Significance of Pasteurization in Neera Processing

Sumi S Nair
Microbiologist, CDB Institute of Technologies, Vazhakulam, Kochi

Neera is an excellent medium for microbial growth because of its neutral pH and nutritional quality. The type of microorganisms present in raw neera could vary depending on many factors like from the Neera tapping environment, personal hygiene of technician (especially their hands), and sanitary condition of collection vessel,contaminated water source, improperly sterilized clay, pests, temperature, collection time, etc. When neera is stored at ambient temperature, bacteria and other pathogens soon proliferate. Under ideal conditions, bacteria multiply rapidly between 5°C and 60°C (the danger zone for food). Below 5°C bacteria multiply slowly. At freezing temperatures bacteria stop multiplying and become dormant. Freezing does not kill bacteria. Most bacteria are killed at temperatures above 60°C. The microorganisms have the potential to produce many chemical compounds in addition to ethanol. Some of them cause changes in the flavor of sap. Total aerobic mesophilic bacteria (TPC) are also abundant in raw neera (Table 1)

This raw, unpasteurized neera may carry dangerous bacteria such as *E. coli, Salmonella Listeria,Bacillus Shigella,Staphylococcus aureus*, etc which are responsible for numerous food borne illnesses such as typhoid, salmonellosis diarrhea, dysentery, kidney failure, anemia, inflam mation swelling of the intestine etc. The species of E. coli known as O157:H7 produces a dangerous toxin, even deadly poison that kills around 60 people annually. WHO estimated that each year 1.8 million people die as a result of diarrheal diseases and most of these cases can be attributed to contaminated food or water. More than 200 known diseases are transmitted through food.

Consumption of contaminated raw neera may show symptoms such as nausea, vomiting, diarrhea, abdominal pain, stomach cramps, loss of appetite, fatigue fever, etc. Symptoms may start within hours after consuming contaminated food or may begin days later. Most food borne illness last from one to 10 days. However, the pathogenic bacteria in raw neera can be especially dangerous to people with weak immune systems, older adults, pregnant women and children. Severity of illness resulting from contaminated food greatly depends on the organism, the degree of exposure to the contaminant, one's age and health. Pregnant women run a serious risk of becoming ill from the bacteria *Listeria* which can cause miscarriage, foetal death or illness or death of a new borne. Proper food processing can prevent most food borne diseases.

Pasteurization is a process that kills harmful bacteria by heating to a specific temperature and time. The time and temperature depends on the type of food and retaining a food's nutrients, colour, texture and flavor. Pasteurization can be done using a continuous method, where the liquid flows through a pasteurization system, or by using a batch method, where one batch of the liquid is pasteurized at a time. Continuous pasteurization is popular for large producers, because it does not slow the supply line as much as batch pasteurization.

Pasteurization must be performed with clean equipment in aseptic environment. If these conditions don't satisfy, Bacteria can colonize and potentially cause contamination. For this reason, companies which perform pasteurization are subject to frequent inspections to ensure that the equipment and environment they are using is safe. Aseptic condition of neera plant is to be ensured by equipment swab, environmental monitoring and fumigation. Bacteria may also appear in pasteurized neera because of improper handling and packing. It is essential to pack the product in aseptic condition after pasteurization to prevent contamination.

Raw neera contain high load of microorganisms. Centrifugation remove microorganisms. In the first stage of centrifugation the microbial load reduced to 40-50% and in double centrifugation it will be less than 5% .Centrifugation also gives clarity to Neera. Pasteurization process destroys sustained microorganisms after centrifugation. Finally the centrifuged Neera is pasteurized and aseptically packed.

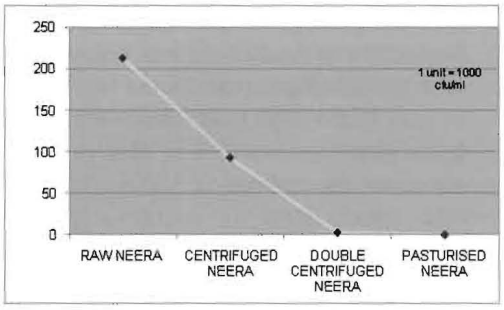
Pasteurized neera packed under aseptic condition is usually considered as pathogen free. The Neera processing companies must remain vigilant to ensure that all measures are taken to prevent the entry and multiplication of pathogenic micro-organisms during tapping, handling processing and packing of neera to prevent any pathogen associated illness. Pasteurization and aseptic packin provide safe, nutrient-rich Neera.

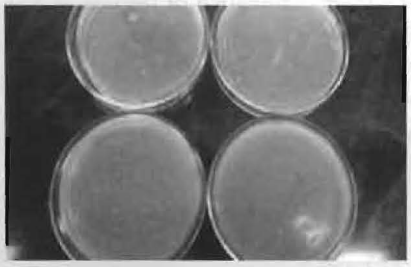
Table 1. Microbiological Analysis of Neera

Parameter	Raw Neera	Centrifuged Neera	Double Centrifuged Neera	Pasteurized Neera
Total plate count CFU/ml	2,13,200	93,600	2700	<10
Total Coliforms MPN/ml	>1100	>1100	460	<3
Yeast&Mold Count CFU/ml	1,90,000	73000	3000	<10
E coli CFU/ml	<10	<10	<10	<10
Staphylococcus aureus CFU/ml	<10	<10	<10	<10
Salmonella/25ml	Absent	Absent	Absent	Absent

***CFU**-Colony Forming unit, **MPN**- Most probable Number Count*

Reduction of Microbial Count (TPC) in different stages of Neera Processing





Total Plate Count – Raw Neera

Total Plate Count - Pasteurized Neera

Yeast &Mold Count – Raw Neera

Yeast &Mold Count – Pasteurized Neera