HI-CALCIUM SWEETENED CONDENSED MILK PLANT FROM COW MILK WITH VACUUM EVAPORATION PROCESS

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Abstract

Hi-calcium sweetened condensed milk products can be made from cow's milk by vacuum evaporation process. Sweetened condensed milk plant has a capacity of 360,000 kg milk/day. The location of the new plant in Boyolali, Central Java, is selected based on stocks of raw materials, water and the ease of transportation.

The process of making sweetened condensed milk consists of three stages, namely stage of mixing, evaporation and cooling. At the stage of mixing milk, supporting materials, such as skim milk, sucrose solution, vitamin A, vitamin B1, vitamin D3 and butter oil are added into cow milk, and then processed in the mixing tank into a solution of milk at 63°C and 1 atm pressure. At this stage of evaporation, the milk solution is evaporated in a vacuum evaporator at 0.9 atm and 96.71°C. Before packing the product of sweetened condensed milk is cooled at 4°C.

The plant is designed to operate during 330 days/year and 24 hours/day. Raw material of cow milk needed to 230.078,3 kg/day and supporting raw materials such as milk skim of 77.313,21 kg/day, butter oil of 18.270,05 of kg/day, vitamin A of 1.63 kg/day, vitamin B1 of 2.76 kg/day, vitamin D3 of 0.43 kg/day, sucrose of 134.466,50 kg/day, lactose of 23.01 kg/day and tricalcium phosphate of 241,57 kg/day. The required water utilities for sanitation water, boiler feedwater, cooling water and water processes are respectively 68 m³/day 245.61 m³/day, 33.17 m³/day and 154.04 m³/day.

Keyword : sweetened condensed milk, cow milk, hi-calcium, vacuum evaporation