OLIVE POMACE BIOREFINERY – CONTRIBUTION OF POLYSACCHARIDES

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Olive fruits are the raw material for a number of products, particularly olive oil and table olives. Olives are picked late in the autumn or winter, depending on the variety and on the desired characteristics of the final product. For olive oil production, the olives are harvested at an early stage of ripening. On the contrary, for table olive production, particularly for black oxidized processing, the olives harvested at different stages of ripening, *i.e.* green, cherry and, for certain varieties, black, are generally used. At these ripening stages, olives have distinct textures which are greatly determined by structural changes in the cell wall pectic polysaccharides[1].

Olive pomace is an industrial by-product originated in the olive oil production process that is obtained by squeezing the olive pulp without any chemical treatment. If water is added to the extraction media, three phases occur: oil, water and pomace. This residue is usually used for the extraction of olive pomace oil with *n*-hexane. For environmental reasons, the addition of water is avoided in most of the industries. This change in the technology results in a very wet pomace due to retention of water from the fruit in the residue. This residue has no significant commercial value due the considerable energy expenditure required to the drying process. With the purpose to valorise this by-product by defining new applications, we have been characterising the wet olive pomace, namely the structural features and rheological properties of the cell wall polysaccharides and phenolic compounds.

The arabinan moiety of olive pulp pectic polysaccharides has been shown to contain a characteristic structural feature that had never been reported to occur in any other arabinan: a β-anomer of an Ara*f* residue occurs as the terminal residue of the (1→5)-linked arabinan backbone. All other Ara residues are in α anomeric configuration[2].

The pectic polysaccharides present in the wet olive pomace are polydisperse in relation to sugar composition and charge due to the high content of arabinose. Despite the high neutral sugar content, this pectic fraction formed elastic gels on addition of calcium, both at pH 7 or pH 3. As compared to a commercial pectin, the olive pectic extract showed higher critical concentrations but also a much larger zone in which homogeneous gels were obtained. The results allowed inferring that olive pomace can be a potential source of gelling pectic material with distinct rheological properties than those available commercially[3].

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[2] Cardoso, S. M., Ferreira, J. A., Mafra, I., Silva, A. M. S., Coimbra, M. A. *J. Agric. Food Chem.* **2007**, *55*, 7124-7130.
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