

RECP Best Practice Catalogue

Reuse of evaporator condensate
Developed within the framework of
MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



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Best Practice - Reuse of evaporator condensate

SECTOR:	Food & Beverage
SUBSECTOR:	Processing and preserving of fruit and vegetables
PRODUCTS	Fruit pulp and concentrates
CATEGORY	Process control or modification
APPLICABILITY	Process
COMPANY NAME	---
COMPANY SIZE	Medium

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Description of the problem (Base scenario):

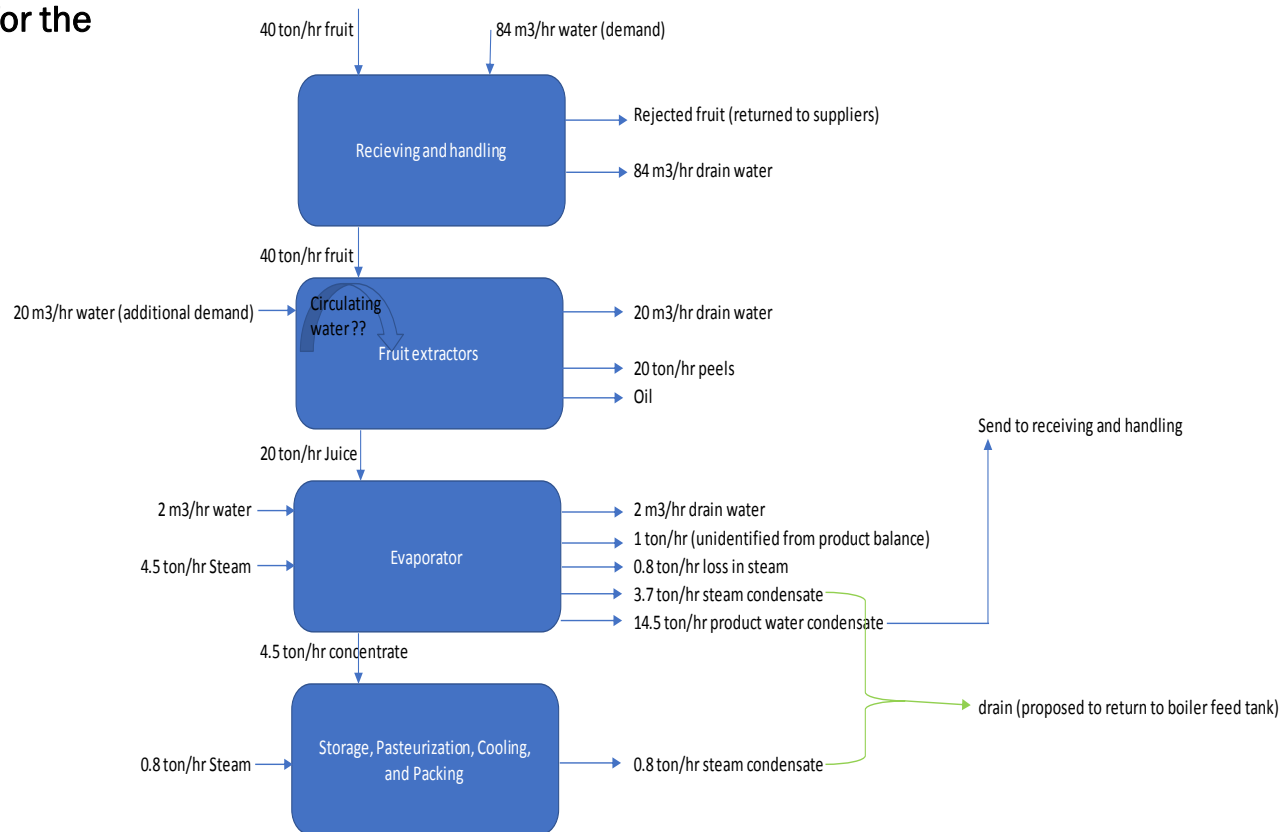
The company operates an orange concentrate production line, in which, fresh orange juice is produced through extractors. Then the juice passes through a multi-effect evaporator to partially remove the water content from the juice and producing orange concentrates (6 liters of juice yield 1 liter of concentrate, and 5 liters of removed water as condensate). Thus orange concentrates occupy much less volume suitable for transport and storage. Removed water from the juice in the evaporator is considered as clean water, with the possibility of having some oil and odor residuals, and low pH values. The base condition is sending that water to the industrial wastewater network for treatment and disposal.

Description of the solution

From the water balance, different water users were identified, with the quantities of each used defined from the Process and Instrumentation Diagram (PID) of the company. Knowing the condensate quantity from the evaporator, the company was recommended to install a collection tank for that condensate and a pump to lift it for reuse in the first rinse of the incoming fruit rather than using fresh water for that purpose.

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Schematic for the solution



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Economic Benefits

14.5 m³/ hr of water is saved, corresponding to:

$14.5 \text{ m}^3/\text{hr} \times 20 \text{ hr/day} \times 22 \text{ day/month} \times 6 \text{ month/year} = 38,280 \text{ m}^3/\text{year}$
of water savings (12.4 % of the baseline)

The economic value of the savings is equivalent to 10,910 Euros/year besides the reduced treatment cost of that amount of wastewater in the existing IWWTP.

Environmental Benefits

Reduce water consumption by 14.5 m³/ hr (38,280 m³/year)
Reducing the wastewater generated by 14.5 m³/hr (38,280 m³/year)
which will reduce the hydraulic and pollution load on the existing IWWTP.

Health and safety impact

Not applicable

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Capital investments & financial indicators	Estimated cost of 2 L tank and pump ranges from 1,000- 2,000 Euro. Payback is 0.18 years (2 months)
Suppliers	Local water pumps suppliers Local manufacturers for water tank and piping
Other aspects	Quality control (QC) to check if the product quality is changed from the reused water (especially from bacterial growth and microbiology). Washing the collection tank from time to time to ensure no bacterial growth.
Implementation	The company is planning to implement this measure, but they started by the QC check for possible adverse effects towards food safety.

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Replicability sectors	The same concept can be replicated in • Fruit Pulp and tomato paste, • Instant coffee, • or any other industry involving evaporation process and requires low grade water for washing
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Aspects to investigate for replicability	Water balance Minimum water quality needed for each step Real water quantity needed for each step
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Useful resources
