A083 Antioxidant activity of 3,4,5-trihydroxybenzaldehyde isolated from *Geum japonicum*

Jung Bong Kim [a], Jong Bum Kim [a], Kang Jin Cho [a], Yong Hwan Kim [a], Gabriele M. Koenig [b] and Anthony D. Wright [b]
[a] National Institute of Agricultural Biotechnology, 225 Sedundong Kwonsunku, Suwon, Korea 441-707. [b] Institute for Pharmaceutical Biology, University of Bonn, Nussallee 6, Bonn 53115, Germany.

Methanol extracts from 20 Korean plants were screened for their radical scavenging activities. Of which *Geum japonicum* Thunb. (Rosaceae) showed the most strong radical scavenging activity against 2,2-diphenyl-1-picrylhydrazyl (DPPH, 0.02% in ethanol). The whole plant of *G. japonicum* has been used as a diuretic in traditional Chinese medicine. From this plant, several hydrolyzable tannins and triterpenoids with HIV-1-RT inhibitory activity have been isolated (1). The *G. japonicum* powder was defatted with CH_2Cl_2 and partioned with EtOAc to yield the major antioxidant fraction. The concentrated fraction of EtOAC was separated by gel filtration (Sephadex LH-20, 5 x 50 cm) with solvent ($MeOH/H_2O$ 4:1). Two active compounds were detected by HPLC RP-18 ($AcOH/MeOH/H_2O$ 2:20:78) from the gel filtration fractions. One was identified as 3,4,5-trihydroxybenzaldehyde (THBA) showing the same ^1H-, ^{13}C-NMR and MS spectral data reported already (2). The other compound was 4,5-dihydroxybenzaldehyde-3-glucose (DHBAG). The antioxidant activity of THBA was compared to various typical antioxidants such as butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), α-tocopherol and rosmarinic acid. As using DPPH as radical substrate, THBA was showed more strong radical scavenging activity (SC_{50}=50% scavenging concentration) than others. Rosmarinic acid, α-tocopherol, BHA and BHT were next to it in order.

Material	THBA	BHA	BHT	α-Tocopherol	Rosmarinic acid
Index	19.5	179	201	152	43.5

In Rancimat test with both lard and palm oil as the substrate, similar results were obtained. In the leaves of *G. japonicum*, THBA was contained 140.7 mg/dried weight 1 kg, in stems 240.5 mg/kg, and in root nothing. This significant antioxidant, natural THBA, will be developed as a commercial food additive. And also it might be useful in cosmetics, and in the treatment of diseases involving radicals *i.e.* inflammation as well (3).

References: 1. X H.X, Zeng et al. (1996) J. Nat. Prod. 59: 643-645. **2.** X H.X., Kadota S., (1994) Heterocyc. 38: 167-175. **3.** Shimizu K. and Kondo R. (1998) Planta Med. 64: 408-412.

A084 Antioxidant activity of *Plantago* spp. extracts

M. Gálvez [a], C. Martín-Cordero [a], M.J. Ayuso [a] and P.J. Houghton [b]
[a] Department of Pharmacology, Faculty of Pharmacy, University of Seville, C/ Prof. García González s/n, 41012 Seville, Spain. [b] Department of Pharmacy, King's College London, Franklin-Wilkins Building, 150 Stamford Street, London SE1 9NN, UK.

The aim of our study was compare the antioxidant activities of the methanol extracts obtained from leaves of six species of *Plantago*: *P. afra*, *P. bellardii*, *P. coronopus*, *P. lagopus*, *P. lanceolata*, and *P. serraria*.
The antioxidant activities were studied by two different assays: inhibition of induced lipid peroxidation and qualitative and quantitative DPPH (1,1-diphenyl-2-picrylhydrazyl radical) assay, to detect the free radical scavenging activity. The lipid peroxidation was initiated in liposomes obtained from bovine brain extracts by addition of ascorbic acid and iron source, and was measured spectrophotometrically with the TBA test. The positive control used was propyllgallate (at a concentration of 10^{-4} M) (1). The qualitative DPPH assay was made by employing a TLC of the extracts and the DPPH as a spray reagent, and the quantitative test were made by spectrophotometrical measure in 96-wells plate and ascorbic acid (10^{-4} M) as positive control (2). The antioxidant activity of each extract was expressed as an IC_{50} value, and was calculated from the correspondence log-dose curve. The results were statistically compared by ANOVA and Turkey test to see the significance.
The lipid peroxidation results showed most activity in the *P. bellardii* and *P. serraria* extracts with a IC_{50} (µg/ml)=24.55±2.33 and 54.73±3.05 respectively ($p<0.001$). In the quantitative DPPH analysis also these extracts had the most activity, with a IC_{50} (µg/ml)=33.10±0.77 and 7.95±0.19 respectively ($p<0.001$).

References: 1. Cos, P. et al. (2001), Planta Med., 67: 515-519. **2.** Cavin, A. et al. (1998), Planta Med., 64: 393-396.