High-resolution mass spectrometry to explore the reactivity and health-promoting functions of dietary fibers.

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Dietary fibers, just like all native polysaccharides, are susceptible to oxidation reactions due to their high content in hydroxyl groups. They can be oxidized enzymatically and/or chemically, resulting in modification of their health-beneficial and technological properties.[1,2] Health-benefits especially for daily intake of soluble dietary fibers include blood cholesterol-lowering properties and improvement of insulin sensitivity in non-diabetic and diabetic individuals alike.[2] To understand the structural properties of oxidized polysaccharides, next to the molecular mass and identification and quantification of the type of newly introduced functional groups, the precise location of these groups in the oxidized polysaccharide is of interest as well. Being able to precisely locate functional groups remains a challenge to reach complete structural characterization of polysaccharides.

Mass spectrometry (MS) has emerged as a powerful technique to unravel the structural features of oxidized polysaccharides, allowing precise location of newly introduced functional groups and understanding of oxidation mechanisms. This is show-cased on examples such as cereal β-glucan[3] and arabinoxylan,[4] both partially soluble dietary fibers with health benefits, using different labelling strategies and specific enzymatic treatments to investigate the oxidized oligosaccharides by ultra-performance liquid chromatography coupled to high-resolution MS.

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