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Fatty acid, sterol and proximate compositions of peanut species (*Arachis* L.) seeds from Bolivia and Argentina

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RESUMEN

Ácidos grasos, esteroles y composiciones porcentuales de semillas de especies (*Arachis* L.) de cacahuete de Bolivia y Argentina

Los contenidos en aceite, proteína, ceniza e hidratos de carbono, índice de acidez, composiciones en ácidos grasos y esteroles fueron estudiadas en semillas de *Arachis correntina*, *A. durannensis, A. Monticola, A. batizocoi,* y *A. cardenasii* originaria de Bolivia y Argentina. El contenido en aceite fue mayor en *A. batizocoi* (valor medio 53,35%). El nivel de proteína fue más alto en *A. monticola* (valor medio 29,40%) y *A. durannensis* (29,13%). El valor medio del ácido oleico varió entre 34,91% (*A. durannensis* y *A. cardenasii*) y 42,60% *(Arachis correntina)*, y el ácido linoleíco osciló entre 40,23% *(A. correntina)* y 45,86% *(A.durannensis)*. La mejor relación oleico a linoleico fue exhibida por *A. correntina* (1.06). El índice de iodo fue más bajo en *A. batizocoi* (106,0). La composición esterólica en las diferentes especies de cacahuetes mostró la más alta concentración de ß-sitosterol (los valores medios oscilaron entre 55,70-58,70%) seguido por campesterol (15,18-16,47%), estigmasterol (10,67-12,27%) y Δ^5-avenasterol (10,80-12,13%).

PALABRAS-CLAVE: Ácido graso – Arachis L. – Argentina – Bolivia – Cacahuete – Esterol.

SUMMARY

Fatty acid, sterol and proximate compositions of peanut species (*Arachis* L.) seeds from Bolivia and Argentina

The oil, protein, ash and carbohydrates contents, iodine value, fatty acid and sterol compositions were studied in seeds of *Arachis correntina, A. durannensis, A. monticola, A. batizocoi,* and *A. cardenasii* originating from Bolivia and Argentina. Oil content was greatest in *A. batizocoi* (mean value 53,35%). The protein level was higher in *A. monticola* (mean value 29,40%) and *A. durannensis* (29,13%). Mean value of oleic acid varied between 34,91% (*A. durannensis* and *A. cardenasii)* and 42,60% *(Arachis correntina)*, and linoleic acid oscilated between 40,23% *(A. correntina)* and 45,86% *(A. durannensis)*. The better oleic to linoleic ratio was exhibited by *A. correntina* (1,06). Iodine value was lower in *A. batizocoi* (106,0). The sterol composition in the different peanut species showed higher concentration of ß-sitosterol (mean values oscilated between 55,70-58,70%) following by campesterol (15,18-16,47%), stigmasterol (10,67-12,27%) and Δ^5-avenasterol (10,80-12,13%).

KEY-WORDS: Arachis L. – Argentine – Bolivia – Fatty acid – Peanut – Sterol.

1. INTRODUCTION

At present there are 68 described wild species of *Arachis* native to South America (Krapovickas and Gregory, 1994). Substantial evidence suggests that the genetic base or gene pool of the cultivated peanut, *A. hypogaea* L., does not have the reserve germplasm needed to resist many of the new agricultural problems brought on by pollution, dwindling water supplies, and the necessity for biological control methods against insects and plant pathogens. Wild species of *Arachis* contain new sources of germplasm which can be used to increase variability in the genetic base of cultivated peanut (Stalker *et al.,* 1989).

Leguminous seeds make an important contribution to the diet in many tropical countries. They are a good source of protein, lipid, and fatty acids for human nutrition (Gaydou *et al.,* 1983). The fatty acid composition of endogenous fats plays and important role in determining shelf life, nutrition, and flavor of food products. The lipids and proteins of cultivated peanut seeds have been widely studied (Ahmed and Young, 1982). The objective of this work was to characterize some chemical components of wild species of *Arachis.*

2. EXPERIMENTAL

Plant material

Sound and mature seeds of *Arachis correntina* (Burkart) Krapov, & W. C. Gregory, *A. durannensis* Krapov. & W. C. Gregory, *A. monticola* Krapov. & Rigoni, *A. batizocoi* Krapov. & W. C. Gregory, and *A. cardenasii* Krapov. & W. C. Gregory were provided by the INTA (Instituto Nacional de Tecnología Agropecuaria) peanut germplasm bank of Manfredi, Córdoba, Argentina. All species used in this work were cultivated in the same crop year (1993/1994), season and place (INTA, Manfredi). All seeds had the same conditions for decreasing environment effects in the

result expected. The collection data and classification is presented in the Table I. A detailed description of the taxonomic classification of peanut was reported by Krapovickas and Gregory (1994). Maturity of seed was establish when they showed maximum dry weight and maximum viability (Crookston and Hill, 1978).

