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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

MED TEST III Lebanon

Transfer of Environmentally Sound Technologies

Food and beverage sector

Liban-Lait s.a.l.

Company overview

Number of employees: 552 Full-time employees

Key products: Consumer milk, fresh products (Laban, Labneh or condensed yoghurt, Ayran, flavored long shelf life milk, concentrate based juices and nectars, white cheeses.

Main markets: Local 100%

Standards & certifications before MED TEST III:

Quality Management System ISO 9001:2015, Food Safety Management System ISO 22000:2005 and FSSC ISO 22002-1:2009 in accordance with Hazard Analysis Critical Control Point (HACCP) and the traceability system ISO 22005:2007 for dairy products

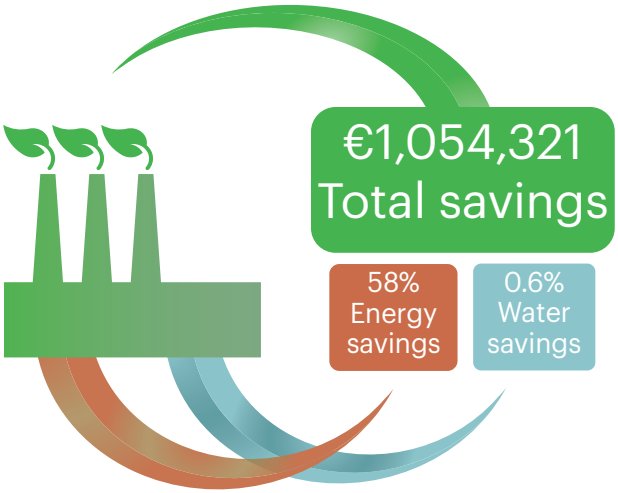
Liban-Lait s.a.l. is one of the leading Lebanese companies in the dairy sector. The company's main business is the production and distribution of dairy products in Lebanon and also operates a franchise from CANDIA, a French international dairy company. Liban-Lait's processing plant is a state-of-the-art facility with fully automated production and packaging lines. Furthermore, the company has a dairy farm with around 2,500 cows.

Benefits

The MED TEST III project identified total annual savings of 1,054,321 Euro* related to energy with an estimated investment of 2,236,673 Euro*. The average payback period for the identified measures is 2.1 years. The top management accepted to implement 56% of the 18 identified measures, and retained 22% for further study. Of the approved measures, 80% have been implemented or are under implementation. The identified energy savings have the potential to reduce about 3,400 tons of CO_2-eq per year and recuperate 4,212 tons of solid waste as manure to be used in as biomass fuel. The energy savings are a combination of energy use reduction due to improved efficiency measures as well as the displacement of conventional energy with renewable energy (PV and biomass).

The company was assisted in developing a new product, valorizing the acid whey that is usually discharged into the wastewater treatment plant. In total, 12 formulations for an Ayran-type beverage were tested at a laboratory scale, while the best options were tested at a larger scale through pilot production batches. Through this innovation, the company can substitute water with acid whey in the range of 40-50% of the initial formulation, with the potential of an average cost reduction of 7% compared to a baseline scenario. Around 50% of the acid whey generated by the company can be valorized, reducing the annual water consumption by 1,175 m³ and decreasing BOD and COD loads in wastewater by 47 and 82 tons per year, respectively. At the same time, a higher value is retained from the milk resulting into a more nutritious product. This company will further explore this initiative from a market perspective.

Identified annual savings



"As a leading diary industry in Lebanon, we are committed to quality and continued improvement of our operations. We joined the MED TEST III project to reduce our costs while optimizing the environmental impacts of our activities. Teaming up our internal team of professionals and the project's expert team, we have made a highly-qualified group to analyse our opportunities for a better use of resources."

Marc Waked
General Manager

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As part of the EU-funded SwitchMed programme, UNIDO demonstrates in the MED TEST III project pathways for industries in the Southern Mediterranean to become more resource efficient and to generate savings for improved competitiveness and environmental performance.

