

RECP Best Practice Catalogue

Reduce waste in cake cutting operation
Developed within the framework
of MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



The SwitchMed Programme is
funded by the European Union

Best Practice - Reduce waste in cake cutting operation

SECTOR:	Food & Beverage
SUBSECTOR:	Bakery and farinaceous products
PRODUCTS	Bread, cakes, muffins, Arabic sweets, petit-four, kaak
CATEGORY	Process control or modification
APPLICABILITY	Process

COMPANY NAME	NOT DISCLOSED
COMPANY SIZE	SME

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Description of the problem (Base scenario):

Large size cakes (50x50 cm) are cut into smaller portions and sold to customers per piece. An estimated 10% of cake production (~ 15 Tonnes) is wasted during cutting and trimming operation. The losses result from the non-uniform edges of the original cake and usage of knives for cutting. The discarded trimmings thickness vary between 15 and 20 mm. Losses can also result from removing the top crust of the cake as it is dry and has strong egg taste reflecting sub-optimal emulsion of egg contents.

This is a case of product wastage, the most inefficient way of resources use because it involves raw material, energy and water wastage not to mention production time.

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Description of the solution

For the material losses from the sides of square or rectangular cakes, reduce cake cuts by:

- Placing Teflon sticks on the inner sides of the cake baking tray. These give the cake uniform edges, they can be easily removed once the cake is out of the oven. Cutting of cakes edges is thus avoided.
- Cutting the sides of the cakes with a plastic string or thread (guillotine), this will reduce the thickness of the discarded parts to 0.5 cm or less instead of 1.5 cm side.

For material losses due to the discarding of the top layer of cakes, it may be possible to reduce losses by adding emulsifying agents (formulation), mixing ingredients thoroughly and optimizing cooking temperature and time (cooking time too long). This is a challenging solution that could imply bringing modifications to the recipe of the cakes and modifying cooking time.

For unavoidable losses, the waste should be valorized by selling as animal feed.

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Economic Benefits	Base case estimated product loss due to trimming wastage: 15 Tonnes/year Estimated product Loss reduction through proposed measures: 50% Specific cost of raw material, energy and water being wasted: 4,500 EUR/Tonne of product Reselling price as animal feed of product being discarded: 100 EUR/Tonne Cost savings achieved through intervention: $15 \times 0.5 \times 4,500 + 15 \times 0.5 \times 100 = 34,500$ EUR/year Specific energy consumption to manufacture product: 4,000 KWhrth/Tonne (as diesel fuel) Specific water consumption to manufacture product: 5 m³/Tonne Energy savings through intervention: $15 \times 0.5 \times 4,000 = 30,000$ KWhrth Water savings achieved after intervention: $15 \times 0.5 \times 5 \sim 37$ m³/year
Environmental Benefits	Specific CO₂ emissions of diesel: 0.24 kgCO₂/Kwhr Avoided CO₂ emissions: $30,000 \times 0.24 = 7,200$ kgCO₂/year Avoided water consumption: 37 m³/year Specific BOD loading: 20 kg/Tonne product Avoided BOD loading: $15 \times 0.5 \times 20 = 150$ kg/year
Other benefits Health and safety impact	Not applicable

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Capital investments & financial indicators	Cost of intervention: 200 EUR Return on investment (simple payback): < 0.1 year
Suppliers	None required
Other aspects	This measure takes time to implement, it involves trial and error approach.
Implementation	This measure is gradually being implemented.