Determination of oil, ash, protein, moisture, and carbodydrate contents

Three samples each containing five seeds from each cultivar were examined for oil, protein, ash and moisture contents. These seeds were selected at random. The sampling size was previously calculated (Cochran, 1974) and it was proper to the statistical design.

Seeds were milled and oil was extracted for 16 h with petroleum ether (boiling range 30-60°C) in a Soxhlet apparatus. The extracted oils were dried over anhydrous sodium sulfate and the solvent removed under reduced pressure in a rotary film evaporator. Oil percentages was determined by weight difference.

Moisture, ash, nitrogen contents were determined according to AOAC (1980). Ash was performed by incineration in a muffle furnace at 525°C. The nitrogen content was estimated by the Kjeldahl method and converted to protein percentage by using the conversion factor 5,46 (Young and Hammons, 1973). Carbohydrate content was estimated by value difference of the other components (expressed on dry basis) using the formula: carbohydrate content = 100% – (% protein + % oil + % ash).

Table I
Collection data of wild species of *Arachis* from Argentina (Arg) and Bolivia (Bol)

Lot 89/90[a]	Species	Collection number[b]	Location
1	*A. correntina*	K 7897	10 Km west or Ruta 12,. Ituzaingó, Corrientes, Arg.
2	*A. correntina*	GKP 9530-31	Ruta 12, Arroyo Riachuelo, Corrientes, Arg.
3	*A. correntina*	GKP 9548	Ramada Paso, Corrientes, Arg.
4	*A. durannensis*	K 7988	Campo Durán, Salta, Arg.
5	*A. durannensis*	K 7988-2	Campo Durán, Salta, Arg.
6	*A. durannensis*	K 7988-3	Campo Durán, Salta, Arg.
7	*A. durannensis*	KGBPScS 30060	Río Perico, El Carmen, Jujuy, Arg.
8	*A. durannensis*	KGBPScS 30061	Palpalá, Jujuy, Arg.
9	*A. durannensis*	KGBPScS 30064	San Salvador (Ruta 66), Jujuy, Arg.
10	*A. durannensis*	KGBPScS 30065	Senda Hachada, Salta, Arg.
11	*A. durannensis*	KGBPScS 30067	Ruta 34 and Río Seco, Senda Hachada, Salta, Arg.
12	*A. durannensis*	KGBPScS 30069	30 Km north of Yacuiba, Caiza, Tarija, Bol.
13	*A. durannensis*	KGBPScS 30070	18 Km north of Yacuiba, Caiza, Tarija, Bol.
14	*A. durannensis*	KGBPScS 30073	30 Km north of Tarija, Bol.
15	*A. durannensis*	KGBPScS 30071	2 Km west of Saladillo, Tarija, Bol.
16	*A. durannensis*	KGBPScS 30072	14 Km west of Caraparí, Tarija, Bol.
17	*A. durannensis*	KGBPScS 30074	2 Km north of Palmar Grande, Santa Cruz, Bol.
18	*A. durannensis*	KSBScC 36002	Río Juramento, El Tunal, Salta, Bol.
19	*A. durannensis*	KSBScC 36004	Palpalá, Jujuy, Arg.
22	*A. durannensis*	KGP 10038-2	El Prado, Río Arenales, Salta, Arg.
23	*A. durannensis*	KScGo 28458	Campo Durán, Salta, Arg.
24	*A. monticola*	BaRiK 7264-1	Yala, Jujuy, Arg.
26	*A. monticola*	KGBPScS 30063	Lozano, Jujuy, Arg.
27	*A. batizocoi*	K 9484	Río Parapetí, Bol.
28	*A. batizocoi*	KGBPScS 30079	Paja Colorada, Bol.
29	*A. batizocoi*	KGBPScC 30081	Lagunillas, Santa Cruz, Bol.
30	*A. batizocoi*	KGBPScS 30083	Gutiérrez, Santa Cruz, Bol.
35	*A. cardenasii*	KSSc 36015	Roboré, Santa Cruz, Bol.
36	*A. cardenasii*	KSSc 36016	Roboré, Santa Cruz, Bol.
37	*A. cardenasii*	KSSc 36020	Roboré, Santa Cruz, Bol.
38	*A. cardenasii*	KSSc 36021	Santiago, Bol.
39	*A. cardenasii*	KSSc 36033	Natividad, Santa Cruz, Bol.
40	*A. cardenasii*	KSSc 36034	Natividad, Santa Cruz, Bol.

