shaded regions and must not have water thrown on them; otherwise, they will eventually become black and rot. Covering baby corn with a clean, water-absorbing cloth will prevent the top ears from becoming excessively dry. To avoid the development of dark scars from knife wounds, baby corn should be covered. When produce is graded, it is sorted by grades or classes by manually or mechanically. These grades are typically based on the corn's length and diameter i.e large size (11-13 cm long and 1.4-1.5 cm diameter), medium size (7-11 cm long with 1.2-1.4-cm diameter) and small size (4-7 cm long with 1.0-1.2-cm diameter). Most preferred size of baby corn is 6-10cm in length and 1-1.5 cm diameter with regular row arrangement.

According to industry regulations, baby corn cobs can be divided into one of three groups: classes I, II, and extra classes. To achieve minimal quality standards, baby corn cobs must be entire, appear fresh, be clean, and be almost free of any apparent foreign matter. They must also be free of rotting or any degradation that would make them inappropriate for ingestion. It must be free of any foreign flavour or smell, free of condensation after being removed from cold storage and free of abnormal exterior moisture after packaging. The baby corn must be picked, managed after harvest, stored, and transported in a proper manner to guarantee that it reaches its destination in good condition. A minimum amount of silk must be connected to and broken off of the cob without impairing the appearance of the baby corn offered to consumers. For class I and class II standards, the total fault area cannot be more than 5% and 10% per cob, respectively. Good packaging in brand new, clean reusable materials after cooling is essential for easy handling, transport and storage. The contents of each package must contain only the cobs of baby corn of the same origin, and be uniform in quality and size. Quality, hygiene, ventilation, free of all external matter and odors is must essential requirement of containers, to ensure proper handling, transport and storage of baby corn. Farmers are generally using poly bags and thermocol trays covered with cellophane for packing. For longer time of preservation of dehusked babycorn, glass or tin packing is the best having 52 percent baby corn and 48 percent brine solution. After filling baby corn in

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container, brine and water are added in cans in the proportion of 2:98 (Brine 2 percent and water 98 percent), alternatively, a solution of 3 percent brine, 2 percent sugar, 0.4 percent citric acid and balance water can also be used. It should be marked with description of the content viz. commodity name and address of packer, quantity, quality (grade), variety and date of packing etc. Baby corn products are highly perishable so these are usually transported from the packing facility to the airport in cool trucks and then exported by air. Mode of transport should be selected as per the requirement according to quantity and distance. It should be easily available at the time of transport, particularly during peak period after harvest and it should be relatively cheaper among available alternatives.

Processing:

To extend the shelf life of baby corn, processing is an option. Three main processing techniques are canning, dehydration, and freezing that can be utilised to extend shelf life. Baby corn can be preserved for months at a time in a brine solution and can shipped to distant locations. Major steps are as follows: Peeled baby corn → Cleaning → Boiling → Soaking → Grading → Containing →Brine solution → Exhaust → Lid Covering → Cooling → Quality inspection. Dehydration can be used to prolong the shelf life of baby corn. Baby corn can be dried in an oven (air oven, vacuum oven, or solar dryer) by cutting it into 0.5 cm round pieces. Baby corn that has been dried can be packaged in a tetra pack, vacuum pack, or polythene bag for longer-term storage. Baby corn can be used to prepare food products such as soups and vegetables after being rehydrated by soaking in water and these have been found to have similar organoleptic qualities to those made from fresh corn. Baby corn needs immediate refrigeration to preserve its sweetness and can be stored in the refrigerator for up to a week without losing quality at 5-7 ^{o} C with a relative humidity of 90 percent. Low temperatures reduce the rate at which sugar is converted to starch. Proper labelling of package must be done that contains information of shipping documents, permanently marked labels, name of the product, i.e. "Baby Corn", grade, size (optional), net weight in grams or kilograms, distributor information, *ie*. name and address of the product. Also the product must be visible from outside. The language of the product label must be in the national or regional languages. The export product label can be in the language of the exporting country. In India, postharvest handling of baby corn is a major limitation of inefficient handling in the field and in transportation. Other major limitations are poor storage, processing, packaging,

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grading and infrastructure technologies. Immediate action is needed to modernize systems and reduce post-harvest losses in India.