

Grainstorm simplifies starch based fermentation

This new process developed at the Technical University of Munich revolutionizes the ethanolic fermentation of starchy raw materials in the production of distilled spirits. It reduces the consumption of energy and water and cuts down on personnel and cleaning costs. It enables the complete digestion of the starch and achieves high alcohol contents. It is suitable for the production of whiskey, vodka or malt spirit.

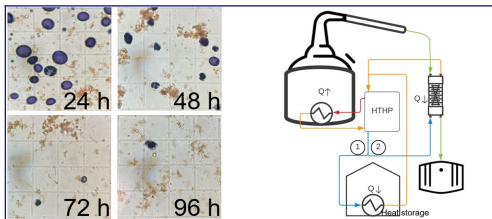


Combined mashing and fermentation speed up the cycle time

In contrast to conventional production, dispersing reduces the energy required in the mashing process by a factor of six and the time required for mashing-in by a multiple of six to ten. Very high mash-in ratios are achieved due to the low gelatinization of starch.

REFERENCES:

[View patent application](#)



Degrading of starch molecules during simultaneous saccharification and fermentation over 4 days. (left)
Schematic layout of a possible energy cycle as there is no thermal energy input needed for mashing. (right)

- 01 Mashing takes place at low temperatures with a dispersing device (up to 32°C)
- 02 No need for cooling the mash, fermentation at mashing temperature
- 03 Complete conversion of starch, very high yields
- 04 Greatly simplified process execution, significant savings in equipment and mashing time



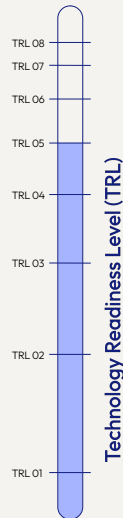
CHALLENGE

Mashing processes are used to break down the starch contained in the raw material into water-soluble saccharides. High temperatures accelerate the process. For this reason, all common processes heat the water-starch suspension and break down the starch into fermentable sugars in a short time. A disadvantage of this is the high viscosity of mashes thus resulting in low alcoholic mashes. Furthermore, the yeast is stressed due to the high osmotic pressure in the mash.

INNOVATION

The invented process carries out a simultaneous saccharification and fermentation. A cold grain-water mixture is dispersed to a homogenous mash. During this process step the temperature rises to fermentation temperature. Enzymes and yeast are added to the mash and are fermented. In tests, wheat mashes reached 14,5 percentage by volume, resulting in 128 LA/ton of mash and up to 396 LA/ton of grain. The grainstorm mashing process allows a new combination of energy streams in the distillery.

01 Basic principles observed 02 Technology concept formulated 03 Experimental proof of concept 04 Technology validated in lab 05 Technology validated in relevant environment 06 Technology demonstrated in relevant environment 07 System prototype demonstrated in operational environment 08 System complete and qualified



An invention of Technical University of Munich



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