[a] Number of lot in INTA of Manfredi, Córdoba, Argentina.

[b] Voucher specimens have been deposited at Museo Botánico de Corrientes (CTES), Argentina.

Fatty Acid Composition

Fatty acid methyl esters were prepared by transmethylation with a 3% solution of sulfuric acid in methanol, as previously described (Jellum and Worthington, 1966). The fatty acid methyl esters of total lipids were analyzed on a Shimadzu GC-R1A gas chromatograph equipped with flame ionization detector (FID). AT-WAX superox II capillary columm (30 m x 0.25 mm i.d.) was used. Column temperature was programmed from 180°C (held for 10 min) to 240°C (4°C/min). Injector temperature was 250°C. The carrier (nitrogen) had a flow rate of 1 mL/min. The separated fatty acid methyl esters were identified by comparing their retention times with those of authentic samples wich were purchased from SIGMA Chemical Co. Quantitative analysis of the fatty acids were performed using the heptadecanoic acid methyl ester as internal standard. Iodine values were calculated from fatty acid composition (Hashim *et al.,* 1993) using the formula: I.V. =(% oleic x 0.8601) + (% linoleic x 1.7321) + (% eicosenoic x 0.7854).

Sterol Composition

Sterols of the unsaponifiable matter from 5 g of oil (after saponification with alcoholic 1 M potassium hydroxide) were purified by preparative thin-layer chromatography (TLC). TLC was performed on silica gel 60 G (20 x 20 cm, 0,5 mm layer thickness) plates using chloroform-diethyl ether (9:1 v/v) as the developing solvent. The approximate relative R_f values of the 4-desmethylsterols fraction was 0,27. The unsaponifiable matter was dissolved in chloroform (5%) and 150 µl was deposited as a streak of 15 cm length on the plate. Cholesterol, used as standard, was spotted on the left and right hand sides of the plate. The corresponding band of 4-desmethylsterols was scraped off the plate and extracted with chloroform (Gaydou *et al.,* 1983). Purified sterols were analyzed on a Shimadzu GC-R1A gas chromatograph equipped with FID. Shimadzu CBP1 capillary column (25 m x 0,25 mm i.d.) was used. Column temperature was programmed from 200 to 300 °C (4° C/min). Injector temperature was 320°C. The carrier (nitrogen) had a flow rate of 1 mL/min. Standard sterols (Sigma Chemical Co.) were run in order to use retention times in identifying sample peaks. The amount of sterols was determined from the weight of 5α-cholestane as internal standard. The data were calculated using a integrator of the chromatograph.

Statistical analysis

All analysis for each sample of the wild *Arachis* were done in triplicate. Mean and standard deviation for each species were determined and significant differences among mean values were evaluated using a t-test (Branch *et al.,* 1990) due the data shown normal distribution according previously researchs performed in this material. Mean values of *A. monticola* were only two genotypes and was not included in the statistical analysis.

3. RESULTS AND DISCUSSION

Moisture, oil, protein, ash, and carbohydrate contents and iodine value are shown in Table II. Peanuts are characterized by high oil and protein contents and low carbohydrates and ash. Knowledge of these components is important in the end products of the industry (Ahmed and Young, 1982). The oil content was highest in *A. batizocoi* (mean value 53,35%) *Arachis monticola* and *A. durannensis* exhibited the highest protein levels.

