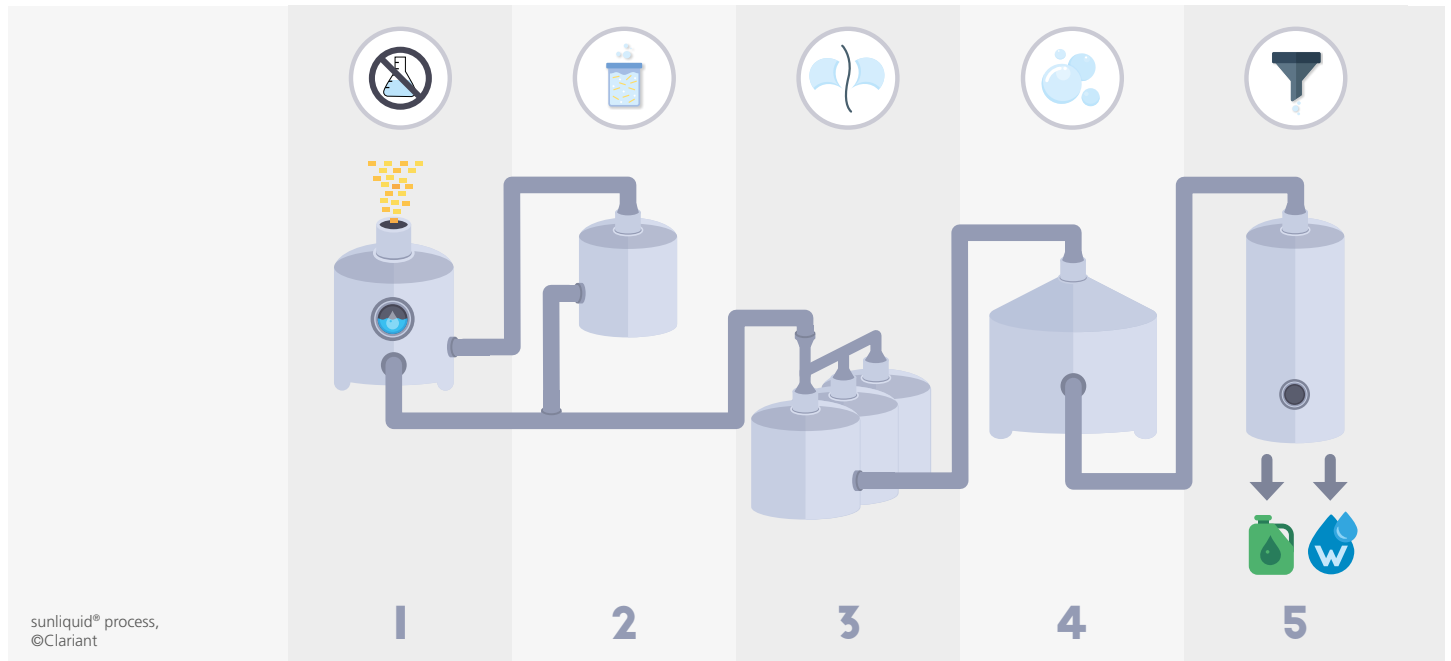


The sunliquid® technology

The sunliquid® process converts agricultural residues such as cereal straw, corn stover, or sugarcane bagasse into cellulosic ethanol.



Chemical-free pre-treatment

The lignocellulosic feedstock is first crushed, chopped, and then treated under pressure and steam. This releases the wood adhesive lignin from the C5 and C6 sugars which are bound in long chains. The solid structure opens up. Electricity and steam for the pre-treatment are obtained by burning the process-inherent residue lignin.

Advantage:

- ✓ Lower production and investment costs
- ✓ Minimized environmental, health and safety risks



Process-integrated enzyme production

A small percentage of the pre-treated feedstock is used for the production of highly optimized enzymes adapted to the feedstock. Special microorganisms use the sugar contained in the straw as a nutrient source to produce the enzymes for the process. This is an integrated part of the process and takes place on-site at the ethanol plant.

Advantage:

- ✓ Significant reduction in production costs
- ✓ Independence from suppliers, price volatility and enzyme supply shortages



Enzymatic hydrolysis (saccharification)

These special enzymes are now added to the pre-treated feedstock. The enzymes break down the sugar chains into the individual sugars glucose, xylose and arabinose.

Advantage:

- ✓ High sugar yields due to feedstock- and process-specific enzymes
- ✓ Fast saccharification process due to highly optimized enzymes



Fermentation

Specially developed fermentation organisms are added to the sugar solution. They simultaneously convert both C5 and C6 sugars into ethanol. Conventional processes only convert C6 sugars.

Advantage:

- ✓ 50% higher ethanol yields due to simultaneous C5 and C6 fermentation



Separation

By using highly optimized and energy-efficient purification methods, ethanol is being separated from water in the final step. The end product contains at least 98.7% ethanol.

Advantage:

- ✓ Pure bioethanol that is ready to be used as drop-ins at petrol stations



Advantages of the sunliquid® process at a glance:

- Cellulosic ethanol realizes up to 95% GHG savings compared to fossil fuels
- No competition with food or feed production and no need for additional arable land
- Fully integrated and compatible process offers high yields at minimal production costs
- Low scale-up risk due to proven process technology and equipment
- Process design can be flexibly adapted to local conditions due to its modular structure
- Flexible use of feedstock: various regional lignocellulosic agricultural residues such as cereal straw, corn stover, or bagasse can be used.

