ESSENTIAL OILS (incl. Flavour and Fragrance)

NPARR 2(4), 2011-0378, Improvement of essential oil yield of oil-bearing (Rosa damascena Mill.) due to surfactant and maceration

The essential oil content of the oil-bearing rose (Rosa damascena Mill.) is relatively low, around 0.3-0.4 mL kg⁻¹ in fresh flowers. There is a need to increase essential oil yield of oil-bearing rose. The objective was to examine the effect of Tween 20 (polyoxyethylene sorbitan monolaurate) applied with, or without, maceration of flowers on oil content and composition of oil-bearing rose harvested at beginning of flowering, full bloom, and end of flowering. Addition of Tween 20 at 1000 mL L⁻¹ and 2500 mL L⁻¹ increased essential oil yield by 26% (to 0.44 mL kg⁻¹) and 54% (to 0.54 mL kg⁻¹) respectively relative to the untreated control that gave 0.35 mL kg⁻¹ yield. Maceration, in combination with the addition of Tween 20 at 1000 mL L⁻¹ and Tween 20 at 2500 mL L⁻¹, increased oil yield by 69% (to 0.59 mL kg⁻¹) and 94% (to 0.68 mL kg⁻¹) respectively. Among the three phenological phases of harvest, harvesting at the beginning of flowering gave the highest yield followed by the full bloom and then by the end of flowering phases. Since the interaction effect was not significant, the differences obtained among the treatments were regardless of the phase, and vice versa. Treatments did not significantly alter composition of the essential oil. Postharvest pre-extraction application of Tween 20 in combination with maceration could be used in the rose industry for increasing the essential oil yield [Anna Dobrevaa, Natasha Kovatchevaa, Tess Astatkieb, and Valtcho D. Zheljazkovc* (Research Institute for Roses, Aromatic and Medicinal Crops, Kazanluk, Bulgaria), Industrial Crops and Products, 2011, 34, 1649-1651

NPARR 2(4), 2011-0379, Chemical composition and biological activities of Calamintha officinalis Moench essential Oil

Calamintha officinalis Moench essential oil is used in cooking as an aromatic herb and also to improve the flavor and fragrance of several pharmaceutical products. The essential oil, obtained by hydrodistillation (5 mL/kg), was analyzed by gas chromatography-mass spectrometry and gas chromatography-flame ionization detection. Sixty-four components were identified, constituting 99.7% of the total oil. The major component was found to be carvone (38.7%), followed by neo-dihydrocarveol (9.9%), dihydrocarveol acetate (7.6%), dihydrocarveol (6.9%), 1, 8 cineole (6.4%), cis-carvyl acetate (6.1%), and pulegone (4.1%). The essential oil showed antifungal and antimicrobial activity against Gram-positive bacteria. In addition, it presented a very low toxicity both in vivo (50% lethal dose >100 mg/kg) and in vitro in the Artemia salina test (50% lethal concentration >500 µL/mL). C. officinalis essential oil, in rodents, produces the typical effects in behavior of a nonselective central nervous system-depressant drug; it potentiates the hypnotic effects of sodium pentobarbital, decreasing the induction time and enhancing the sleeping time. Moreover, it produces a decrease in body temperature and a protection against pentylenetetrazole-induced convulsions [Maria Teresa Monforte, Olga Tzakou, Antonia Nostro, Vincenzo Zimbalatti, and Enza Maria Galati* (Pharmaco-Biological Department, School of Pharmacy, University of Messina, Vill. SS. Annunziata, 98168, Messina, Italy), Journal of Medicinal Food, 2011, 14(3): 297-303].

NPARR 2(4), 2011-0380, Antibacterial activity of essential oils from Eucalyptus and of selected components against multidrug-resistant bacterial pathogens

Eucalyptus globulus Labill (Myrtaceae) is the principal source of eucalyptus oil in the world and has been used as an antiseptic and for relieving symptoms of cough, cold, sore throat and other infections. The oil, well known as ‘eucalyptus oil’ commercially, has been produced from the leaves. Biological properties of the essential oil of fruits from E. globulus have not been investigated much. The present study was performed to examine the antimicrobial activity of the fruit oil of E. globulus (EGF) and the leaf oils of E. globulus (EGL), E. radiata Sieber ex DC (ERL) and E. citriodora Hook (ECL) against multidrug-resistant (MDR) bacteria. Furthermore, this study was attempted to characterize the oils as well as to establish a relationship between the chemical composition and the corresponding antimicrobial properties.
The chemical composition of the oils was analyzed by GLC-MS. The oils and isolated major components of the oils were tested against MDR bacteria using the broth microdilution method. EGF exerted the most pronounced activity against methicillin-resistant *Staphylococcus aureus* (MIC ~ 250 µg/ml). EGF mainly consisted of aromadendrene (31.17%), whereas ECL had citronellal (90.07%) and citronellol (4.32%) as the major compounds. 1, 8-cineole was most abundant in EGL (86.51%) and ERL (82.66%).

The activity of the oils can be ranked as EGF > ECL > ERL ~ EGL. However, all the oils and the components were hardly active against MDR Gram-negative bacteria. Aromadendrene was found to be the most active, followed by citronellol, citronellal and 1, 8-cineole. [Sri Mulyaningisih, Frank Sporer, Jürgen Reichling, Michael Wink*(, Institute of Pharmacy and Molecular Biotechnology, Heidelberg University, Im Neuenheimer Feld 364, 69120, Heidelberg, Germany), *Pharmaceutical Biology*, 2011, 49(9), 893-899].

**NPARR** 2(4), 2011-0381, *Influence of different stabilizing operations and storage time on the composition of essential oil of thyme* (*Thymus officinalis* L.) *and rosemary* (*Rosmarinus officinalis* L.)

The effect of different stabilizing techniques on the composition of essential oil of rosemary (*Rosmarinus officinalis* L.) and thyme (*Thymus officinalis* L.) during one year of storage is reported. The study was aimed to know what is the stabilizing technique to keep at the best the original essential oil composition. The fresh samples were collected and treated as follows: air-dried in a laboratory scale pilot dryer, frozen in a forced-air freezer and freeze-dried in a laboratory freeze-dryer. The fresh sample served as control. The treated samples were packaged with appropriate packaging material and stored at 20°C or −20°C for 12 months. All the samples were hydrodistilled every three months and the oils composition was obtained by means of gas chromatography/mass spectrometry (GC/MS). Quantification of known compounds was done with the use of an internal standard. Freezing best maintained the composition of rosemary and thyme essential oil. Appropriate packaging of air-dried and freeze-dried herbs resulted in negligible quality loss up to one year of storage. The frozen and stored thyme samples showed the best retention of thymol, the most important compound, as well as of γ-terpinene and carvacrol [Marianna Usai, Mauro Marchetti, Marzia Foddai, Alessandra Del Caro, Roberta Desogus, Iser Sanna and Antonio Piga*(Dipartimento di Scienze Ambientali Agrarie e Biotecnologie Agro-Alimentari, Università degli Studi di Sassari, Viale Italia 39/A, 07100 Sassari, Italy), *LWT-Food Science and Technology*, 2011, 44(1), 244-249].