

Raw material and energy efficiency in food industry with enzymes

About Novozymes

With over 700 products used in more than 130 countries, Novozymes' bioinnovations improve industrial performance and reduce raw material consumption by offering sustainable solutions to several industries. Novozymes' business is industrial enzymes, microorganisms and biopharmaceutical ingredients.

In industrial applications, enzymes can replace chemicals and optimize production processes. Enzymes can assist companies in improving their raw material efficiency, save energy and/or generate less waste. As an example, enzymes can assist industrial food producers make the most of their resources and optimize their processes, saving time and cost while reducing their impact on the environment.

Improving energy efficiency in baking

Novozymes has an enzyme solution which releases glucose from starch providing a number of benefits including enhanced crust color, reduced baking time and improved yeast functionality. The reduced baking time can be translated into reduced energy costs and CO₂ emissions. Additionally, enzyme products containing amylase can increase the time when cake and bread has the best consistency by diminishing the crystallization of the starch and thereby releasing the natural moist in the flour. This allows for more flexibility in the distribution and gives more time for full utilization of the bread and cake and thereby less waste.

Raw material efficiency in the fishing industry

Besides improving energy efficiency, enzymes can also help industrial food producers increase raw material efficiency. The fishing industry is a one example.

When fish are fileted in industrial production processes, substantial amounts of fish meat remain with the bones and ends up as animal feed or waste. The remaining fish meat on the bones can, however, be extracted from the bones with the help of enzymes and the "fish protein extract" can be used in processed fish products such as smoked fish and fish pate. As a result, enzyme application leads to better raw material utilization and less waste.

Substituting chemicals with enzymatic solution in vegetable oil production

Enzymes can increase output and remove substantial amounts of chemicals in the production of vegetable oil. Phospholipids are removed from vegetable oil to avoid the oil getting rancid. By substituting the traditional phospholipid removal process with an enzymatic process, chemicals and energy are saved and the yield of oil is increased. By adding 31 gram of enzyme product to the production of 1 ton vegetable oil, 3000 liter of water, 10 MJ process energy and more than 15 kg chemicals (sodium hydroxide, sulphuric acid, aluminiumsulphate, and phosphoric acid) are saved while output is increased by 8 kg.

Learn more about enzyme applications in the food industry

Learn more about the optimization possibilities of enzymes and find LCA studies related to the food industry and other industries here:

- [Novozymes' enzymatic solutions](#)
- [Published LCA studies by Novozymes for several industries](#)