FuturEnzyme. Technologies of the FUTURe for low-cost ENZYMEs for environment-friendly products

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Challenges of detergent, cosmetic ingredients and textile production and bio-processing

Detergents:

Large annual energy and water consumption during the washing process

The entire volume of detergent used in a washing cycle is released to the waste water stream

Concerns about the detergents' actual washing capacity at low temperature

Concerns about the storage stability of enzymes in liquid detergents in emerging markets.

Textiles:

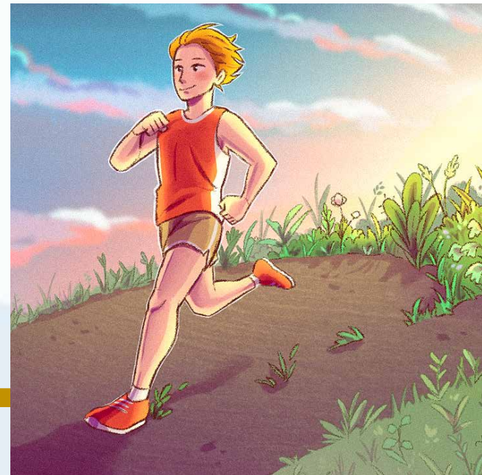
The manufacturing process requires massive amounts of water, heating energy and chemicals

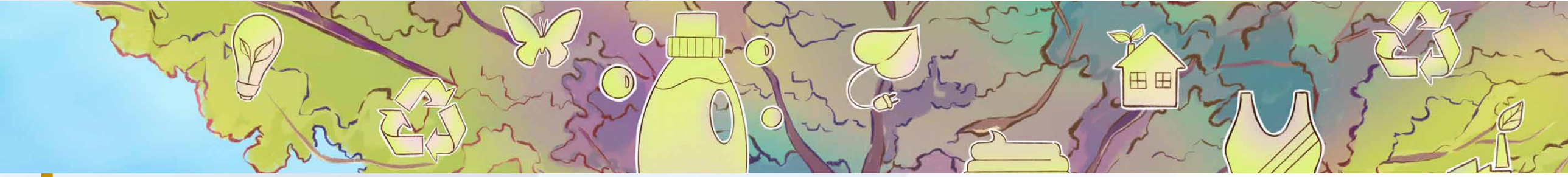
Consumers expect high quality textiles, being equally colored and having sophisticated benefits, like absorbing moisture, being resistant to mechanical stress, avoiding swetting and thus the textile industry is constantly looking for meeting these consumers' needs.

Cosmetics:

Producing eco-friendly cosmetic ingredients remains a challenge, as their processing commonly requires the use of chemicals and high temperature

Consumers increasingly demand cosmetics with better properties, e.g. maintaining skin looking young and avoiding-ageing.

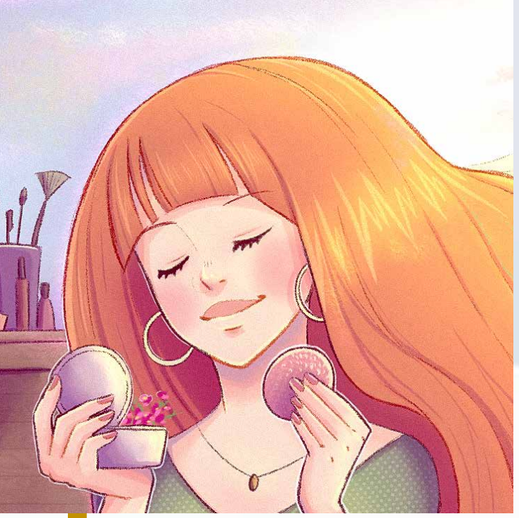




European consumers would like to access to more environmentally friendly products

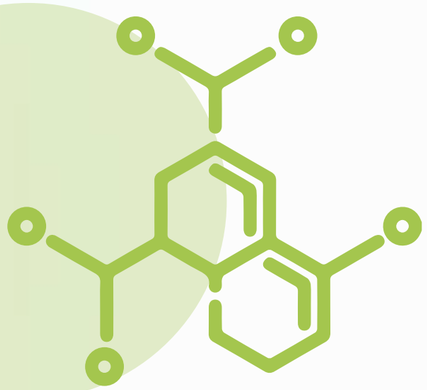
Consumers are becoming increasingly aware of the negative impact of everyday products on the environment and are searching for alternatives that could be beneficial for the planet.

Socio-economic evaluations that assess consumer perception of the environmental impact of daily life habits revealed that approximately **90% of consumers have a more positive image of a company that supports biotechnology and pursue sustainable values.** Furthermore, about **50% of Europeans** are willing to pay a **green tax for a more sustainable alternative.**

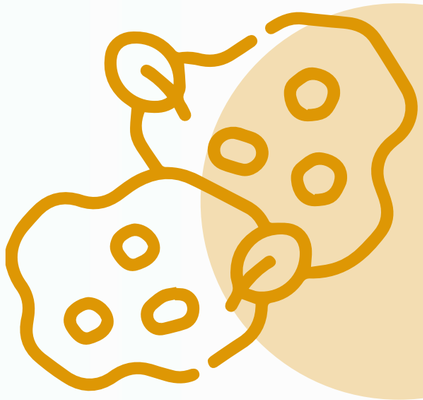


FuturEnzyme project: New consumer products for the green transition of European industries

FuturEnzyme's ambition is to approach the complex reality and obvious challenges of detergent, anti-ageing cosmetic ingredients and textile production and bio-processing through the development of microbial enzymes with enhanced performances compared to the existing ones in the market.



For that, FuturEnzyme's goal is to develop **"intelligent" enzymes** that meet the characteristics of efficiency and stability required by industry. This will be achieved through a massive bio-prospecting of enzymes from microorganisms, including those from remote and inaccessible places, and their massive analysis with the help of supercomputers.



On the other hand, several techniques will be applied to improve, both technically and economically, the performance and productivity of the best enzymes.

We strongly believe that with these enzymes, that themselves are **eco-ingredients**, we will guarantee not only **high ecological standards** (reduction of water pollution and consumption, chemical usage, waste production and energy consumption)

but also **high performance** of three consumer products already in the market:

A **laundry detergent**, with enzymes being stable under different storage conditions, with reduced chemical quantity in the formulation and effective at lower washing temperature reducing the energy consumption of a washing cycle

A **hyaluronic acid-based cosmetic cream**, starting with an enzymatic processes to produce, at low temperature and aqueous solution, eco-hyaluronic acid with better defined molecular weight that is expected to have better anti-ageing properties

A **textile** that is produced with more sustainable (less water and energy consumption) enzyme-based pre-treatment and finishing steps, and improved fabric properties.

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