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## **COST ACTION GREENERING – DATA COLLECTION**

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**First name, Family Name:** Erika Maria Vagi

**Type (Academic or Industrial):** Academic

**Country:** Hungary

**Leadership position in the COST:** STSM coordinator on CA18224

**Working Group in which you are involved:** WG3

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**Laboratory/Company:** Budapest University of Technology and Economics (BME), Department of Chemical and Environmental Process Engineering, Extraction Research Group

**Laboratory/Company info:** BME is the one of the oldest and the largest university in Hungary. The Extraction Research group focuses on separation of active compounds or compound families from plant materials, pharmaceuticals, and waste streams. Traditional extraction techniques are used in laboratory and pilot plant scales along with high pressure extraction applying laboratory and pilot plant sized supercritical carbon dioxide extraction units, with antisolvent crystallisation units and with high pressure view cell for studying the phase equilibria of certain compounds in pressurized fluids.

**Link to the home page of the Laboratory/Company:**

<http://sfe.kkft.bme.hu/en/current-research.html>

**Fields of expertise:** High pressure extraction and separation up to 500 bar pressure. Fractionate separation of medicinal plants, spices and vegetable matters. Value-added phytochemicals from waste materials. Traditional extraction techniques (Soxhlet extraction, steam distillation, and solvent extraction in lab and pilot plant scales, high pressure liquid extraction), supercritical carbon dioxide extraction. Antisolvent fractionation bioactive compounds and compound-families. Enantioselective crystallisation of pharmaceuticals with CO<sub>2</sub>. Colourants, antioxidants and antimicrobial compounds from food industrial wastes and by-products.

**5 Main publications or patents:**

- Vági E., Balázs M., Komoczi A., Kiss I., Mihalovits M., Székely E., Cannabinoids enriched extracts from industrial hemp residues, *Periodica Polytechnica Chemical Engineering*, **2019**, 63 (2), 357-363. DOI: 10.3311/PPch.12896
- Calvo A, Dévényi D, Kószó B, Sanz S, Oelbermann A-L, Maier M, Keve T, Komka K, Gamse T, Weidner E, Székely E, Controlling concentration of bioactive components in cat's claw based products with a hybrid separation process, *Journal of Supercritical Fluids*, **2017**, 125, 50-55. DOI: 10.1016/j.supflu.2017.01.018
- Bartolomé OA, Calvo A, Székely E, Škerget M, Knez Ž, Supercritical fluid extraction from Saw Palmetto berries at a pressure range between 300 bar and 450 bar, *Journal of Supercritical Fluids*, **2017**, 120, 132-139. DOI: 10.1016/j.supflu.2016.11.003



- Tukacs JM, Fridrich B, Dibó G, Székely E, Mika LT, Direct asymmetric reduction of levulinic acid to gamma-valerolactone: synthesis of a chiral platform molecule, *Green Chemistry*, **2015**, 17(12), 5189-5195. DOI: 10.1039/C5GC01099C
- Catchpole OJ, Tallon SJ, Dyer P, Montanes F, Moreno T, Vagi E, Eltringham W, Billakanti J, Integrated supercritical fluid extraction and bioprocessing. *American Journal of Biochemistry and Biotechnology*, **2012**, 8, 263-287. DOI: 10.3844/ajbbsp.2012.263.287
- Vagi E, Simandi B, Vasarhelyine KP, Daood H, Kery A, Doleschall F, Nagy B, Supercritical carbon dioxide extraction of carotenoids, tocopherols and sitosterols from industrial tomato by-products, *The Journal of Supercritical Fluids*, **2007**, 40 (2), 218-226. (2007) DOI: 10.1016/j.supflu.2006.05.009

#### **Collaborations:**

PROBIOMAT EU-MEST-CT-2004-007767;

DoHip, EU FP7 Marie Curie ITN, PITN-GA-2012-316959;

COST Action CM1206 EXIL;

Industry driven R&D with Hungarian food and cosmetic industries (BioBerta Drog Ltd., Bay Zoltán Nonprofit Ltd., Gradiens Ltd., HunHemp Ltd., Bunge Ltd.)

#### **Facilities:**

- A pilot plant (5 L) high pressure supercritical carbon dioxide extraction unit with two separators (up to 500 bar and 100°C);
- Laboratory sized high pressure extractors, reactors (2-120 mL)
- High pressure optical view cell (up to 750 bar pressure)
- Laboratory sized high pressure antisolvent fractionation unit (with crystallization and separation vessels, up to 200 bar pressure)
- Pilot plant Soxhlet extraction unit (5 L)
- Pilot plant steam distillation unit
- All kinds of facilities for chemical analysis (GC, HPLC, IR, NMR, etc) and solid phase analysis (SEM, TEM, XRD, DSC, TG, DTA, BET, etc.)
- Free radical scavenging activity measurements (with spectrophotometer)
- Oxidative stability measurements (by Rancimat apparatus)
- Microbial tests for evaluation of antibacterial and antifungal activities
- basic laboratory tools (spectrophotometer, scales, sieve racks, driers, evaporators, etc.).