

Short Communication

Chemical composition of *Opuntia ficus-indica* (L.) fruit

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Chemical composition of pulp, skin and seeds of fruit of *Opuntia ficus-indica* was investigated. Results showed high amount of water in the pulp (84.14%) and skin (90.33%). Glucose and fructose (29 and 24%, respectively) in the pulp were greater than in the skin (14 and 2.29%, respectively), whereas saccharose was very low in the pulp (0.19%) than in the skin (2.25%). The seed does not contain any trace of sugars. Potassium was very high in the three fractions of the fruit compared to other minerals. Prickly pear fruit is a remarkable fruit and its consumption is encouraged.

Key words: Chemical composition, *Opuntia ficus-indica*, cactus pear, fruit.

INTRODUCTION

Cactus pear or prickly pear, a member of the Cactaceae family (Reyes Aguero et al., 2005), originated from arid and semi-arid regions of Mexico, and was introduced into North Africa in the 16th century (Griffiths, 2004). More than 1500 known species of cactus are in the genus *Opuntia* (Hegwood, 1990). The fruit is a berry, varying in shape, size and colour and has a consistent number of hard seeds. The fairly high sugar content and low acidity of the fruit (Joubert, 1993; Munoz de Chavez et al., 1995) make it very sweet and delicious. Moreover, cactus pear fruit containing betalain pigments is a good potential for the use as a natural food colorant. This fruit contains the red-violet betacyanins in addition to the yellow betaxanthins (Merin et al., 1987; Forni et al., 1992; Turker et al., 2001).

The human medical potential of *Opuntia* depends on its tissue composition (Hegwood, 1990). Several research studies have been carried out on the chemical composition of the cladodes than the fruits, because of a larger utilisation of the cladodes as forage for animal foods.

MATERIAL AND METHODS

Fruits of *Opuntia ficus-indica* were collected in a private cultivar in the month of September 2005. One kilogram of edible prickly pear fruits were brushed for two minutes under distilled water with a nail-

brush. The skin, pulp and seeds were removed from each other and then dried in oven at 105°C for 24 h to determine water content. Dry matter of each fraction (skin, pulp and seeds) were ground separately and passed through a 100-mesh sieve before analysis.

Moisture, lipids and ash were determined according to AOAC methods (AOAC, 1980). Nitrogen was determined by a Kjeldahl procedure. The factor 6.25 was used to convert nitrogen to crude protein (Jones, 1991).

Carbohydrate composition was determined by HPLC. For mineral composition, calcium, sodium was evaluated by flame emission, magnesium and potassium by mass spectrometry in soil laboratory (Department of Agronomy) of Mostaganem University Algeria.

Statistical analysis

Results are expressed as mean \pm SD of samples.

RESULTS AND DISCUSSION

The chemical composition parameters of *O. ficus-indica* (pulp, skin and seeds) are listed in Tables 1 and 2 and 3, respectively. Pulp and skin contained higher amount of water (94 and 90%, respectively) than the seeds (18%). This confirms the results obtained in a previous study (Saenz-Hernandez, 1995).

Protein content shows that the seeds contain more amount than the pulp and the skin. Same observation was made for lipids where the seeds have a greater amount (3.66%) than the pulp (0.7%) or skin (1.06%). Our results are comparable to the results obtained by Sawaya et al. (1983).

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Table 1. Composition of *Opuntia ficus-indica* fruit samples (% w/w, dry matter).

Parameter	Pulp	Skin	Seed
Water content	94.40±2.61	90.33±0.21	18.05±2.53
Protein	1.45±0.08	1.45±0.08	4.48±0.01
Lipids	0.7±0.08	1.06±0.08	3.66±0.21
Ash	1±0.01	3.05±0.15	12.66±0.62

Mean ± standard deviation; n=3.

Table 2. Carbohydrate composition of *Opuntia ficus-indica* fruit samples (% dry matter).

Sugar	Pulp	Skin	Seed
Saccharose	0.19	2.25	0
Glucose	29	14	0
Fructose	24	2.29	0

Table 3. Mineral composition of *Opuntia ficus-indica* fruit samples (mg/100 g, dry matter).

Mineral	Pulp	Skin	Seed
Ca	12.4	15.7	21.2
K	199	98	78.6
Na	1.09	1.1	0.54
Mg	18.8	15.2	9.85

For carbohydrate analysis, the pulp showed less amount of saccharose than in the skin. However, the pulp contains more glucose than in the skin, and no trace of glucose was found in the seeds. Similar observations for fructose were obtained; where 24% of glucose was detected in the pulp, 14% in the skin and 0% in the seeds. This confirms the sweetness of the pulp and the skin, similar to those described in the literatures (Rodriguez et al., 1998).

For mineral analysis, our results showed that the pulp and the skin of prickly pear are rich in potassium, magnesium and calcium; however they contained less amount of sodium. The mineral pattern depends on the fruit origin and factors of the site of cultivation. Similar results have been reported in the literatures (Stintzing et al., 2001). In conclusion, prickly pear fruit is an interesting summer fruit, and its use in arid and semi arid regions should be encouraged.

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