COMPARISON OF EXTRACTION YIELD AND SELECTIVITY BETWEEN SUPERCRITICAL FLUID AND CLASSICAL METHODS OF TAGITININ C EXTRACTION

E. Ziémons[a], E. Goffin [b], R. Lejeune[a], L. Angenot [b], L. Thunus [a]

[a] Laboratory of Analytical Chemistry, Bioanalytical and Pharmaceutical Research Center, Institute of Pharmacy, University of Liège (ULg), CHU, Tour 4, Avenue de l'Hôpital 1, B-4000 Liège, Belgium;
Fax: +32 (4) 3664324 ; e-mail : eziemons@ulg.ac.be.
[b] Laboratory of Pharmacognosy, Natural and Synthetic Drugs Research Center, Institute of Pharmacy, University of Liège (ULg), CHU, Tour 4, Avenue de l'Hôpital 1, B-4000 Liège, Belgium.

INTRODUCTION

Supercritical fluid extraction is known as efficient method for the extraction of non polar compounds from plant matrices. Carbon dioxide is the most widely used solvent for extraction of natural products for foods and medicines, under mild conditions. It is inert, inexpensive, odourless, tasteless and environment-friendly solvent. Further, there is no solvent residue in the extract, since it is a gas in the ambient condition [1, 2].

Tagitinin C, an active sesquiterpene lactone against *Plasmodium falciparum* [3], was extracted from the aerial parts of *Tithonia diversifolia* using supercritical carbon dioxide and was quantified by FTIR spectroscopy.

AIM

The aim of this work is to compare the extraction yield of tagitinin C and the selectivity of the carbon dioxide supercritical fluid extraction (SFE) to classical methods as Soxhlet (S) extraction with dichloromethane and maceration followed by lixiviation with ether (ML).

METHODS

Supercritical fluid extractions were performed using a Varian Star SFE Autoprep 44 (Suprex Corporation, Blacksburg-VA, USA).

Tagitinin C contents of *T. diversifolia* aerial parts were quantified by FTIR using a Perkin-Elmer Spectrum GX Fourier Transform Infrared spectrophotometer (Perkin-Elmer Limited, Beaconsfield, England). The absorbance of the very specific C=O stretching vibration at 1664.8 cm^{-1} was compared to those of calibration standards to quantify tagitinin C [4].

RESULTS AND DISCUSSION

The optimal conditions were determined using a designed experiment and were met for a pressure of 35.0 MPa and temperature of 67.8°C. The operating procedures were given in a previous work [5].

The results demonstrated that the $SFE_{optimized}$ is an effective and selective extraction method for tagitinin C. Soxhlet extraction with dichloromethane and maceration followed by lixiviation with ether gave similar extraction yields but the tagitinin C concentration in S extract (15.6% w/w) and in ML extract (30.7% w/w) was lower than that in the optimized SFE extract (52.8% w/w).

REFERENCES

[1] Mukapadhyay, M., CRC Press (Ed.), CRC Press, Boca Raton, **2000**, p.315
[2] Taylor, L., Wiley-Interscience (Ed.), Wiley-Interscience, New York, **1996**, p.175
[3] Goffin, E., Ziemons, E., De Mol, P., De Ceu De Madureira, M., Martins, A.P., Proenca Da Cunha, A., Philippe, G., Tits, M., Angenot, L., Frederich, M., Planta Medica, Vol. 68, **2002**, p. 541
[4] Ziemons, E., Goffin, E., Lejeune, R., Angenot, L., Thunus, L., Talanta, Submitted
[5] Ziemons, E., Goffin, E., Angenot, L., Thunus, L, Proceeding of 10th Forum of Pharmaceutical Sciences, Journal de Pharmacie de Belgique, **2001**, p.52