This post is part of the ZEBRA-LIFE 101 series. In this first edition, we will introduce the basis of the ZEBRA-LIFE project and we will go over the whole project value chain; from the raw materials, the technology, the products that will be obtained and a review of its potential benefits. Stay tuned to not miss anything!

LIGNIN – ZEBRA-LIFE'S RAW MATERIAL

This week we start with Lignin, the project's raw material, the second most abundant organic substance in plants after cellulose which constitutes 30% of the non-fossil organic carbon in nature. But what do you know about Lignin? In this blog post we will explain more about this natural raw material that offers a great source of aromatic molecules that can replace those derived from fossil sources.

Lignin is one of the three main components of plants, jointly with cellulose and hemicellulose. Lignin is a fibrous and tasteless complex molecule comprised of single units linked together and was discovered by a Swiss botanist Augustin Pyramus de Candolle in 1813. He first called it lignine from the Latin word *lignum* meaning wood although nowadays we also know it is present in other herbaceous plants.

Lignin acts as glue or binding agent in plants and its main function is to provide mechanical strength and support for the formation of vascular tissue to transport nutrients. It also acts as a barrier to resist microbial attacks and sunlight UV damages thanks to its antioxidant properties. This natural raw material is the greatest source of aromatic molecules similar to those found in some goods derived from fossil sources.

In the current pulp and paper industry, Lignin is a by-product of the production of cellulose pulp from woodchips, which is the raw material used to produce paper. At the end of the process, large amounts of Lignin are generated and most of it is currently used to recycle the inorganic chemicals used by pulp and paper mills.

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However, due to its important source of aromatic molecules Lignin could be valorized in much more than only energy as aromatic compounds are vital in the biochemistry of every living organism.

Nowadays, these aromatics have multiple industrial applications, with 35 million tons being manufactured every year mainly from fossil sources, such as oil or coal tar. Despite the enormous amounts of Lignin produced every year, its use as a source of aromatics is still at a very early stage of development.

The ZEBRA-LIFE project aims to develop a novel technology to take advantage of the Lignin produced by the pulp and paper industry and to use it as non-fossil aromatic ingredients for products with high antioxidant capacity and UV absorbance. In this way, ZEBRA-LIFE will develop a renewable aromatic product with direct use in multiple industrial sectors (e.g. cosmetics, food, rubber, fuels & lubricants), contributing to an improved life cycle assessment by the integration of a circular process.

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