

THE PRICKLY PEAR FRUIT

THE SECRETS OF A MAGICAL FRUIT





Originating in Mexico, the prickly pear fruit, called *tuna*, had sailed across many seas and taken on many different names at different destinations, before it cast anchor in Tunisia. The Spanish used to call it *higo de las Indias*.

The Berbers, as for them, called it *hendi* (the Indian), or alternatively *kermous ensara* (the Christians' fig), thus evoking the memory of the Spanish who were the first to bring this fruit to North Africa in the 16th century.

In France, where the prickly pear fruit was introduced on a large scale by the Berbers, this fruit was christened *figue de Berbérie* (the ancient name of the Maghreb), before the French gave it the name *figue de Barbarie* (the Berbers' Fig).

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THE HEAVEN-SENT PLANT

“The prickly pear tree is one of the most useful plants that nature has ever offered mankind. It grows well on its own in the most barren lands at no cost. Far from depleting the soil on which they grow, the prickly pear’s roots make it even more fertile. This plant gives back to the soil as much as it takes from it.”

This tree-like plant is endowed with an ingenious root system allowing it to survive in periods of drought. After a shower of rain, the prickly pear can grow “rain roots” that capture the water before they shrink or disappear altogether once the soil dries up.

«SOLTANE EL GHALLA» THE SULTAN OF THE FRUIT REALM

Once upon a time, a cactus from Mexico traveled all the way to Tunisia to settle there. Whether grown **in the wilderness**, planted as copses around rural houses, used as fences surrounding the fields or **cultivated**, the **prickly pear tree** is everywhere in Tunisia's countryside.

Since the 1920s, Tunisia developed its **forage crops** to serve as animal feed supplement for livestock when grass becomes scarcer.

Today, **growing the prickly pear tree**, an activity that holds great promise at the socio-economic level and that is increasingly carried out under the **organic label**, has been leveraging modern techniques. The area planted (about 600,000 hectares) has been growing steadily. Indeed, **second only to Mexico**, **Tunisia is one of the largest producers of prickly pear fruits in the world**.

Aside from the market value of the prickly pear fruit per se, a fruit that Tunisians call **«Soltane El Ghalla»** (the Sultan of the fruit realm), many other sectors have come into play to take advantage of this plant: agri-food, cosmetics, pharmaceuticals and the energy sector. Incentivized by the State and by other large international bodies, the prickly pear tree processing industry.



Opuntia are cacti that belong to the *Cactaceae* family which includes many species (1600). The *Opuntia ficus indica*, L., better known under the name of prickly pear tree, is the most widespread species around the Mediterranean.

Prickly pear trees and olive trees
of Tunisia.

Gray green and running
lengthwise, the 1.5 to 3 cm thick
nopales may grow to a size of
up to 50 cm in length and 30 cm
in width.

Supplementary livestock feed

While camels eat the nopales
in spite of the thorns clinging
to them, the thorny nopales
are grilled on fire before they
are given to small ruminants
(cattle, sheep, etc.) as
supplementary feed.



AN IMPORTANT ECONOMIC RESOURCE

In rural areas, the local populations are reclaiming this local resource by developing the prickly pear crops.



A PLANT WITH A MYRIAD OF ADVANTAGES

Planting the prickly pear cactus helps to **control** water and wind **erosion** as well as **restore** and stabilize depleted soils. Thanks to its fire-resistant properties, the prickly pear cactus can serve as a **firebreak**. Every single part of the plant is an excellent **fertilizer**.

The prickly pear cactus can be propagated through setting out seedlings or else through cuttings. In fruit orchards, it is sown in bunches in lines spaced three to four meters apart.



Alley cropping is an agroforestry practice whereby perennial crops are grown alongside annual crops. Recently introduced into Tunisia, alley cropping, with intermittent spaces between the cacti, allows farmers to keep on

cultivating the land for other crops, such as barley in between a cactus and another, and livestock to graze on barley stubble during the summer season.



A ROBUST, NATURALLY SCULPTURED PLANT

The prickly pear plant is made of flattened stems, otherwise called **cladodes** or, more commonly, **pads**. They are born one after the other, with this year's cladodes bearing those of next year's. Thick and elliptical in shape, they form a bunch of stems that grow upwards and sideways to reach up to 5 meters in either direction.

Beyond the fourth year of their growth, the pads at the base of the plant lignify to form one or more thick-barked, dull **trunks** that crack over time. The **root system** is superficial and is concentrated in the first 30 centimeters of the soil. However, it is particularly extensive and retains every single drop of water.

Conical-shaped, few millimeters long **leaves** are born on the current-year cladodes. Each leaf is inserted on a small, well-marked protuberance. Ephemeral, they disappear well before the current-year cladode reaches its maximum height.



