



NATURALITY IN AFYREN'S PRODUCTS

Consumers are looking for products that are healthy, authentic and above all, natural. Fermentation is a natural transformation as ancient as life on Earth. Natural fermentation is also the key to AFYREN's contribution to a circular, biobased economy. Definitions of naturalness vary according to geography and sector, but these days, everyone seems to want it.

Sourdough bread, balsamic vinegar, beer or blue cheese. These everyday products have one thing in common: they are all fermented. Fermented food is transformed by microorganisms like bacteria or yeast that are commonly found in nature. During the fermentation process, these microorganisms transform substrate such as sugars into energy and molecules including aromatic substances and vitamins.

Across the globe, fermented food and drink takes many forms. Fermentation is an obligatory step in creating everyday luxuries like wine, chocolate, or vanilla, to name just a few.

Natural fermentation is also the key to AFYREN's contribution to a **circular, biobased economy**.

The global environmental issues we are facing have made us rethink the way we are eating. Increasingly, consumers aspire to a healthier lifestyle and seek fine products that don't compromise on authenticity. They are looking for food produced **sustainably** and with respect for the environment and our ecosystems. 83% of French people say they pay attention to the naturalness of the products they buy, [according to a survey by Mediaprism](#).

At AFYREN, we offer sustainable, competitive, biobased ingredients that can replace conventional petro-based products.

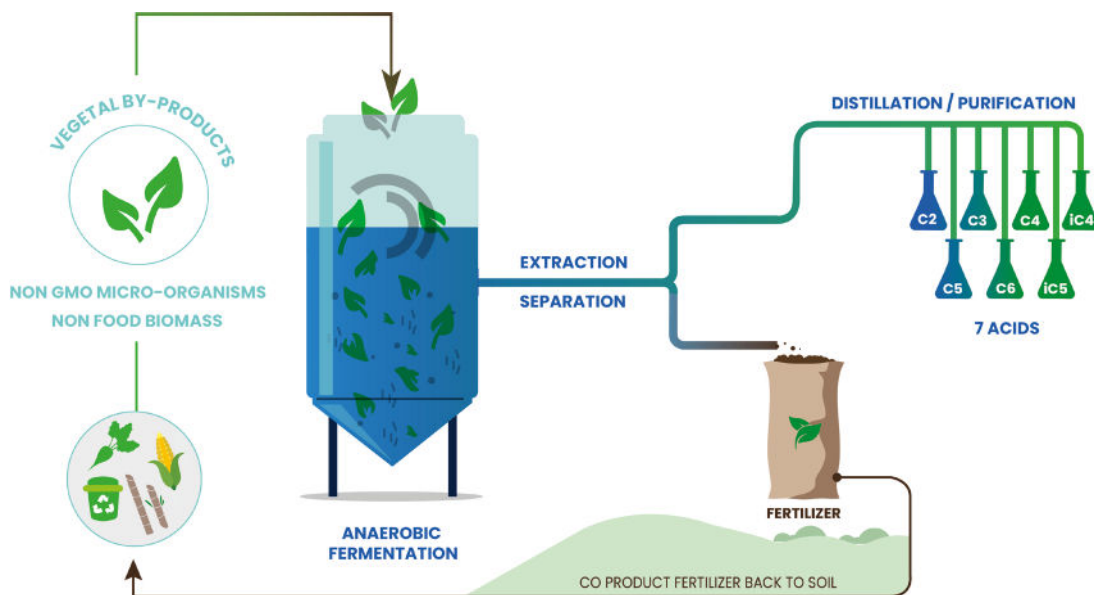
Over the past decade, our teams have developed a process to create a range of [7 organic acids](#) through fermentation, reproducing the conditions existing since ages in nature.

These biomolecules – produced at industrial scale – offer the same performance as existing conventional products but with only **one-fifth of the carbon footprint** (source: [LCA AFYREN](#)). What is more, the process does not affect the human food chain, as only biomass co-products are used.



AFYREN's biomimetic process

The unique **biotech approach** developed by AFYREN uses a mix of natural living microorganisms to ferment biomass substrates, such as sugar beet co-products, to produce **7 carboxylic acids**: from acetic acid to caproic acid. The full process is biomimetic – a true replication at industrial scale of an ancient transformation found in nature.



After the fermentation step, the acids are processed through distillation and other purification steps to obtain pure molecules. The final products are commonly found in food products such as acetic acid, which is naturally present in vinegar, or butyric and caproic acids (present in cheese, coconut oil or red berries.)

Regulatory overview of natural products

There are many regulations and standards that define naturality, depending on the region and what the final product is used for. AFYREN ensures that its products respect the appropriate regulations for natural ingredients.

For example, [ISO 9235](#), a standard for natural fragrances, stipulates that to be considered as natural, an aromatic raw material should be produced from raw material of natural origin (vegetal, animal, etc.) and produced through a traditional process (heated, ground, distilled, fermented, etc.).

For flavoring substances, additional requirements must be met if you are following the European regulation ([EC 1334/2008](#)). "Natural flavoring substances" have to meet requirement 1 above and be processed by one or more of the traditional food preparation processes

listed in the regulation. Additionally, the substance must be naturally present and found in nature.

Finally, to be considered as a "natural product" as per the [ISO 16128-1](#) standard for cosmetic products, a product should meet requirements 1 and 2 as stated above. The substance must also be obtained from physical processes (grinding, drying, distillation, etc.) or obtained from fermentation reactions that exist in nature and that lead to molecules that also exist in nature.

AFYREN's products meet the key standards

AFYREN's products strictly meet all the flavors, fragrances and cosmetics industry regulations and standards mentioned above. They are also suitable as ingredients for natural flavors in the U.S. As for cosmetics, AFYREN products are approved as COSMOS raw material for COSMOS-standard cosmetics.

Benefits for the whole value chain

AFYREN's natural ingredients can be used directly and as intermediates for other natural ingredients in flavors, fragrances, and cosmetics. Our seven natural organic acids offer a large range of possibilities in several industries where companies are seeking access to ingredients that are **responsibly** produced, **sustainable** and **follow a short and transparent supply chain**.

