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FATTY-ACID COMPOSITION OF *Prosopis ruscifolia* SEED UPON PROLONGED STORAGE CONDITIONS

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Prosopis ruscifolia, a member of the Mimosoidae family, is a leguminous tree found widely in the argentine Chaco region (Northeastern provinces), where this ecosystem is very fragile and strongly affected by extreme changes in climate and soil conditions which in turn leads very often to lack of food supplies for their inhabitants. The genus *Prosopis* is abundantly represented in Argentina, where the most prominent members are the well-known *P. alba*, *P. chilensis*, *P. flexuosa*, and *P. nigra* [1]. In the past the plant has been regarded as a nuisance, but it has recently been reported as an alternative for vegetable coal, and its timber can be used for building constructions; most interestingly, their pods offer an array of useful components: high levels of protein, polysaccharides (galactomannans), and some antioxidants, presumably provided by polyphenols and phytates [2], which make this resource a valuable asset for food ingredients or nutraceutical uses.

There is no published research on the composition of the seed oil of *Prosopis ruscifolia* kept under long storage conditions, although our team has been examining the properties and composition of fresh, mature seeds of the plant.

Nature plant seeds were collected by harvesting pods of the vine from Formosa Province, Argentina in the natural habitats of the plants during the summers of 2003 and 2007. Samples from 2003 were stored under room temperature conditions (average 22°C). The seeds were separated from the pods by gross milling and sieving, the fractions weighed to obtain the yield and powdered to a fine meal by milling with a laboratory "Udy" cyclone mill, followed by extraction with chloroform and methanol (2:1 v/v) [3]; after elimination of the solvent in a rotary evaporator, 10–20 mg of oil was later converted to methyl esters with a sulfuric acid–methanol–toluene mixture with refluxing at 70°C for 3 h, then extracted by purified hexane, centrifuged at 2200 g for 10 min, then kept in vials for immediate analysis [4]. The methyl esters of the fatty acids were injected into a GLC column (Konik Model 5000 series, Barcelona, Spain) equipped with an FID detector.

Capillary GC analysis was carried out under the following settings: capillary column Tracer Analytica (Valencia, Spain), Carbowax, 60 m × 0.250 mm, film thickness 0.25 μm, oven temperature set at 220°C, detector and injector temperature 250°C, carrier gas 1 mL/min, split ratio 1/20, and injection volume 2 μL. Identification of the peaks was carried out through a comparison with standards of pure fatty acid methyl esters, and the relative percentage amounts of the fatty acids were calculated by software PeakSimple-II, (SRI Instruments, Torrance, CA, USA). Data obtained from sample analyses of the seed oil were expresed as means (± SD) and evaluated using ANOVA statistical procedures. In this study, seed oil was obtained at an average yield of 5.4%. The compositions of the fatty acids of the seed oil expressed as relative percentages are given in Table 1.

TABLE 1. Fatty Acid Methyl Ester Composition of Vine Seed Kernels and Soya Bean, as Area Percent Determined by GC

Compound	Vine*[a]	Vine**[a]	Soya bean***	Compound	Vine*[a]	Vine**[a]	Soya bean***
14:0	Tr.	Tr.	N.d.	18:1	26.58	26.02	21.16
16:0	13.35	11.61	9.87	18:2	49.4	50.02	58.76
16:1	Tr.	Tr.	N.d.	18:3	1.80	1.75	7.31
18:0	3.88	4.29	3.48	20:0	2.82	2.69	N.d.

Mean values plus/minus standard deviations, a: insignificant differences for the columns marked ($p \le 0.05$);*four independent samples, 4 years storage; **eight independent samples recently harvested; ***four independent samples included for comparison purposes; Tr.: traces, nonquantified, detected; N.d.: nondetected.

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The major constituents of the oil were unsaturated fatty acids. The total unsaturated acid content was nearly 80%; the main component was linoleic acid (49.4%), followed by oleic acid (26.58%), and when we compared the saturated fatty acids, the amount of palmitic acid (13.35%) was higher than others such as stearic (3.88%) and arachidic (2.82%) acids; all figures are expressed as mean values for vine samples stored for 4 years. When ANOVA is applied to both groups of vine samples, the slight differences seen for the mean values proved to be insignificant, so the vine seed oil seems to be quite stable.

To the best of our knowledge, this is the first report on the seed oil content of *Prosopis ruscifolia* under long storage periods. This resource could be stored as food or feed source without deleterious effects or changes in its oil composition, making it available in seasons when the food supply is scant.

REFERENCES

1. A. Burkart, *J. Arnold Arboretum,* **57** (3), 219 (1975).
2. C. Bernardi, M. Freyre, M. E. Sambucetti, and M. D. Pirovani, *Plant Foods Human Nutr.*, **59**, 175 (2004).
3. J. Folch, M. Lees, and G. H. S. Stanley, *J. Biol. Chem.,* **226**, 497 (1957).
4. W. Christie, *Gas Chromatography and Lipids, A practical Guide,* The Oily Press. Ayr, Scotland, 1989.