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Saving opportunities**

Actions	Economic key figures			Resource savings & Environmental impacts		
	Investment Euro*	Savings Euro* per year	Payback period years	Water & Materials per year	Energy MWh per year	Environmental impact per year
Good housekeeping measures	3,924	26,845	0.1	-	252	Reduction of 3,399 tons of CO_2-eq. 4,212 tons of manure 47 tons of BOD 82 tons of COD
Steam system performance	23,926	48,521	0.5	-	482	
Variable Speed Drives for air compressors	57,422	22,012	2.6	-	116	
Renewable energy technologies	1,847,067	757,010	2.4	-	6,108	
Thermic treatment optimization	7,656	24,985	0.3	-	215	
Process lines optimization	296,676	172,700	1.7	-	1,236	
Use of whey for new product formulation	-	2,248	-	2,349 m³ water	-	
TOTAL	**2,236,673**	**1,054,321**	**2.1**	**2,349 m³ water**	**8,409**	

* Using average exchange rate February 2022-February 2023 1 USD=0.957 Euro
**Numbers based on the production value: August 2021-July 2022

Good housekeeping measures

This group of measures is related to good practices like cleaning and adequate maintenance of support utilities like boilers, chillers, and air compressors. It comprises equipment cleaning, tuning and fixing leaks of steam distribution pipelines and compressed air, isolation of refrigeration pipes and valves, combing of condensers coils and relocation of the refrigeration system.

Steam system performance

Measures to improve the steam system performance include optimization of boilers' operational parameters such as the air-fuel ratio and insulation of main components like boilers, boilers' accessory piping, steam pipes, valves and tanks.

Variable Speed Drives for air compressors

Through the use of Variable Speed Drives, air compressors will be able to modulate their operational speed according to compressed air demand, avoiding the use of full speed during partial loading which generate excessive energy consumption.

Renewable energy technologies

The company has the exceptional potential to close the loop of its biomass flow generated from the cow farm and integrate it to the steam generation in the manufacturing plant, replacing conventional fuel boilers with biomass boilers. The biomass feedstock will consist of a combination of manure and straw in a proportion equivalent to the current manure production of the dairy farm, and four tons/day of straw. The needed investment includes the preparation steps such as pre-drying and processing through a pelletizer machine. On the other hand, there is potential to extend the current PV solar capacity installed for the factory, by installing a 1,200 kWp PV system connected to the existing one of 214 kWp; the additional capacity would replace 21% of the company's electricity demand. The company decided to install a larger PV system of 1,844 kWp to cover the plant's energy needs in the future and to achieve more self-reliance in the current country situation of energy scarcity.

Thermic treatment optimization

The quality control in Liban-Lait allows a clear distinction of incoming milk grades in quality A and B. Both qualities are never mixed not commingled, therefore it is possible to differentiate thermic treatment profile, bypassing the bactofuge process step when handling low-bacteria-count milk (grade A), and adjusting temperature values as per respective quality, generating thermal and cooling savings.

Process lines optimization

Different process units can be optimized by avoiding double treatment of some milk streams or bypassing redundant equipment like homogenizers for milk products which do not require to undergo additional homogenization. Other measures are typical process control measures involving modifying process temperatures while not compromising the quality or health integrity of the product like for example segregating between the pasteurization temperatures of milk based products and non-milk based juices. Other measures aim to improve the heat recovery ratio at the pasteurization and homogenization stages. This last category requires the most investments and involves advanced technical expertise.

> "The technical assistance from the MED TEST III project helped us to identify important resource efficiency measures mainly in the use of fuel, reduction of energy consumption and the potential for greening our activities by using biomass-based energy. Moreover, we are also exploring new uses of the whey generated from the cheese production, as a parallel initiative to the RECP audit with UNIDO. We will strive to continue improving our environmental performance."
>
> Marc Waked
> General Manager

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