Iodine value and O/L ratio are both indicators of peanut oil stability and shelf-life (Ahmed and Young, 1982). Higher O/L ratios and lower iodine values suggest better stability, longer shelf-life, and quality of the oils (Branch *et al.,* 1990). All wild species of peanut had in relation to iodine value and O/L ratio, lower stability and quality of their oils than the US peanut cultivars (Branch *et al.,* 1990) and Argentina (Grosso *et al.,* 1994). These variations could be due to differences in climatic conditions, soil moisture and air temperature during maturation of peanut seed. The best O/L ratio and iodine values were found in *A. correntina* (mean value 1,06) and *A. batizocoi* (mean value 106), respectively (Table II).

The fatty acid composition is presented in Table III. Palmitic (16:0), stearic (18:0), oleic (18:1), linoleic (18:2), arachidic (20:0), eicosenoic (20:1), behenic (22:0) and lignoceric (24:0) acids were detected. Oleic and linoleic acids were the principal components (Table III). Oleic acid was predominant in the samples of *A. correntina.* The lowest oleic and highest linoleic concentrations were the principal differences with respect to the fatty acid composition of peanut cultivars previously published (Branch *et al.,* 1990; Grosso and Guzmán, 1995a) and with other species of *Arachis* (Stalker *et al.,* 1989). The differences between species detected in this work are not probably due to climatic conditions, because all sample of especies were cultivated in the same year, growing season and locality. However, the differences observed with data previously reported could be due these causes.

The sterols are components of unsaponifiable lipids and are important to identify blends of fats and oils (Belitz and Grosch, 1987). Tocopherols and sterols are also of interest because of their antioxidant activity (Dutta and Appelqvist, 1996). The total sterols in peanut are about 0,5% of oil (Formo *et al.,* 1979). The following sterols were detected (Table IV): cholesterol, campesterol, stigmasterol, ß-sitosterol, Δ^5-avenasterol, Δ^7-stigmasterol, and Δ^7-avenasterol. *Arachis correntina* showed higher concentrations of campesterol (16,47%), stigmasterol (12,27%) and Δ^5-avenasterol, (12,13%) and lower ß-sitosterol (56,40%) than the other species. These results shown similarity with peanut cultivars previously reported (Grosso and Guzmán, 1995b). Some significant differences were found in sterols.

