

## 2<sup>nd</sup> International Conference and Expo on **Separation Techniques**

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### **Supercritical CO<sub>2</sub> in its multiple roles: Solvent for fractionation of complex mixtures and blowing agent in polymer foaming**

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Carbon dioxide in its supercritical state (sc-CO<sub>2</sub>) can find application in formation of microcellular polystyrene foams (PSF) with improved thermal properties in comparison with PSF on the market. A most important application of sc-CO<sub>2</sub> on industrial scale is supercritical fluid extraction (SFE) from plants. Both processes have been studied in our laboratory. Although the SFE is more selective than common extraction methods, CO<sub>2</sub> extracts still contain a mixture of chemical compounds. If a high concentrated isolate is required, suitable fractionation methods have to be involved into the process. Supercritical adsorption, a novel promising method combining SFE from plants with selective adsorption of extracted compounds, could be a solution when high purity isolates free of any traces of organic solvents are required. We used this method for fractionation of turmeric (*Curcuma longa* L.) isolate obtained by SFE. The major compounds analyzed by GC were turmerone (22.7 wt%), ar-turmerone (13.2 wt%) and curlone (13.8 wt%). Turmerones belong to widely studied substances with potential use in the treatment of neurodegenerative diseases. The efficiency of fractionation was studied in terms of adsorption conditions, adsorbent type and sorbent-to-feed ratio. The concentration of turmerones in isolate increased from the initial 49.7 wt.% up to 93.8 wt% with using a particular type of silica gel. Moreover, the concentration of  $\beta$ -sesquiphellandrene, a compound with a potential anticancer activity, in volatile fraction obtained from supercritical adsorption process was almost 16 times higher than in the initial sample. These are promising results for a more detailed subsequent research on this method.

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#### **Biography**

Martin Topiar has completed his Master of Science in Synthesis and Production of Drugs from University of Chemistry and Technology Prague. Presently he is a PhD student at Institute of Chemical Process Fundamentals of the CAS, v.v.i. focusing on the SFE from plants with particular interest in a study of several types of fractionation techniques. He has published 3 papers in reputed journals and presented his work in many international conferences dealing with supercritical fluids.

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