

Energy saving potential of emerging technologies in milk powder production

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ABSTRACT

The past years energy has become an important issue in product processing, and the food industry is no exception. The EU CO₂ targets of 2050 state: cutting 80% of the greenhouse gas emissions and moving to a carbon free energy system. To reach these target energy saving is one of the crucial options. This can only be accomplished by making use of renewable energy sources, and it is crucial to increase the energy efficiency. Therefore we believe technological breakthroughs are necessary to achieve these goals.

Highly energy consuming processes are related to thermal processing. A sector with many heating and cooling operations is the dairy sector. Especially milk powder production consumes large amounts of energy, evaporation and drying processes are responsible for nearly 70% of the total energy demand. Milk powder production has not changed radically over the past decades. Current technologies like evaporation and spray drying are optimized to a maximum; therefore new technologies are required to be able to take a next step in energy reduction. In this work we present how emerging technologies like membrane distillation, mono dispersed droplet drying, air dehumidification with adsorption systems, inline monitoring, and radio frequency heating, coupled with renewable energy sources as thermal solar systems have the ability to reduce the energy footprint of powder production. A combination of these emerging technologies have great potential to reduce the energy consumption in skimmed milk powder production to almost one third of the current energy demand.

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