

Enzymatic process development for the extraction of ferulic acid from wheat bran



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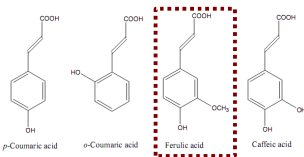


The agro-industries generate each year thousands of tons of by-products, such as cereal bran or sugar beet pulps. For instance, Walloon wheat transformation industry provides annually about 200.000 tons of bran. Most of those by-products are under-valorized as cattle feed. By the use of biorefinery, this biomass may constitute a renewable source for various value-added molecules like dietary fibres, proteins, antioxidants, and more.

A thesis in progress in the Food Science and formulation laboratory of Gembloux Agro- Bio Tech focuses on the bio-extraction of ferulic acid

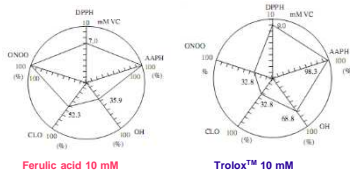
What is ferulic acid ?

Ferulic acid (FA) is the main example of the **hydroxycinnamic acids** part of the phenolic acids family



Major hydroxycinnamic acids

FA is a **powerful antioxidant** as it is a strong H donor stabilized by resonance

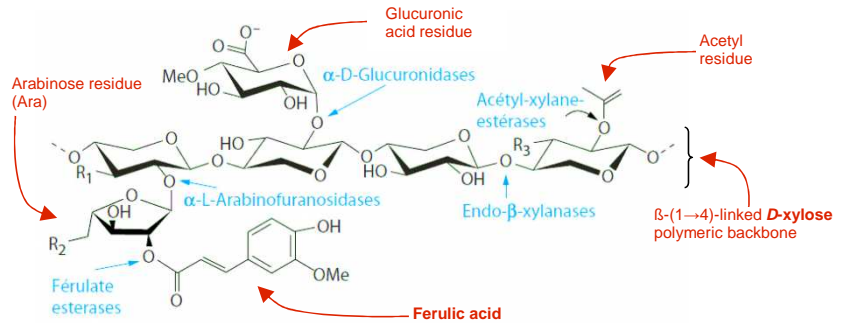


Comparison of the antioxidant activities of FA and Trolox measured by several methods i.e. by the scavenging of several radicals.
DPPH (1,1-diphenyl-2-picrylhydrazyl), AAPH (peroxyl radical), OH (hydroxyl radical), CLO (hypochlorite ion), ONOO (peroxynitrite). Terashima et al., Food Chemistry (2009).

Occurrence

FA is present in **wheat bran** about 5 mg/g, dry basis, mainly ester-linked to the constitutive arabinoxylans (AX).

Enzymatic hydrolysis of ferulic acid is the result of a synergistic action of several AX-degrading enzymes, mainly xylanases (hemicellulases) and ferulic acid esterases. Other enzymes (cellulases, proteases) may help to crack the complex cell-wall structure.



Structural units of arabinoxylan, showing main constitutive elements (substitution of the xylan backbone) and hydrolysing enzymes. Meyer et al., STI (2005).

Extraction process : in development