“This plant rightly deserves to figure on the list of the nature's finest miracles.”

Pierandrea Mattioli
(Italian botanist
1501-1578)

■ A ROBUST, NATURALLY SCULPTURED PLANT

At the axil of every leaf, on the same protuberance, there is a modified axillary bud: the **areole**, about 150 per cladode. Each areole contains a meristem that can produce thorns and a new nopal, a flower or roots (if the areole is in the soil).

Instead of typical plant leaves, **prickly pear elliptical nopales** perform the **chlorophyll function**. They are covered with a cuticle (the cutin), which restricts the plant's transpiration, retains water, and protects it against fungi, insects and excessive solar radiation.



**AN OUTSTANDING
CAPACITY TO
ADAPT**

The prickly pear tree is highly appreciated for its **robustness** and its **limited needs** in **care**. It can make do with soils low in organic matter and can withstand extreme climatic conditions. It tolerates extrem **heat** and exposure to sunlight.

■ A ROBUST, NATURALLY SCULPTURED PLANT

There are **two types** of **prickly pear thorns**: the whitish, rigid ones, one to two centimeters long, firmly embedded and grouped in threes in the center of small warts, and the thin, a few millimeters long, brownish thorns (**glochidia**).

Some **thornless** (spine-free) varieties of prickly pear exist, often cultivated for animal feed. The **thorny** varieties are used to make hedgerows or defensive hedges.

A hedge of prickly pears being impassable, popular wisdom has it that a prickly pear nopal pad put on the roof of the house or a potted prickly pear tree on the patio will ward off any danger.



FLORIFEROUS CLADODES

During the terrace season, May through July, the youngest cladodes are laden with **blossoms**. Directly tied to the stem (without petiole or peduncle), they are usually **born** on the areolas located at the top of the nopal, on the rounded edge and nearby. In the case of overladen prickly pear nopales, the areolas in the center will also give birth to the blossoms.

The **number** of blossoms will vary according to the position of the nopal on the plant and its exposure to the sun, as well as according to physiological factors (nutrition). A fertile **nopal pad** can bear up to **thirty blossoms**.

Blooming flowers, with **large corollas** of 4 to 10 cm, dipped in all the shades of yellow to red, turning reddish as the plant grows senescent (biologically ages), stand next to flowers in the making and the prickly pear nopales of the year.



SUN-COLORED FLOWERS

The hermaphrodite **flowers** of the prickly pear tree give birth to impressive **fruits**. When the flowers wither, the petals, stamens, styli and stigmas fall off.

Below the petals, directly linked to the floral receptacle, at the top of a fleshy, green part of the flower, there is a single locule **ovary** (called inferior) that contains many **ovules**.

Only the part containing the ovary remains attached to the prickly pear nopal. At the top, the rough cavity corresponds to the former site of the petals, stamens, styli and stigmas.

As the green part and the ovary develop into the fruit and as this fruit ripens, the cavity narrows as a result of the rise of its bottom that subsists with a rough surface at the top of the ripe fruit in the shape of a **circular scar**.



HONEY IN THE MAKING

The prickly pear tree flower pollen honey is smooth, creamy and fruity flavored: a true treat for the taste buds. Rich in potassium and polyphenols (flavonoids), it is recommended to soothe sore throats, improve urinary comfort and fight hemorrhoids.



THE DELIGHTS OF A RIPE FRUIT

The flowers bring about the fruits. These **thick-skinned berries**, bristling with fine **thorns** which, in fact, are the glochidia of the areola that stay on the fruit.

The first seasonal fruits are often egg-shaped while those that come at the end of the season have a more elongated shape. Yellowish green, sometimes stained with a red color that may turn into purple according to variety and degree of ripeness, the prickly pear fruit can be five to eight centimeters in **length** and 150 to 400 grams in **weight**. It contains a sweet, reddish, greenish or yellowish **flesh** peppered with many small, dark **seeds** (300 seeds for a fruit of 160 g) that can be eaten.



The prickly pear's harvest season

The first fruits come to **ripeness** towards the **end of the summer** season.

When ripe, the prickly pears display a beautiful size and a soft skin and are ready to be **picked**! No need to pick a large number of them at the same time since they can remain unaltered on the prickly pear tree for months on end.

In the Governorate of Nabeul, in the North eastern part of the country, late season prickly pears of an outstanding quality are obtained by performing **“Scozzolatura”** on the cacti. A **castration** whereby all flower buds and young cladodes are eliminated in full bloom to prompt another wave of flowering that brings about out-of-season fruits.



