Technical note
non chemically modified cellulose fibres

1. Context

The proposed Directive on the Reduction of the impact of certain plastic products on the environment proposes the following definition of plastic: "'plastic' means a material consisting of a polymer within the meaning of Article 3(5) of Regulation (EC) No 1907/2006, to which additives or other substances may have been added, and which can function as a main structural component of final products, with the exception of natural polymers that have not been chemically modified."

Article 3(40) of Regulation (EC) No 1907/2006 of the European Parliament and of the council of 18 December 2006 states: "Not chemically modified substance: means a substance whose chemical structure remains unchanged, even if it has undergone a chemical process or treatment, or a physical mineralogical transformation, for instance to remove impurities".

2. Regenerated cellulose fibres have the same molecular structure as cellulose and are not chemically modified

All plants contain cellulose as a major structural polymer. Especially in wood, cellulose is the main constituent together with lignin. Cellulose fibres can also be produced by an industrial process, by extraction of the cellulose from plant material, dissolution and regeneration. The most important raw material used is wood, therefore these fibre types are also summarized as wood-based fibres. They are termed viscose, modal, and lyocell according the generic fibre names by BISFA (BISFA, 2018). The cellulose in natural fibres (cotton and bast fibres) and regenerated cellulose fibres (viscose, lyocell…) is the same natural polymer and completely identical.

The production process starts from the renewable raw material wood. In the first step, pulp is produced in a process very similar to paper pulp making. Following, this pulp is dissolved either by a non-isolated intermediate (viscose) or by direct physical dissolution (lyocell). Viscose and lyocell fibres are pure cellulose without any chemical modification. Viscose and lyocell have the same molecular structure as the natural cellulose. It is known that cellulose in both natural and regenerated cellulose fibres is biodegradable by the same enzyme systems of microorganisms (Bechtold and Schimper, 2010).

References

- BISFA (2018) generic fibre names, www.bisfa.org
- T. Bechtold and C. Schimper (2010) Hydrolysis of regenerated cellulose fibres for textile and other applications. Advances in textile biotechnology, 312 pp.