PHYTOCHEMICALS

NPARR 5(1), 2014-049 **Metabolite profiling of phenolics, anthocyanins and flavonols in cabbage (Brassica oleracea var. capitata)**

Metabolite profiling of phenolic acids, anthocyanidins and flavonols in Brassica oleracea var. capitata cultivated in the spring and fall seasons were evaluated. Phenolic acids (caffeic, p-coumaric, ferulic and sinapic acid), anthocyanidins (cyanidin and peonidin), and flavonols (quercetin and kaempferol) were identified and quantified by LC–MS and HPLC analyses. The total phenolic acid contents (10,633 µg/g DW) were increased 6.3-fold in red cabbages; in contrast, phenolic acids were present in significantly higher levels in the outer parts of the green cabbages in the spring sowing than in those of the fall sowing. In the case of red cabbages, the phenolic acid levels in the outer parts were higher (3147.5 µg/g DW), but the seasonal factor was not significant. Statistical analysis exhibited a significantly negative correlation between anthocyanidins and quercetin but exhibited a positive correlation between flavonols and phenolic acids in both cultivars. The most dramatic differences in the effect of the tissue position were analyzed by two-way MANOVA. The levels of anthocyanidins were 25–28% higher in the spring than those in the fall cabbages, whereas the contents were similar in the various tissue positions. [Suhyoung Park, Mariadhas Valan Arasu, Nan Jiang, Seung-Hyun Choi, Yong Pyo Lim, Jong-Tae Park, Naif Abdullah Al-Dhabi and Sun-Ju Kim* (Department of Bio-Environmental Chemistry, Chungnam National University, 99 Daechak-ro, Yuseong-gu, Daejeon 305-764, Republic of Korea), Industrial Crops and Products, 2014, 60, 8–14].

NPARR 5(1), 2014-050 **Simmondsia chinensis**: A rich source of bioactive flavonoids and lignans

A radical scavenging guided phytochemical study on the leaf of Simmondsia chinensis afforded ten flavonoids (1-10) and four lignans (11-14). The structures of the isolated compounds were elucidated on the basis of spectroscopic evidences and correlated with known compounds. Among isolated compounds, flavonoid aglycones (1-4) showed stronger antioxidant activity than their glycosides (5-10) whilst lignan glycosides (11-14) showed moderate to weak antioxidant activity using DPPH and β-carotene methods in relation to BHT (positive control). The inhibitory potential against enzyme lipoxygenase was also evaluated for isolated compounds exhibiting variable potency. For flavonoids, glycosides are less potent inhibitors than free aglycones. Quercetin is the most potent inhibitor with an IC\(_{50}\) of 5.6 µM. Lignoid glycosides exhibited moderate to weak inhibitory effect against lipoxygenase enzyme. Luteolin was used as a positive control in lipoxygenase inhibiting assay. [Wael M. Abdel-Mageed*, Soad A.H. Bayoumi, Awwad A. Radwan, Mounir M. Salem-Bekhit, Sherif H. Abd-Alrahman, Omer A. Basudan and Hanaa M. Sayed (Pharmacognosy Department, College of Pharmacy, King Saud University, Riyadh 11451, P.O. Box 2457, Saudi Arabia) Industrial Crops and Products, 2014, 60, 99–103].

NPARR 5(1), 2014-051 **Changes in bioactive phytochemical content and in vitro antioxidant activity of carob (Ceratonia siliqua L.) as influenced by fruit ripening**

In the present study, three varieties (Wild, Fleshy and Sisam) of carob (Ceratonia siliqua L.) pods were analyzed for their bioactive phytochemical content and antioxidant activities (AA) at three ripening stages. The results showed that the samples have the highest total phenolic (TPC), total flavonoid (TFC) and ascorbic acid content (AAC) in the unripe stage. The antioxidant activity examined using free radical scavenging effect against 2-2-diphenyl-1-picrylhydrazyl (DPPH), ferric reducing power (FRP) and ferrous iron chelating (FIC) assays decreased significantly throughout the ripening.
Extremely significant correlations ($p < 0.001$) were found between phytochemical compound contents (TPC, TFC and AAC) and assessed antioxidant activities, except between AAC and FIC where just a very significant correlation ($p < 0.01$) was recorded. Our data revealed that extracts of unripe C. siliqua L. are an excellent source of natural antioxidants that might be more widely used in cosmetic, pharmaceutical and food industries. [Yassine Benchikh, Hayette Louailiche*, Béatrice George and André Merlin (Laboratoire de Biochimie Appliquée, Faculté des Sciences de la Nature et de la Vie, Université de Bejaia, 06000 Bejaia, Algérie), *Industrial Crops and Products, 2014, 60, 298–303].

NPARR 5(1), 2014-052 Comparative chemical and biochemical analysis of extracts of *Hibiscus sabdariffa*

*Hibiscus sabdariffa* extracts have attracted attention because of potentially useful bioactivity. However, there have been no systematic studies of extraction efficiencies of *H. sabdariffa*. The nature of extracts used in different studies has varied considerably, making comparisons difficult. Therefore, a systematic study of extracts of *H. sabdariffa* made with different solvents was carried out using water, methanol, ethyl acetate and hexane in the presence/absence of formic acid, using different extraction times and temperatures. The extracts were analysed for total polyphenol content, antioxidant capacity using DPPH, FRAP and TEAC assays, and specific anthocyanins were determined using HPLC and LC–MS. The results showed that chufa peels can be regarded as an excellent source of natural antioxidants (mainly flavonoids) and a good additive in the beverage and canning. [Yanghe Luo, Xingren Li, Juan He, Jia Su, Liyan Peng, Xingde Wu, Runan Du and Qinshi Zhao* (State Key Laboratory of Phytochemistry and Plant Resources in West China, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650204, People’s Republic of China), *Food Chemistry, 2014, 164, 30-35].

NPARR 5(1), 2014-054 Effect of domestic processing on the polyphenol content and bioaccessibility in finger millet (*Eleusine coracana*) and pearl millet (*Pennisetum glaucum*)

Finger millet (*Eleusine coracana*) and pearl millet (*Pennisetum glaucum*) were evaluated for polyphenolic content and their bioaccessibility. Total polyphenols of native finger millet was 10.2 mg/g which reduced by 50% after sprouting or pressure-cooking, while 12–19% reduction was seen after open-pan
boiling. Total flavonoids of the grain reduced drastically on sprouting, pressure-cooking or open-pan boiling. Concentration of phenolic acids generally increased during sprouting and roasting of finger millet. Pressure cooking, open-pan boiling and microwave-heating reduced the bioaccessible polyphenols by 30–35%, while the same was increased by 67% by sprouting. Significant reduction of total polyphenols was observed in pressure-cooked, open-pan boiled and microwave-heated pearl millet. Concentration of sinapic and salicylic acids were highest phenolic acids of pearl millet. Total polyphenols reduced during sprouting and pressure-cooking. There was a 20% increase in the bioaccessible polyphenols after sprouting of pearl millet. Thus, sprouting and roasting provided more bioaccessible phenolics from these two common millets studied. [Gavirangappa Hithamani and Krishnapura Srinivasan* (Department of Biochemistry and Nutrition, CSIR–Central Food Technological Research Institute, Mysore 570 020, India), Food Chemistry, 2014, 164, 55-62].