Formerly, prickly pears used to be picked using a stick slit in the end into three to four parts spread apart using a stone embedded in the middle.



Four varieties are **grown** in Tunisia: *Roga pelona* (dark red colored) that comes to ripeness in July-August, *Gialla* (yellow), *Bianca* (white) and *Rossa* (dark red) which ripen from August through November.



The prickly pear fruit is **juicy** and **scented** with a subtle floral aroma. It has a mild taste and a slightly sweet flavor. Rich in water (the pulp's water content ranges between 81 to 90%, respectively, depending on whether the season is dry or wet), the prickly pear is **refreshing** and **thirst-quenching**.



Picking prickly pears at a farm in Kasserine in central-western Tunisia.

AN IMPORTANT ECONOMIC RESOURCE

The development of the prickly pear tree sector in Tunisia has created about 1,000 jobs over the last five years, jobs that are needed to ensure the proper maintenance of orchards, harvesting and the development of the food, cosmetic and pharmaceutical industries related to the prickly pear.

A TYPICAL PRODUCT

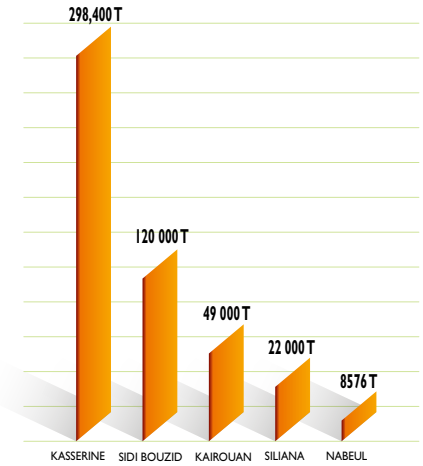
About 490,000 tons of prickly pear products were produced by all four main prickly pear producing governorates (Kasserine, Kairouan, Sidi Bouzid and Siliana), with approximately 39,000 producers involved.

The prickly pear tree, a **long-standing crop** in the governorate of Kasserine, is valued thanks to **age-old know-how** and **local processing practices** (artisanal production of robb - molasses, fresh prickly pear jams, etc.). In Kasserine, in the Zelfène area alone, 3,000 hectares of orchards are now **certified organic**.

For decades on end, the **prickly pear of Zelfene**, otherwise called “Hindi Thala”, a fruit with a very unique taste, has enjoyed nationwide fame and is particularly well-positioned to obtain the “Appellation d'Origine Contrôlée” (AOC) label. In the governorate of Nabeul, the **Bou Argoub prickly pear**, a late-season variety obtained by castrating the prickly pear tree, is well-placed to receive the label. The cultivation of this fruit extends over 800 hectares with an average production of 8 to 12 tons per hectare.



Production of prickly pear fruits in tons.



Area of prickly pear trees cultivated in a traditional way by governorate.

A HIDDEN TREASURE



How to **peel** a **prickly pear fruit**

In general, the fruits sold on the market have their thorns removed. Industrialists use rotary brush machines; otherwise, the thorns are removed manually by dry brushing.

If the thorns have not been removed, the fruit should be rubbed using a piece of cloth or newspaper to remove them. In case some thorns are left, wash the fruit under the tap while scrubbing it with a brush.

