ESSENTIAL OILS (incl. Flavour and Fragrance)

NPARR 2(2), 2011-0152, Essential Oils as Biopreservatives: Different Methods for the Technological Application in Lettuce Leaves

Investigations were carried out to assess the efficiency of 3 essential oils, clove, tea tree, and rosemary, as natural preservatives during the postharvest of lettuce leaves. The effect of different concentration (1 and 0.5 MIC) of plant essential oils applied in 3 forms (spray, immersion, and capsules) was studied on lettuce leaves. The evolution of different microbial populations was evaluated during refrigerated storage. The application forms of the biopreservatives were shown to be an important factor in determining the effectiveness of the essential oils. Clove and tea tree essential oils at 1 MIC and applied embedded in lactose capsules presented a significant inhibition on mesophilic, psicrotrophic, and coliforms populations, while rosemary in none of the 3 technological applications forms exerted inhibitory effect on all microbial populations evaluated. Essential oils (at 0.5 MIC) applied by spray, immersion, and embedded in lactose capsules exerted lower inhibitory effects, with respect to 1 MIC, on the different microbial populations present on lettuce leaves. At the end of the storage (7 d), lettuce samples treated with tea tree, clove, and rosemary (at 1 and 0.5 MIC) by spray were the only organoleptically acceptable. It is concluded that clove and tea tree essential oils can control different microbial population present in lettuce [Alejandra Ponce, Sara I. Roura and María del R. Moreira*(Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina), Journal of Food Science, 2011, 76(1), M34–M40].

NPARR 2(2), 2011-0153, Variations in essential oil yield and composition during Cinnamomum cassia bark growth

To extract essential oil for industrial use, the yields and compositions of bark oil during Cinnamomum cassia growth (1-3 years old for the branch bark; 5-12 years old for the stem bark) were determined. The branch bark fraction had a higher essential oil yield from branch bark varied within 2.70–3.11% (w/w), while that from stem bark was 0.41–2.61% (w/w) due to differences in age and segment (top, center and lower) of the tree. There were 41 volatile compounds identified in bark oil, among which the majority presented high fluctuations in percentage of composition both in different growth stages and segments. Variations in oil yields did not present the same pattern as the percentages of trans-cinnamaldehyde. The results suggest that choosing bark according to trees’ growth stages and separating stem barks into top, center and lower sections within a tree should significantly improve the extraction efficiency [Shilei Geng*, Zhaoxue Cui, Xinchao Huang, Yufen Chen, Di Xu and Ping Xiong (College of Life Science, South China Agricultural University, Guangzhou Guangdong 510642, China), Industrial Crops and Products, 2011, 33(1), 248-252].

NPARR 2(2), 2011-0154, Volatile compounds and antimicrobial and antioxidant activities of the essential oils of the needles of Pinus densiflora and Pinus thunbergii

To investigate the volatile compounds and the antibacterial and antioxidant effects of the essential oils of Pinus densiflora needles (EPDN) and Pinus thunbergii needles (EPTN), the volatile compounds of steam-distilled essential oils were analysed by gas chromatography–mass spectrometry. Antibacterial activities were analysed by performing disc-agar diffusion assay and determining the minimum inhibitory concentrations (MICs) of the essential oils. Antioxidant activities were analysed via radical- and nitrite-scavenging activity assays.

The yields of EPDN and EPTN were 0.304% (v/w) and 0.296% (v/w), respectively. In the antibacterial activity assay, the MICs of EPDN and EPTN for Klebsiella pneumoniae, Shigella flexneri and Proteus vulgaris were < 0.4 mg mL\(^{-1}\). In the antioxidant activity assay, the 50% inhibitory concentrations (IC\(_{50}\)) of EPDN and EPTN were 120 and 30 µg mL\(^{-1}\), respectively. At 1680 µg mL\(^{-1}\), both EPDN and EPTN exhibited > 50% nitrite-scavenging activity. EPDN can be used as a natural antimicrobial substance [Ju-Sung Park and Gyu-Hee Lee*(Gyu-Hee Lee, Department of Food Science and Biotechnology, Woosong University, Dong-gu, Daejeon 300-718, Korea), Journal of the Science of Food and...
Agriculture, 2011, 91(4), 703-709].

NPARR 2(2), 2011-0155, Dry matter content and fruit size affect flavour and texture of novel Actinidia deliciosa genotypes

Previous studies with commercial kiwifruit cultivars have demonstrated that the taste of fruit with higher dry matter content (DM) is more liked by consumers. A unique replicated trial of kiwifruit genotypes (10 high/low DM × small/large-fruited genotypes) has provided an opportunity to consider how the genetic propensity for a kiwifruit to accumulate DM affects fruit flavour and texture. In the present study, eating-ripe fruit from each of the genotypes were assessed using a trained sensory panel and the relationships between these sensory attributes and fresh weight, DM, flesh firmness and soluble solids content (SSC) were explored.

The genotypes provided a diversity of flavour and texture attributes, each of which varied in perceived intensity of the sensory experience. High-DM genotypes had higher SSC and were perceived as sweeter than low-DM genotypes. Sweet taste was closely associated with the perception of the tropical flavour and high-DM genotypes were found to have more tropical notes. Fruit size was associated with fruit texture, and small fruit were characterised by a firmer and more fibrous core. Large high-DM fruit were perceived as juicier than those of all other genotypes.

Genotypes were perceived differently from one another, and differences in fruit size and DM content were reflected in fruit sensorial properties. This study is unique in demonstrating interactions between fruit size, DM and sensory properties. These findings could be relevant not only to kiwifruit but to fruiting crop breeders in general, because of the demonstrated potential for effects of fruit size and DM content on sweetness, flavour and fruit texture. Simona Nardozza*, Joanna Gamble, Lauren G Axten, Mark W Wohlers, Michael J Clearwater, Jinquan Feng and F Roger Harker (The New Zealand Institute for Plant & Food Research Limited, Mt Albert Research Centre, Private Bag 92169, Auckland, New Zealand), Journal of the Science of Food and Agriculture, 2011, 91(4), 742-748].