Quality evaluation of cold-pressed edible oil from the seeds of Gojy Berry (wolfberry) "*Lycium barbarum*"

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Introduction

Wolfberry (*L. barbarum*) in the family Solanaceae is famous as functional food as well as traditional cure in Chinese herbal medicine. There is positive relation between daly intake of this fruit and hypoglycaemic, immunomodulation, anti-hypertension, lipotropic, protecting hepatic function, anti-ageing, antifatigue, antioxidant activity. The object of this study is the quality evaluation of cold-pressed oil from the seeds of goji – berry, including determination of fatty acid composition, vitamin-E-active compounds and phy-

Materials and methods

Determination of fatty acid composition

The fatty acid composition of cold-pressed edible oil from goji berry was determined using gas chromatography equipped with flame ionization detector (FID). The esters were prepared using two drops of each oil dissolved in 1mL of heptane. After addition of 50 mL of sodium methylate with concentration of 2mol/L, the samples were homogenized. After homogenization, 100mL of distilled water was added to each sample. Samples were centrifuged and the lower phase was removed while to the upper phase 50mL of 1MHCl was added. After second homogenization, sodium sulphate anhydride was added to remove water traces. Finally, the upper phase was transferred in GC vials and fatty acidmethyl esters were analyzed using a capillary GC equipped with a CP7420 Select FAME column, 100m x 0.25mm internal diameter with 0.25 mm film thickness. Analyzes were performed on Agilent 6890 equipped with KAS4Plus and FID. The oven temperature was programmed to increase from 150 to 240°C with a rate of 1.5°C/min and maintained isotherm at 240°C for 20min. The injector and detector temperature were both 260°C. Hydrogen was used as the carrier gas at an average velocity of 25mL/min. The

Determination of Vitamin-E-active compounds

One hundred milligram of each sample of virgin oils was dissolved in 1mL of heptane. Determination of tocopherols was performed with an HPLC instrument equipped with a L6000 pump, a Merck–Hitachi F-1000 fluorescence detector with excitation wavelength on 295 nm and emission wavelength on 330 nm and a Diol phase HPLC column 25 cm x 4.6mm ID (Merck, Darmstadt, Germany). The flow rate was 1.3mL/min and the injection volume 20mL.The mobile phase was a mixture of heptane and TBME in

Determination of phytosterols

The sterol composition of the cold –pressed Goji Berry oil was determined following ISO/FIDS 12228:1999 (E). In brief, 250mg of oil was saponified with a solution of ethanolic potassium hydroxide by boiling under reflux. The unsaponifiable matter was isolated by solid-phase extraction on an aluminium oxide column (Merck) on which fatty acid anions were retained and sterols passed through. The sterol fraction was separated from other unsaponifiable matter by thin-layer chromatography (Merck), re-extracted from the TLC material, and afterward, the composition of the sterol fraction was determined by GLC using betulin as internal standard. The compounds were separated on a SE 54 CB (50m long, 0.32mm ID, 0.25mm film thickness; Macherey-Nagel, Duren, Germany). Further parameters were as follows: hydrogen as carrier gas, split ratio 1:20, injection and detection temperature adjusted to 320 °C, temperature program, 245–260 °C at 5 °C/min. Peaks were identified either by standard compounds (b-sitosterol, campesterol, stigmasterol), by a mixture of sterols isolated from rape seed oil (brassicasterol) or by a mixture of sterols isolated from sunflower oil (D7-avenasterol, D7-stigmasterol, and

Results and discussion

The results presented in Table 1 showed that cold-pressed edible oil obtained from the seeds of Goji Berry is valuable sours of unsaturated fatty acids, vitamin-E-active compounds and pytosterols. Fatty acid composition indicated monounsaturated oleic acid and polyunsaturated linoleic acid as the most abundant with 17.33±0.01and 66.97±0.02% respectively. α-linolenic acid was detected only in quantity less than 2%.

Significant amount of α and γ-tocopherol can be further examined in order to see antioxidant activity of this oil by different antioxidant assays.Phytosterols are plant sterols with structure similar to cholesterol. They are minor constituents in oils and normal constituents of human diet. Phytosterols, primarily β-sitosterol, campesterol, and stigmasterol are membrane constituents of plants that effectively reduce serum LDL cholesterol and atherosclerotic risk. The most dominant pytosterol in Goji berry seed oil was β-sitosterol with abundance of 2183.46±111.26 mg/kg oil. Stigmasterol was quantified in the level of 521.58±21.77 mg/kg oil. Significant amount of brassicasterol (480.45±12.28 mg/kg) and other identified and quanti-

Table 1. Identification and quantification of fatty acids, vitamin-E-active compounds and phytosterols

Fatty acid composition (%)		Vitamin-E-active compounds (mg/100 g)		Pytosterols (mg/kg)	
C16:0	9.53±0.01	α-tocopherol	34.43±0.05	Brassicasterol	480.45±12.28
C18:0	3.64±0.02	β-tocopherol	0.01±0.00	24-Methylencholesterol	62.57±7.55
C18:1D9	17.33±0.01	γ-tocopherol	65.57±1.02	Campestanol	86.63±11.17
C10:2	66.97±0.02	δ-tocopherol	0.03±0.00	Stigmasterol	521.58±21.77
C18:3	1.63±0.00	β-tocotrienol	0.05±0.01	Δ7-Campesterol	93.63±4.58
				Δ5,23-Stigmastadienol	183.77±35.19
				Chlerosterol	98.45±18.55
				ß-Sitosterol	2183.46±111.26
				Sitostanol	132.58±24.79
				Δ5,24-Stigmastadienol	112.89±27.55
				Δ7-Stigmastanol	90.57±12.43
				Δ7-Avenasterol	329.49±23.41
				Total	4376.07±310.53

Conclusion

Cold-pressed edible oil is valuable product which can have significant effect on human health. High level of oleic and linoleic acid, as well as high amount of α and γ-tocopherols makes this oil suitable for

References:

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