Table II
Moisture, oil, protein, ash, and carbohydrate (Carb.) contents (wt%) and iodine value of wild peanuts from Argentina and Bolivia

	Species	Moisture	Oil[a]	Protein[a]	Ash[a]	Carb[a]	I.V.
1	*A. correntina*	5.5	50.3	27.5	2.4	19.8	105
2	*A. correntina*	5.9	51.5	26.5	2.7	19.3	109
3	*A. correntina*	5.7	49.5	26.1	2.5	21.9	108
	M (n=3)[b]	5.70a	50.43ab	26.70b	2.53a	20.33a	107.3a
	SD	± 0.20	±1.01	±0.72	±0.15	±1.43	±2.1
4	*A. durannensis*	5.5	52.9	30.5	2.7	13.9	110
5	*A. durannensis*	5.8	52.5	29.3	2.5	15.7	109
6	*A. durannensis*	5.8	51.7	31.7	2.3	14.3	111
7	*A. durannensis*	5.9	51.5	27.3	2.8	18.4	113
8	*A. durannensis*	5.6	53.2	27.5	2.6	16.7	113
9	*A. durannensis*	5.7	51.2	26.9	2.6	14.3	110
10	*A. durannensis*	5.5	52.2	28.3	2.4	17.1	107
11	*A. durannensis*	5.9	53.0	29.6	2.9	14.5	109
12	*A. durannensis*	5.3	53.8	31.9	2.5	11.8	110
13	*A. durannensis*	5.5	52.3	30.6	2.5	14.6	110
14	*A. durannensis*	5.5	49.6	30.8	2.6	17.0	109
15	*A. durannensis*	5.7	53.6	29.4	2.7	14.3	108
16	*A. durannensis*	5.8	49.6	28.2	2.3	19.9	108
17	*A. durannensis*	5.5	53.4	30.5	2.4	13.7	112
18	*A. durannensis*	5.6	49.2	28.7	2.7	19.4	108
19	*A. durannensis*	5.6	49.6	28.7	2.8	18.9	112
22	*A. durannensis*	5.7	53.7	27.5	2.6	16.2	110
23	*A. durannensis*	5.6	49.9	27.0	2.6	20.5	110
	M (n=18)[b]	5.64a	51.83b	29.13c	2.58a	16.17b	109.9b
	SD	±0.16	±1.61	±1.60	±0.17	±2.48	±1.7
24	*A. monticola*	5.8	50.1	28.2	2.4	19.3	109
26	*A. monticola*	5.5	49.0	30.6	2.7	17.7	105
	M (n=2)	5.65	49.55	29.40	2.55	18.50	107.0
	SD	±0.21	±0.78	±1.70	±0.21	±0.91	±2.8
27	*A. batizocoi*	5.5	53.2	28.8	2.5	15.5	105
28	*A. batizocoi*	5.4	52.6	26.7	2.4	18.3	109
29	*A. batizocoi*	5.8	53.7	27.6	2.7	16.0	106
30	*A. batizocoi*	5.5	53.9	25.2	2.6	18.3	104
	M (n=4)[b]	5.55a	53.35c	27.07ab	2.55a	17.02b	106.0a
	SD	±0.17	±0.58	±1.52	±0.13	±1.59	±2.2
35	*A. cardenasii*	5.9	51.7	28.5	2.6	17.2	104
36	*A. cardenasii*	5.5	51.0	27.9	2.6	18.5	104
37	*A. cardenasii*	5.5	50.3	28.2	2.4	19.1	107
38	*A. cardenasii*	5.7	48.9	26.3	2.8	22.0	109
39	*A. cardenasii*	5.8	49.0	26.6	2.6	21.8	108
40	*A. cardenasii*	5.6	51.6	27.5	2.5	18.4	108
	M (n=6)[b]	5.67a	50.42a	27.50a	2.58a	19.50a	106.7a
	SD	±0.16	±1.24	±0.88	±0.13	±1.95	±2.2

