

SUPERCritical FLUID EXTRACTION OF LIPOPHILIC EXTRACTIVES FROM WHEAT STRAW *TRITICUM AESTIVUM*

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Wheat straw is an abundant by-product of growing wheat for grain and alternative uses would be extremely valuable to the agriculture industry because farm incomes are at a record low, and would favour environmental protection and sustainable development. The isolation of the lipophilic extractives of wheat straw is of particular interest for several reasons: the world's supplies of natural waxes, such as Carnauba (*Copernicia cerifera*) are starting to run short of demand;¹ previous research has shown that wheat straw wax has the ideal properties for use in the cosmetics industry.² Also, the cellulose present within wheat straw could be used as a raw material for the paper industry, where lipophilic extractives are renowned to cause production and environmental problems.³ Therefore, the removal of such extractives would be advantageous.

Conventionally, neutral lipids are isolated by solvent extraction using an organic solvent. These extractives consist of 5 main lipid classes (free fatty/resin acids, wax esters, sterols, steryl esters, and triglycerides).

However, the drawbacks associated with this technique such as low selectivity and solvent hazards have led to the search for new alternative extraction processes. In this work, the lipophilic extractives of wheat straw have been isolated from *Triticum aestivum* by an environmentally friendly process using supercritical carbon dioxide. The process conditions during the extraction with supercritical CO₂ have been optimised with respect to pressure, temperature, nature and percentage of modifier in order to selectively obtain the lipophilic extractives as well as the different families of lipophilic components. Qualitative and quantitative analyses of the extracts was determined by GC and GC-MS and compared with those obtained by solvent extraction with dichloromethane, acetone, and dichloromethane/methanol (4:1).

¹ Juniper B.E.; Straw, its structure and chemistry and the possibilities for its further use as raw material for industry, Paper given at the international conference: Straw – opportunities and Innovations (1990) Peterborough

² Hero: http://www.hero.ac.uk/business/archive/print_straw_materials1358.cfm

³ Allen L.H., Pitch control during the production of aspen kraft pulp, *Pulp Paper Can.*, 89 (1988) 87-91