CASHEWNUT PROCESSING AN OVERVIEW

RAW CASHEWNUT HARVESTING, HANDLING AND STORAGE:
Cashew nut is hand picked and manually handled in various stages of operation-right from picking at farm level to processing at factory level and to storage and transportation. To preserve the quality of harvested nuts, it is imperative that proper safeguards are observed against natural and man-made contaminations. Improper post-harvest handling and storage of nuts, such as high moisture, temperature and insect or mechanical damage can influence the incidence of the fungus that produces toxins like aflatoxin.

By following proper method of drying fungal infection can be avoided. After drying (to about 8 to 10 per cent moisture) the nut must be freed from any adhering plant material. Shriveled and spoiled nuts should be removed which are potential source of fungal infection. Only healthy and matured Nuts should be kept for storage.

Quality of Raw nut in harvesting, handling and storage can be ensured by
1. Proper Harvesting techniques - Only matured nuts from fully grown apple must be harvested.
2. Proper Drying methods – nut should be sun dried immediately after harvesting / collection. Drying should be on hard ground, preferably, concrete / slate drying yards. Quantity of nuts dried shall not exceed 20kg per sq.m. Uniform drying can be achieved by constantly turning nuts over to prevent partial / non-uniform heating / drying. Freshly harvested nuts normally require three days of sun drying.
3. Proper storing methods – Dried nuts should be stored in jute / sisal bags [80kg nut per bag] and not heaped or stored in silos to avoid warm humid Condition in storage room. Storing in woven HDPE bags are not recommended for storage of raw nuts. While storing it is necessary to provide proper wooden Dunn age to Prevent damage to the cashew nut in bags by avoiding direct contact of bags to the Warehouse floor. This can be economically achieved by keeping bamboos, criss-crossed and tied and placed on the warehouse floor. Dried nuts should be stored in well-ventilated, fly-proof place with low Humidity, free of stored product pests and well insulated to prevent water Seepage during rains.

PROCESS FLOW:
1. Steam Cooking
2. Shelling
3. Borma Treatment
4. Humidification
5. Peeling
6. Grading
7. Conditioning
8. Filling & Packing
STEAM COOKING:
The raw cashew nuts suns dried and stored in the warehouse are steamed in boiler [without steam pressurizing the cooker vessel] for about 30 minutes. The cooking time is varied depending upon the conditions of cashew nut and atmospheric conditions. The steaming expands the shell, softens the nuts due to penetration of steam into the shell. After steaming, the nuts are air-cured by spreading out on the floor in the shade. These ultimately harden the shell and make it fit enough for de-shelling in the manually operated cutting machine. The steam processing preserves the original color of the cashew kernel inside the Nut. The cut shells of steam roasting process yield quality Cashew Nut Shell Liquid [C.N.S.L.].

SHELLING:
The Steam cooked and air-cured Cashew nuts are de-shelled by hand and leg operated cutters. Two workers work on one cutter, one de-shells the nut and the other worker retrieves the kernels from the cut opened shell. The nuts are fed one by one manually between the two sets of blades to fit the Contour of the fixed blade. The pressing of the pedal pierces the Cashew nut on the convex side by means of two blades. The two blades are used to split the nut by operating the handle of the cutter. After de-shelling the nut falls freely due to gravity and is collected beneath the cutter. The operator's assistant works upon each de-shelled nut and takes out the cashew kernel embedded inside the shell. A pair of skilled worker normally de-shells about 80kg of cashew nuts in 8 hrs, which yields approximately 20 kg of Cashew kernel. De-shelling in the mechanical cutter soils the hands of operator, causing corrosion due to C.N.S.L oozing out from the shells due to impact of blades. It is a general practice to rinse the hands with suitable oil, mostly castor oil, to protect the hands from corrosive shell oil. Alternatively, suitable water soluble and washable protective chemical coating like “Kerodex” cream can be applied to the hands for the purpose. In some places workers use wood ash or white cement for the purpose.