[a] Expressed on dry weight basis.

[b] Mean values (M) and standard deviations (SD) for each species. Means followed by the same letter within each column are not significantly different at P=0.05.

Table III
Fatty acid composition (wt%) of wild peanuts from Argentina and Bolivia

	Species	16:0	18:0	18:1	18:2	20:0	20:1	22:0	24:0	O/L
1	*A. correntina*	9.9	1.8	43.3	38.7	1.1	1.4	2.5	1.1	1.22
2	*A. correntina*	10.1	1.4	41.5	42.0	0.7	1.1	2.2	0.5	0.99
3	*A. correntina*	9.7	1.7	43.0	40.0	1.2	1.1	2.2	0.7	1.07
	M (n=3)[a]	9.90a	1.63a	42.60c	40.23a	1.00a	1.20a	2.30b	0.77b	1.06c
	SD	±0.20	±0.21	±0.96	±1.66	±0.26	±0.17	±0.17	±0.31	±0.07
4	*A. durannensis*	10.4	1.4	34.2	45.9	1.3	1.4	3.4	1.6	0.74
5	*A. durannensis*	10.5	1.8	34.8	44.9	1.3	1.5	3.5	1.5	0.77
6	*A. durannensis*	10.0	1.4	33.7	46.8	1.0	1.7	3.5	1.5	0.72
7	*A. durannensis*	9.9	1.9	33.5	48.0	0.9	1.4	2.8	1.2	0.70
8	*A. durannensis*	9.7	2.5	34.0	47.9	0.9	1.5	2.6	0.6	0.71
9	*A. durannensis*	10.4	1.6	37.3	44.4	0.8	1.6	2.8	0.8	0.84
10	*A. durannensis*	11.0	1.5	35.9	43.2	1.6	1.7	3.5	1.3	0.83
11	*A. durannensis*	11.0	1.9	36.9	44.2	1.2	1.2	2.5	1.0	0.83
12	*A. durannensis*	10.3	2.1	35.2	45.5	1.0	1.1	3.1	1.3	0.77
13	*A. durannensis*	10.1	2.5	33.1	46.9	1.3	1.0	2.9	1.3	0.70
14	*A. durannensis*	9.5	3.0	37.0	44.3	1.5	1.0	2.9	0.7	0.83
15	*A. durannensis*	11.5	2.4	34.3	44.4	1.6	1.5	3.2	0.8	0.77
16	*A. durannensis*	9.7	2.3	37.3	43.5	1.2	1.4	2.9	1.3	0.86
17	*A. durannensis*	9.8	1.4	33.4	47.6	0.9	1.0	3.8	1.5	0.70
18	*A. durannensis*	11.9	1.0	36.2	47.6	1.2	1.1	3.3	1.2	0.83
19	*A. durannensis*	9.4	2.2	33.2	48.6	1.2	1.4	3.1	1.3	0.70
22	*A. durannensis*	11.1	2.5	34.6	45.9	1.2	1.0	2.6	1.0	0.75
23	*A. durannensis*	10.1	2.3	33.8	45.9	1.3	1.4	3.2	1.4	0.74
	M (n=18)[a]	10.35a	1.98a	34.91a	45.86b	1.19a	1.33a	3.09a	1.18a	0.77a
	SD	±0.70	±0.52	±1.48	±1.67	±0.24	±0.24	±0.37	±0.30	±0.06
24	*A. monticola*	10.6	2.4	38.3	43.5	1.1	1.1	2.2	0.6	0.88
26	*A. monticola*	10.7	2.8	37.6	41.4	1.7	1.6	2.3	1.3	0.91
	M (n=2)	10.65	2.60	37.95	42.45	1.40	1.35	2.25	0.95	0.89
	SD	±0.07	±0.28	±0.49	±1.48	±0.42	±0.35	±0.07	±0.49	±0.02
27	*A. batizocoi*	10.7	1.5	38.5	40.9	1.5	1.8	3.2	1.5	0.94
28	*A. batizocoi*	10.4	2.2	41.8	41.3	0.8	1.5	1.2	0.5	1.01
29	*A. batizocoi*	12.7	2.3	37.4	42.2	1.1	0.9	2.1	0.8	0.89
30	*A. batizocoi*	10.6	2.2	39.7	39.8	1.2	1.4	3.6	1.0	1.00
	M (n=4)[a]	11.10b	2.05a	39.35b	41.05a	1.15a	1.40ab	2.52b	0.95ab	0.96b
	SD	±1.07	±0.37	±1.88	±0.99	±0.29	±0.37	±1.09	±0.42	±0.06
35	*A. cardenasii*	11.6	1.7	37.0	40.7	1.2	1.7	3.8	1.6	0.91
36	*A. cardenasii*	10.8	1.6	35.9	41.2	1.9	2.6	3.6	1.8	0.87
37	*A. cardenasii*	11.6	1.9	34.5	44.3	1.2	1.5	3.5	1.2	0.78
38	*A. cardenasii*	10.7	1.4	36.4	44.5	0.9	1.6	3.3	1.2	0.82
39	*A. cardenasii*	11.3	1.2	32.7	45.6	1.8	1.2	4.3	1.4	0.71
40	*A. cardenasii*	11.3	2.5	33.0	45.1	0.9	1.6	3.7	1.4	0.73
	M (n=6)[a]	11.22b	1.72a	34.91a	43.57c	1.32a	1.70b	3.70c	1.43c	0.80a
	SD	±0.39	±0.45	±1.80	±2.08	±0.44	±0.47	±0.34	±0.23	±0.08

[a] Mean values (M) and standard deviations (SD) for each species. Means followed by the same letter within each column are not significantly different at P=0.05.

