

RECP Best Practice Catalogue

Replace electricity with steam as a source of heat for olive browning

Developed within the framework of MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



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Best Practice - Replace electricity with steam as a source of heat for olive browning

SECTOR:	Food & Beverage
SUBSECTOR:	Manufacture of other food products
PRODUCTS	Jam, halawa, syrups, pickles, olives, dates
CATEGORY	Technology upgrade/Eco-innovation
APPLICABILITY	Process

COMPANY NAME	NOT DISCLOSED
COMPANY SIZE	SME

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Description of the problem (Base scenario):

The processing of black olives involves a browning stage where green olives are turned black when heated in a brine solution. The source of heat for the olive browning machine used to be electrical resistances. The yearly electricity consumption during the monitoring period was found to be 33,000 Kwhr.

Using electricity as a source of heat is a wasteful practice unless the type of process being considered requires so. In the case at hand, browning is not a critically delicate process that requires precise temperature control and the configuration of the machine can lend itself easily to modifications.

Description of the solution

Considering that saturated steam at 6 bars was available at the premises of the olive production line, the electrical resistances were replaced with a steam coil controlled by a throttling valve. Because the machine works in batches, the steam flow is fixed once and kept unchanged as long as the same weight of olives in brine is introduced in the machine.

The financial savings result from the difference in cost of electricity and steam while the environmental benefits occur because it requires less CO2 emissions to produce steam than electricity.

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Economic Benefits	<p>Cost of electricity: 0.14 EUR/KWhre</p> <p>Cost of saturated steam at 6 bars: 0.044 EUR/KWhrth (Heavy fuel is used to produce steam)</p> <p>Savings in energy after intervention: $33,000 \times (0.14 - 0.044) \sim 3,000$ EUR/year</p> <p>Water consumption due to steam use is minimal because condensate is returned to boiler</p>
Environmental Benefits	<p>Specific CO₂ emissions of electricity: 1 kgCO₂/Kwhre</p> <p>Specific CO₂ emissions of heavy fuel: 0.4 kgCO₂/KWhrth (at boiler efficiency)</p> <p>Avoided CO₂ emissions: $33,000 \times (1 - 0.4) \sim 20,000$ kgCO₂/year</p>
Negative impacts	Not applicable
Other benefits	
Health and safety impact	

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Capital investments & financial indicators	Cost of intervention: EUR 5,000 Return on investment (simple payback): 1.7 year
Suppliers	None, no special equipment required.
Other aspects	The monitoring period extended from June 2016 till June 2017.
Implementation	Implemented in June 2017.