HEAT TREATMENT OF UNPEELED KERNELS [BORMA TREATMENT]
The kernels after they are removed from the shells have to be dried in order to loosen the red skin adhering to the kernel for easy peeling. A few processors adopt conventional tray drier commonly known as “Borma”. The borma chamber outer sides are heated by means of flue gas generated by burning oil-extracted shell-cake at the bottom. The inner chamber heats up by radiation of heat. The above system is becoming obsolete due to poor heat transfer efficiency. In the absence of air-circulation inside the chamber, heating is non-uniform. This results in over heating of kernels causing scorching of kernels in spite changing of trays and turning the kernels in the trays periodically. The conventional “Borma” is presently replaced by more efficient electrical/diesel operated tray driers. This system ensures uniform heating of kernels for a pre-set temperature [80oC] and time [2 ½ to 5 hours] by means of reliable electronic controller and timer. This system reduces the heating time considerably and does not requires periodic changing of trays during heating, as uniform heat is maintained through out the drier by forced air circulation. This system preserves the original color of
the Cashew Kernel and quality consistency is achieved within a batch and in every batch treated.

**HUMIDIFICATION OF UNPEELED CASHEWKERNELS:**
The Borma treated Cashew kernels are humidified [Moisturized by water-mist] by means of electrical humidifier. The Cashew kernels in trays are kept in trolleys are humidified in a closed room for a period depending on the atmospheric conditions and moisture level of Cashew kernels. The treatment time varies anywhere between 15 mts to 20 mts. Depending on the condition of the Cashew kernels under treatment and climatic conditions. The brown skin [Testa] of the humidified kernels undergoes shrinkage due to sudden cooling. This helps to dislodge the hold [Adhesion] of skin to the kernel.

**PEELING OF CONDITIONED CASHEWKERNELS:**
The Cashew kernels conditioned as above is now ready for peeling. Peeling of the Testa is done manually; usage of sharp edges of knife is discouraged as it causes scraping of kernels. Scrapping mars [spoils] the look of the Cashew kernel and is more pronounced after oil roasting. However knives are very selectively used on a very small quantity of Cashew kernel, whose skin does not peel off easily in manual peeling. Major classification / grading of kernels into wholes, broken and rejections are done at this stage. A skilled laborer can peel approximately 6 to 8 kg.

**GRADING OF CASHEWKERNELS:**
The peeled kernels are manually graded in natural light by skilled labour. The Cashew kernels are graded on the basis of shape, size and color. International specification and standard for grading are widely followed in the industry. The color grade chart officially issued by the Cashew Export Promotion Council of India serves as a guide for color grading. Normally a skilled laborer can grade anywhere between 20 to 25kg. Of Cashew kernel per day depending upon grader’s skill and the size of the kernel being graded. For grading brokens into LWP, SWP and BB graded mechanized wire-mesh sieves are used.

**CONDITIONING OF GRADED CASHEWKERNEL:**
The moisture percentage permitted in the graded Cashew kernel is 5% max. By weight at the port of importation. While a moisture level above 4% at the time of final packing is not preferred as the same may cause fungi and aid infestation, low moisture level below 2% is undesirable as it causes breakage of kernel during processing and shipment. Processors by and large control the final moisture level up to 3%. Cashew kernels are humidified to increase moisture percentage to the required level, heat treated to reduce the excess moisture before final packing.

**FILLING AND PACKING**
The graded and moisture conditioned cashew kernel are filled in 18Lt/ square tins, 25lbs (11.34kg) to a tin. The Cashew kernels are fed into the vibratory filling machine through a pneumatic Foreign Matter Segregator (PFMS). 8 Tins (Leak tested and Tar weighed) are filled at a time; Filled tins are then weighed for a net weighed of 11.34 kg.
plus or minus 10gm using electronic weighing scale. The weighed tins are “Vita Packed”. Vita packing is the process of vacuumising and injecting inert gas viz. Carbon-di-oxide or Nitrogen into the cashew kernel filled tins. The gas infused tins is hand-soldered hermetically using lead free solder. Two tins are packed in a unit carton and strapped and stencil marked for shipment. The consignment is shipped after per-shipment inspection formalities.

**Modern Packaging system** - Cashew Kernels can be also being packed in multilayer flexible pouches; gas flushed and sealed – 25 pounds net per pouch. All importers in USA and Europe prefer this system of packing.