# Energy Efficient Milky Sprays

## Publieke samenvatting / Public summary

### Aanleiding

Spray drying is a very energy intensive process to dry amongst others milk products into a functional powders. A liquid with typically 50% solids content (absolute level highly depending on composition) is atomized in a high pressure atomizer and dried under the influence of hot air. The internal liquid flow in a high pressure swirl nozzle largely influences the liquid sheet breakup and hence determines droplet size distribution, which in turn determine spray drying efficiency and product quality. High solid content liquids, are typically highly viscous and depending on composition can exhibit non-Newtonian flow behavior. Currently the level of understanding is not yet sufficient to allow for a higher solids loading, which has the potential to lead to a 20% energy reduction, because more of the liquid can be evaporated in the more efficient evaporator or by reconstituting at a higher solids content.

### Doelstelling

This project aims to develop fundamental understanding on the complex fluid dynamics inside the nozzle as well as the liquid sheet breakup, through high fidelity numerical simulations and non-invasive monitoring techniques. The aim is to study the effect of solids content and main constituent components of model liquids on atomization efficiency of the nozzle.

### Resultaat

Ultimately this will lead to recommendations for design and operational principles to help meet the Dutch climate agreements of July 2018 to reduce

**Projectinformatie / Project information**

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**Algemene informatie / General information**

**Penvoerder / Secretariat**
ISPT

**Publicaties en materialen / Publications and attachments**

- **15.12.2024**

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greenhouse emissions by reducing the energy requirements of spray drying processes.

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