

of IL-10 (as immunosuppressive cytokine) and IL-6 (which takes part in myoproteosis degradation) serum levels can restore immune cells activity. It was correlated with increasing the leukocyte integrins expression. Down regulation of serum IL-6 and IL-10 cytok-

ines in males of CBA inbred mice with high frequency of spontaneous hepatocarcinomas is considered to reduce antitumor antibodies production (which cover tumor cells antigens and diminish immune cells activity) as well as cachexia symptoms.

NUTRACEUTICALS FROM BEETROOT POMACE EXTRACT WITH ANTIOXIDANT AND HEPATOPROTECTIVE EFFECTS

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The beetroot pomace (BPE), residue from the juice processing, is promising source of bioactive compounds with antioxidant, hepatoprotective and antitumor properties. The aim of this research was to investigate the antioxidant activity of BPE and its effect on biochemical parameters of oxidative stress evaluated in liver homogenate of rats. The antioxidant activity of BPE, including reducing power and DPPH free radical scavenging activity were determined spectrophotometrically. The effects of BPE on several biochemical parameters of oxidative stress were evaluated in liver homogenate of rats treated with CCl₄ as a free radical generator: LPx intensity, content of GSH and activities of GSH-Px, GR, Px, XOD and CAT. BPE was able to scavenge DPPH radicals (EC₅₀^{DPPH} = 3.4 µg/ml). The reducing power of BPE increased with increasing the concentration. The BPE, combined with a CCl₄, expressed

a clear and dose-dependent suppressive effect against lipid peroxidation in liver homogenate. Simultaneous application of extract and CCl₄ has led to a significant decrease in GSH-Px levels, keeping the GSH content in liver homogenate close to physiological level. Similar impact on GR activity has been observed in liver of the animals. The catalase activity was decreased after treatment with BPE and CCl₄. Similar influence on hepatic Px activity has been also observed. Although CCl₄ does not alter the activity of hepatic XOD certain increase of XOD activity has been measured after addition of BPE. Obtained results demonstrated that the beetroot pomace extract might possess a specific antioxidant potential, suggesting that it might be used not only as a hepatoprotective agent, but as an active agent in treatment of other disorders caused by oxidative stress.

VALORISATION OF ANTIOXIDANT AND CELL GROWTH ACTIVITIES OF TOMATO WASTE LIPOPHILIC EXTRACTS

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Tomato, fresh and its products, possess a high nutritional value, due to content of different types of antioxidants: carotenoids, polyphenolics, vitamin C and vitamin E. According to the fact that different valuable compounds remained in the waste from tomato juice processing, the aim of this research was to investigate the antioxidant and cell growth activities of tomato waste lipophilic extracts (obtained from genotypes — Bačka and Saint Pierre). The lycopene and β-carotene in tomato waste extracts were identified and quantified by HPLC method by matching their retention times (RT) and on-line ultraviolet (UV) spectra with those of stan-

dards. The antioxidant activity of extracts were investigated by measuring 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity by spectrophotometric method. The cell growth activity was measured using the sulforhodamine B colorimetric assay on human cancer HeLa (cervix epitheloid carcinoma) and MCF7 (breast adenocarcinoma) cell lines. The Bačka waste extract contained higher content of lycopene (13.6±0.1 mg/g) and β-carotene (12.0±0.3 mg/g). The extracts were able to scavenge DPPH radical and higher antioxidant activity, expressed as IC₅₀^{DPPH} value, was obtained in the case of the Bačka waste extract

($EC_{50}^{DPPH} = 0.071 \pm 0.003$ mg/ml). Both tomato waste extracts influenced cell growth depending on cell line and extract dose. The strongest activity against cancer cells was observed by Bačka extract in HeLa cell line (EC_{50}^{He-}

$La = 0.51 \pm 0.02$ mg/ml). The obtained results show that tomato waste could represent a cheap and readily available source of value-added ingredient for functional food and some other health products.

MICROPROPAGATION OF GLOSSOGYNE TENUIFOLIA CASSINI — A TRADITIONAL MEDICINAL PLANT

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Glossogyne tenuifolia Cass. (Hsiang Ju in chinese) belongs to the family Asteraceae and originates in Penghu Island, Taiwan and it is used to make traditional healthy food and drink consumed in Penghu Island. *G. tenuifolia* has a long history of being use as an antipyretic, hepatoprotective and anti-inflammatory remedy in folk medicine among local residents. Oleanolic acid and luteolin-7-glucoside are main active compound of *G. tenuifolia*. The levels of these active compounds in *G. tenuifolia* are affected by many factors including climatic change and pathogens. The plant cell culture is a promising potential alternative technique to produce high value sec-

ondary metabolites. Therefore, the present study aims to develop a micropropagation protocol for *G. tenuifolia*. Maximum numbers of shoots (2.4 shoots/explant) were obtained from *in vitro* seedling-derived shoot tip cultured on half-strength Murashige & Skoog (1962) (MS) medium supplemented with 0.1 mg/L benzyladenine. The well-developed shoots were rooted on half strength MS medium supplemented with 0.5 mg/L Naphthaleneacetic acid and 0.1 mg/L putrescine. Eighty percent of the inoculated shoots produced roots with an average of 3.4 roots/shoot. The rooted plantlets were successfully acclimatized in greenhouse with 100% survival rate.

ANTIOXIDANT ACTIVITY OF KOELREUTERIA HENRYI DUMMER FLOWER

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Koelreuteria henryi Dummer (Known as Golden Flame Tree in Taiwan) is a deciduous tree native to Taiwan belonging to the family Sapindaceae. It has been traditionally used in folk medicine for the treatment of diarrhea, malaria and urethritis. The present study was undertaken to find the antioxidant properties of the flower of *Koelreuteria henryi* Dummer by DPPH radical-scavenging activity, Trolox equivalent antioxidant activity, and ferric reducing antioxidant power assay and phytochemical analysis. The flowers were extracted with five different polar solvents: distilled deionized

water, methanol, ethanol, ethyl acetate and hexane. Maximum yield of antioxidant components were observed in water extract (27.2%) followed by ethanol extract (20.2%) and methanol extract (19.5%). It was also found that methanol extract showed highest radical scavenging activity (83.5 ± 0.3) at the concentration of 0.25 mg/ml. Phytochemical analysis showed that highest concentration of total phenol and total flavonoids were observed in methanol extract. The results revealed that the flower of *K. henryi* could be exploited as potential antioxidant additives.