ESSENTIAL OILS (incl. Flavour and Fragrance)

NPARR 5(1), 2014-017 Chemical composition and anti-inflammatory activity of the essential oils of Psidium guajava fruits and leaves

Psidium guajava L. (Myrtaceae) has been used traditionally against gastrointestinal disturbances and respiratory ailments. The chemical composition of the essential oil of both leaves and fruits were elucidated by gas–liquid chromatography/mass spectrometry (GLC/MS). Forty-five and forty-two compounds, accounting for 93.7% and 89.7% of the fruit and leaf oil, were identified, respectively. The dominant compounds were β-caryophyllene (17.6%) and limonene (11.0%) for the fruit oil and β-caryophyllene (16.9%) and selin-7(11)-en-4α-ol (8.3%) for the leaf oil. The radical scavenging activities of both essential oils were assessed by the diphenyl picrylhydrazyl (DPPH•) and deoxyribose degradation assays. Guava leaf oil reduced DPPH• radicals and prevented the degradation of the deoxyribose with IC50 values of 3.59 and 12.64 µg/mL. The in vitro cytotoxicity of the oils in HepG2 and MCF-7 carcinoma cells was examined using the SRB assay (IC50 values of 32.53 and 49.76 µg/mL for the leaves and fruit oils against HepG2 cells). Inhibition of 5-lipoxygenase (5-LOX) was used to evaluate the anti-inflammatory activity of both oils (IC50 values of 130.69 and 196.45 µg/mL for the leaves and fruit oils). The anti-inflammatory activity was explained via virtual docking of the major identified compounds to the main sites in the 5-LOX crystal structure [Sherweit H. El-Ahmady, Mohamed L. Ashour and Michael Wink* (Institute of Pharmacy and Molecular Biotechnology, Heidelberg University, Heidelberg, Germany), Journal of Essential Oil Research, 2013, 25(6), 475-481]

NPARR 5(1), 2014-018 Antimicrobial and antioxidant activities of the essential oil from onion (Allium cepa L.)

The aims of this study were to test the efficacy of essential oil of Allium cepa against food spoilage and food-borne pathogenic microorganisms and its antioxidant activity. The essential oil revealed an interesting antimicrobial effect against the tested microorganisms with the MIC and MBC values in the ranges of 0.18–1.80 mg/mL and 0.54–3.6 mg/mL, respectively. The antioxidant activities of the essential oil were investigated and the oil showed moderate antioxidant activities in ABTS assay (0.67 mg/mL as IC50 value), DPPH test (IC50 value = 0.63 mg/mL) and metal chelating assay (IC50 value of 0.51 mg/mL). Furthermore, the reducing power of the oil was dose dependent, and the reducing capacity of the oil was inferior to butylated hydroxytoluene, which is known to be a strong reducing agent. It was suggested that the essential oil from A. cepa may be a new potential source as natural antimicrobial and antioxidant agents applied in food system [Chun-Lin Ye*, De-Hui Dai and Wei-Lian Hu (School of Biological and Chemical Engineering, Zhejiang University of Science and Technology, Hangzhou 310023, PR China), Food Control, 2013, 30 (1), 48-53]

NPARR 5(1), 2014-019 Preservation of sensory and chemical properties in flavoured cheese prepared with cream cheese base using oregano and rosemary essential oils

The purpose of this study was to evaluate the effect of oregano and rosemary essential oils on the oxidative and fermentative stabilities of flavoured cheese prepared with cream cheese base. The studied samples were cream cheese (CC) and cream cheese with the addition of oregano (CO) and rosemary (CR) essential oils which were evaluated for peroxide (PV) and anisidine (AV) values, descriptive analysis and fermentation parameters as stability indicators during storage. The samples CO and CR showed higher stability during storage. On day 35, CO and CR exhibited lower PV (11.70 and 12.32 meq O2/kg, respectively) than CC. Also,
rancid flavour intensities were much higher in CC during storage showing ratings of 26.27 with respect to the ratings of 20.22 in CO and 20.67 in CR detected on storage day 35. Furthermore, the samples with essential oils treatments showed lower acidity and total viable counts (TVCs) and higher pH than CC. On storage day 35, CO samples had the highest pH (4.68), and the lowest acidity (1.24 mg lactic acid/100 g) and TVC (2.35 CFU/g). Oregano and rosemary essential oils demonstrated a protective effect against lipid oxidation and fermentation in flavoured cheese prepared with cream cheese base [Rubén H. Olmedo, Valeria Nepote and Nelson R. Grosso*(Química Biológica, Facultad de Ciencias Agropecuarias (UNC), IMBIV-CONICET, CC 509, 5000 Cordoba, Argentina), LWT - Food Science and Technology, 2013, 53(2), 409-417].

NPARR 5(1), 2014-020 Screening of fruit and leaf essential oils of Litsea cubeba Pers. from North-East India – Chemical composition and antimicrobial activity

Essential oils from the leaves and fruits of Litsea cubeba Pers. collected in the Assam and Arunachal Pradesh states in north-east India, were analyzed by gas chromatography (GC) and GC–mass spectrometry (GC–MS). On the whole, 117 components have been characterized. The two leaf oils (LC1, LC2) show sabinene as the main component; the other significant compounds for LC1 oil are α-pinene, terpinen-4-ol, α-terpineol and myrcene, whereas for LC2 1,8-cineole and α-pinene are the other most important compounds. The three fruit oils (LC3, LC4 and LC5) were characterized by different profiles, indeed LC3 and LC4 showed a similar composition with citronellol and citronellal the main components, accounting for 70% and 10% of total oils, respectively. LC5, instead, presents geranial (c. 44%) and neral (c. 40%) as the main components, whereas citronellal reaches only c. 3%. Essential oils were evaluated for their antimicrobial activity against Staphylococcus aureus, Listeria monocytogenes, Escherichia coli, Pseudomonas aeruginosa, Candida albicans and Aspergillus niger. All microbial strains appeared sensitive to the cytotoxic activity of the essential oils under investigation. Leaf and fruit oils showed different levels of inhibition depending on their particular chemical composition; however, the LC5 sample was broadly the most effective [Anil Kumar Saikia, Dipak Chetia, Manuela DArrigo, Antonella Smeriglio, Tonia Strano and Giuseppe Ruberto *(Istituto del C.N.R. di Chimica Biomolecolare, Catania, Italy), Journal of Essential Oil Research, 2013, 25(4), 330-338].