



## Quality Requirements for Neera Processing - Chemical & Microbiological aspects

● **Praseetha K.C.** Chemist , **Sumi S Nair.** Microbiologist, CIT.

Coconut Inflorescence Sap (Neera) is a natural and non alcoholic delicious health drink, high in nutritional value. Coconut Inflorescence sap is highly susceptible to contamination and deterioration by microorganisms whenever it is exposed to air and external environment. Proper handling, temperature management and sanitation management throughout the post harvest and processing chain is required to retain its inherent qualities.

Pre harvest factors such as contamination by insects and pests, contamination by microorganisms through collection vessels, water, manual handling, unhygienic practices etc. affects the quality of Neera. Contamination by microorganisms as a result of improper post harvest handling and processing techniques also results in poor quality of Neera. Improper packing and storage of bottled Neera may cause deterioration of the product.

### **Collection and Harvesting**

**Harvesting:** High yielding, properly maintained and irrigated, disease free palms should be selected for tapping Neera. For collection of Neera, it is necessary to ensure the hygiene of the crown. Clear the crown of the palm and nearby areas of the selected inflorescence. The inflorescence should be made hygienic by treatment with disinfectant (Sodium Hypochlorite) and it should be covered with net for preventing the entry of insects and pests. Distilled water should be used for cleaning of inflorescence.

The tools and vessels used for harvesting Neera should be clean. Two collection jars are required for each

inflorescence. Both the collection and transportation containers should be washed with mild (colourless & odourless) soap solution and brush, then wash using water and rinsed by hot water, finally rinse by 0.05% Potassium meta bisulphite solution and dry in sunlight.

**Preparation of Anti-Fermentation Solution:** Anti Ferment Solution should be prepared in a hygienic environment. Personals involved in the preparation of AFS should wear hygienic aids. Work bench should be wiped using Isopropyl alcohol prior to the preparation. Glasswares used for the preparation should be washed and dried properly. Centrifuge tubes should be washed in mild hot water and should be dried properly before filling. Sterilized water should be used for the preparation of AFS. After preparation, AFS should be transferred immediately to the centrifuge tubes and capped properly to avoid air contact. Prepared AFS should be handled properly and should be stored in dry and hygienic environment.

**Sterilization of clay:** Clay should be sterilized to avoid contamination and to ensure hygienic collection of Neera. Clay is made in a paste form with adequate water, 2 -3 gm of which is wrapped using aluminum foil. Sterilize the clay using autoclave at 121°C and 15 lbs pressure for 15 minutes or in a pressure cooker. Pack the clays in plastic bags and use this within 2 days. Sterilized clay should be applied on the inflorescence using gloves.

**Post harvest handling:** Harvested Neera must be in contact with clean surfaces all time. Immediately after

harvesting, it should be stored in chilled condition. It is transported to the processing site either in mobile chillers or ice boxes. Dry, clean and well ventilated place should be selected for storage of Neera. Avoid contact with sunlight.

**Personal hygiene:** All employees involved in Neera processing must wash hands with soap and warm water before work, after using restrooms, upon returning to their work station from a break for lunch. All employees should wear, clean, good fitting uniform and hair restraints (hair nets, caps, scarves). No workers shall wear jewellery including: watches/bracelets/wrist bands, ring etc. Food, candy, chewing gum, or other comestibles should not be allowed in the plant and control bad habits. Employee infected with or showing symptoms of any infectious or communicable disease or that demonstrate open sores, boils, infected should leave from work place. Gloves should be cleaned and/or sanitized at the beginning of work. Personnel working in the low risk areas of the plant should not enter other high risk areas as this movement could possibly contaminate equipment and product with extraneous matter or pathogens. Visitors and Management should follow the same rules as employee.

**Plant Environment:** Maintain clean plant environment so as to reduce the potential for contamination. Plant surroundings must be free of trash and debris. It must have adequate drainage/disposal facility to avoid stagnation of water. Waste disposal facilities must be well maintained and designed to prevent contamination of product.

**Process area and Storage:** Ensure that all glass lights in processing and warehouse areas are shielded or otherwise protected against Neera contamination in case of glass breakage. Provide adequate lighting in all Neera processing and support areas, including hand-washing areas and all areas where Neera is examined, processed or stored. Provide adequate space and layout to facilitate production and prevent accidental contamination of Neera. Ensure that floors, walls, and ceilings are constructed of appropriate materials. Provide adequate ventilation or control equipment to minimize odors and vapors of steam in areas where they may contaminate Neera. Monthly fumigation and environmental monitoring shall be followed for maintaining hygienic environment.