Table IV
Sterol composition (wt%) of wild peanuts from Argentina and Bolivia

	Species	Chol.	Camp.	Stig.	Sit.	Δ5-av.	Δ7-stig.	Δ7-av.
1	*A. correntina*	1.3	16.4	12.8	55.6	11.6	0.9	1.1
2	*A. correntina*	0.9	15.9	12.6	56.2	12.3	1.2	0.7
3	*A. correntina*	2.0	17.1	11.4	57.4	12.5	1.5	1.5
	M (n=3)[b]	1.40a	16.47b	12.27b	56.40b	12.13b	1.20b	1.10a
	SD	±0.56	±0.60	±0.76	±0.92	±0.47	±0.30	±0.40
4	*A. durannensis*	0.6	15.2	13.0	59.7	9.4	0.6	1.3
5	*A. durannensis*	1.8	16.8	10.9	56.7	12.3	0.3	1.1
6	*A. durannensis*	2.3	14.1	12.3	58.6	10.0	1.7	0.8
7	*A. durannensis*	1.5	16.1	9.8	60.0	8.8	2.0	1.7
8	*A. durannensis*	2.1	13.0	12.5	59.5	11.5	0.9	0.3
9	*A. durannensis*	1.0	17.2	10.3	59.7	9.7	0.9	1.0
10	*A. durannensis*	2.7	15.1	12.0	55.2	12.3	1.4	1.0
11	*A. durannensis*	2.1	14.9	11.3	56.4	11.5	1.7	2.0
12	*A. durannensis*	1.7	16.0	12.1	57.5	10.7	0.9	0.8
13	*A. durannensis*	2.3	14.8	10.9	57.1	12.0	1.2	1.7
14	*A. durannensis*	0.6	16.0	11.8	59.1	11.0	0.7	0.6
15	*A. durannensis*	1.8	15.3	9.6	59.8	10.7	1.3	1.2
16	*A. durannensis*	2.0	17.1	11.0	58.9	8.6	0.7	1.5
17	*A. durannensis*	0.8	16.3	10.1	58.6	11.0	1.7	1.3
18	*A. durannensis*	1.6	15.9	12.0	58.2	10.9	0.3	0.8
19	*A. durannensis*	1.9	16.7	10.3	55.0	12.7	1.6	1.3
22	*A. durannensis*	2.4	13.5	11.6	56.6	11.7	2.0	1.6
23	*A. durannensis*	1.6	15.8	12.3	57.1	10.1	1.7	1.3
	M (n=18)[b]	1.71a	15.54ab	11.32ab	57.98a	10.83a	1.20ab	1.18a
	SD	±0.62	±1.18	±1.01	±1.59	±1.20	±0.60	±0.46
24	*A. monticola*	2.1	15.6	12.3	56.1	10.7	1.4	1.6
26	*A. monticola*	1.7	16.0	11.4	55.3	11.7	1.9	1.5
	M (n=2)	1.90	15.80	11.85	55.70	11.20	1.65	1.55
	SD	±0.28	±0.28	±0.64	±0.57	±0.71	±0.35	±0.07
27	*A. batizocoi*	2.0	15.2	9.7	61.6	10.0	0.9	0.3
28	*A. batizocoi*	1.3	14.9	10.9	61.2	9.7	0.9	1.0
29	*A. batizocoi*	0.9	16.8	11.3	55.7	12.0	1.8	1.3
30	*A. batizocoi*	1.9	16.1	10.8	56.3	11.5	1.5	1.3
	M (n=4)[b]	1.52a	15.75ab	10.67a	58.70ab	10.80a	1.27b	0.97a
	SD	±0.53	±0.87	±0.68	±3.13	±1.12	±0.45	±0.57
35	*A. cardenasii*	1.5	13.7	10.5	59.4	12.0	1.5	0.9
36	*A. cardenasii*	1.5	17.0	10.0	58.0	9.6	1.5	1.7
37	*A. cardenasii*	2.3	14.9	11.4	60.1	10.7	0.6	0.3
38	*A. cardenasii*	1.4	14.7	11.2	56.5	12.1	1.9	1.7
39	*A. cardenasii*	0.9	15.3	11.7	57.2	12.0	1.3	1.2
40	*A. cardenasii*	1.7	15.5	11.2	56.1	11.8	1.9	1.6
	M (n=6)[b]	1.55a	15.18a	11.00a	57.88ab	11.37ab	1.45ab	1.23a
	SD	±0.45	±1.09	±0.63	±1.60	±1.01	±0.48	±0.63

[a] Abbreviations: Chol. Cholesterol; Camp., Campesterol, Stig. Sitgmasterol, Sit; ß-sitosterol, Δ5-av., Δ5avenasterol; Δ7-Sitg., Δ7-stigmasterol; Δ7-av. Δ7-avenasterol. tr.: less than 5g / kg.

[b] Mean values (M) and standard deviations (SD) for each species. Means followed by the same letter within each column are not significantly different at P=0.05.

The chemical quality of oils (iodine value and O/L ratio) from wild peanut studied in this work is not better than cultivated peanut. However, the chemical composition of wild species in *Arachis* contributes to characterization of germplasm bank materials.

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