**Equipment:** Specific attention shall be given to equipments and utensils used in the processing of Neera to ensure that the design is easy for cleaning and sanitation. Equipment must be made of non-toxic materials, appropriate to their use, and resistant to deterioration by cleaning and sanitizing agents. Design the equipment to minimize exposed screws, bolts, bearings, etc. that could potentially contaminate Neera. Equipment must be well

maintained, with no rust, excess lubrication, flaking paint, etc. Plastic (such as baskets, conveyors) should be well maintained without chips, cracks or breaks in the material.

All cold storage facilities in the plant must be equipped with a temperature measuring or recording device that can be accurately read to confirm temperature.

Before processing, the entire plant, machineries and utensils should be cleaned thoroughly using mild antibacterial agent Potassium metabisulphite (0.05%) and rinsing with hot water or steam. After Processing, clean the plant and machineries using water and mild (colorless, odorless) soap solution. Rinse the utensils and machineries using antibacterial agent Per Acetic acid (0.05%) and hot water. Effectiveness of cleaning should be verified by visual inspection or swab test.

**Water:** Water used for Neera contact surfaces or used in the facility for employee services must be potable and meet state and federal regulations for drinking water. There must be no cross-connections between potable and non-potable water supplies. Water shall be tested at yearly intervals.

**Packaging control measures:** Packing materials that are not being used immediately shall be stored safely to protect from contamination. All bottles and caps must be sanitized in portable water. It shall be dried in hot air oven at 40°C. Bottles should be kept in drain racks inside the oven. During bottling and capping, all chances of human and environmental contamination should be avoided. Immediately after processing, Neera must be bottled and aseptically sealed. Packing materials shall provide adequate protection for products to minimize contamination and prevent damage. Packaging materials shall be nontoxic /food grade and not pose a threat to safety and suitability of food under specified conditions, storage and use.

**Pest Control:** At the entrance of processing hall and storage areas, pest-capture lights or other facilities shall be installed. Service of licensed pest control agencies can be utilized on contract.

**Storage & Transportation:** Neera must be stored under conditions that protect against contamination and minimize deterioration. Storage facility used for finished products shall be maintained in a condition that protects products against biological, chemical and physical contaminants. Raw Neera and finished product



Quality requirements of packed Neera	
Parameter	Value
pH	5 - 5.5
Brix	14 - 17
Appearance	Clear and transparent
Taste	Characteristic sweet taste
Odour	Devoid of any off odour
Total plate count	<50 CFU/ml
Yeast and mold	<100 CFU/ml
Total coliforms	<3 MPN/ml
E.coli	Absent/ml
Staphylococcus aureus	Absent/ml
Salmonella	Absent/25ml

should be stored in different places in order to avoid cross contamination. Ensure that vehicles used to transport Neera to the facility are not used to convey any other items such as chemicals, waste products or other potential contaminants.

**Product hold:** A product hold and release program shall be established to ensure that no product is released until all the necessary chemical, physical and microbiological analysis have been completed and customer specifications have been met.

Major sensory parameters which determine the quality of Neera are colour, taste, odour and clarity. Chemical parameters such as pH & Brix / Total soluble solids need to be checked for assuring quality of Raw Neera after collection. pH of Neera immediately after collection in hygienic environment is 6.5 to 7.5 & Brix is 140 to 170.

Chemical analysis of Neera can be done in a laboratory for analyzing the nutritional parameters like carbohydrates, fat, protein, minerals etc. Microbiological analysis can be carried out to determine the number and type of microorganism present in a sample of the product. Since Neera is rich in nutrients, it is highly susceptible to contamination by microbes. Six parameters like Total Plate Count, Yeast and mould, Total Coliforms, E.coli and Staphylococcus aureus are commonly analyzed. ■

## Statement of ownership and other particulars about the INDIAN COCONUT JOURNAL FORM IV (See Rule 8)

1. Place of Publication : Kochi - 11
2. Periodicity of Publication : Monthly
3. Printer's Name : Rajeev P George  
Nationality : Indian  
Address : Chief Coconut Development Officer  
Coconut Development Board,  
Kochi - 11, Kerala.
4. Publisher's Name : Rajeev P George  
Nationality : Indian  
Address : Chief Coconut Development Officer  
Coconut Development Board, Kochi - 11, Kerala
5. Editor's Name : R Jnanadevan  
Nationality : Indian  
Address : Deputy Director  
Coconut Development Board, Kochi - 11, Kerala
6. Names and addresses of individuals who own the newspaper and partners or shareholders holding more than one percent of the total capital : The periodical is owned by the Coconut Development Board which is a body corporate set up by the Government of India under the Coconut Development Board Act, 1979.

I, Rajeev P George, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/

(Rajeev P George)

Date : 01-03-2016