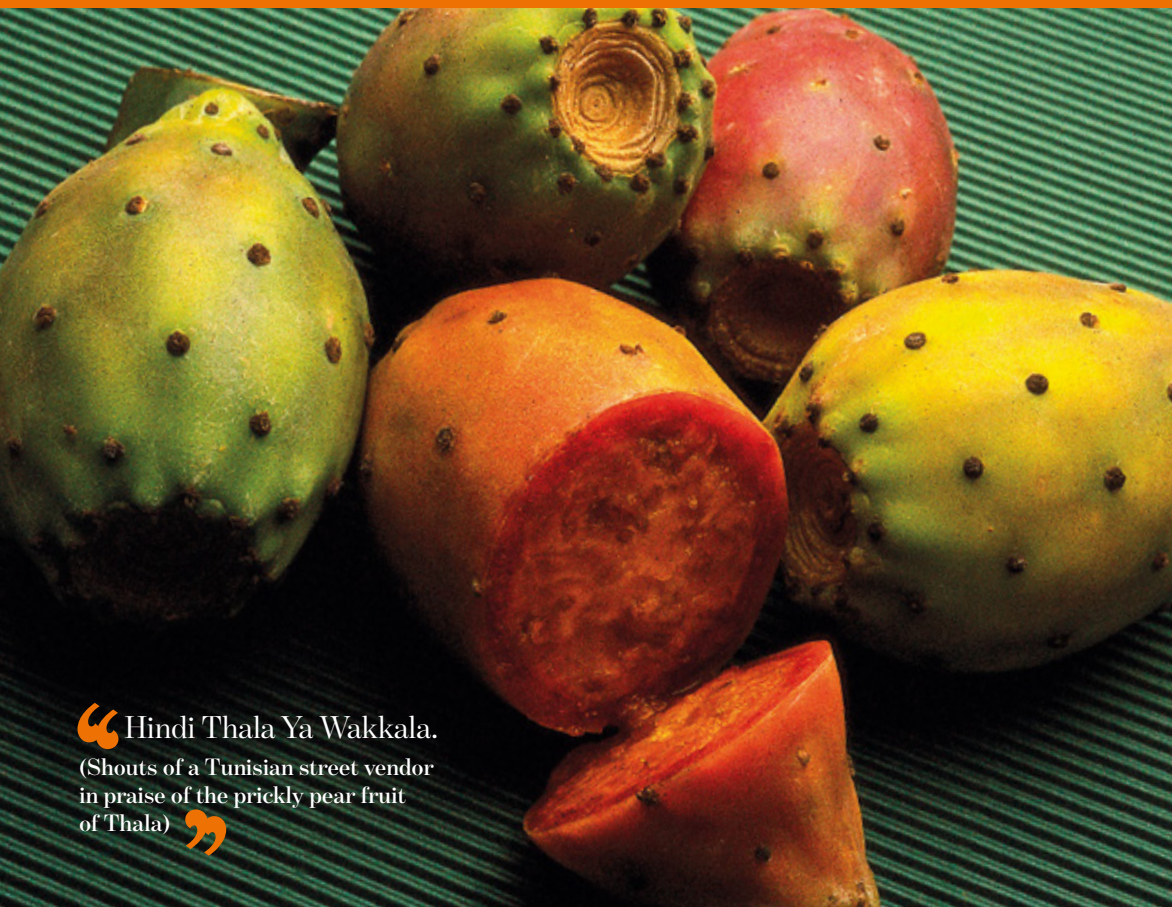
Once the thorns have been removed, use a fork to prick the skin of the fruit, cut both ends with a knife, and then split the skin lengthwise. Pass the point of the knife delicately through the notch to remove the fruit from its skin. Once peeled, the fruit is eaten as is.

You can **store** your prickly pear fruits in the crisper drawer of your refrigerator for two to three days.

■ The prickly pear thorns are covered with small hooks that could stick into the skin. Do not use tweezers **to pull out any such thorns**. Instead, apply some non-toxic liquid glue on your skin and let

it dry until the glue hardens; remove the glue and the thorns will go away with it. If no glue is available, use adhesive tape.

A WEALTH OF NUTRITIONAL BENEFITS



“Hindi Thala Ya Wakkala.
(Shouts of a Tunisian street vendor
in praise of the prickly pear fruit
of Thala) ”

The prickly pear fruit supplies the human body with a wide range of vitamins. Rich in **vitamin C** (22 mg per 100 g), a higher value compared to traditional fruits, it also contains **provitamin A** and **vitamin B**, not to mention **minerals** and **potassium**. The **calcium** and **magnesium** rates are among the highest for a fresh fruit (46 mg and 28 mg per 100 g, respectively). The presence of **trace elements** such as **iron** and **copper** (1.1 mg and 0.6 mg per 100 g, respectively) helps to improve our body's natural resistance.

The **carbohydrates** (8 g per 100 g, a little less than the average of classic fruits) make the prickly pear a **moderately energetic** fruit (44 kcal or 182 kJ). The high content of the fruit in mostly insoluble **fibers** (4.4 to 5 g per 100 g) helps to regulate intestinal transit.

THERAPEUTIC PROPERTIES:

- Powerful anti-diarrheal, it protects the colon and effectively fights against digestive disorders and gastrointestinal pain, even preventing ulcers.
- Improves urinary flow.
- Stabilizes blood sugar levels (diabetes and hyperglycemia).
- Prevents the accumulation of cholesterol in the veins and arteries.
- Delays premature aging by protecting the body from oxidative stress.

FOR A CREATIVE CUISINE



The prickly pear tree has **three edible** parts: the **nopal leaf** that can be consumed like a vegetable, the **petals** of the flower which can be used in salads and the prickly pear **fruit**. Eaten raw, the fruit is consumed with the seeds, while some people prefer to remove them. It can also be eaten as puree, in fruit salads or as desserts or it can be processed into fruit cheeses.

The prickly pear fruit has a subtle, sweet and fruity **flavor**. Compared to kiwi, this fruit is slightly sweet but without the acid flavor. **In the kitchen**, the prickly pear blends well with both sweet and savory dishes. For a moderate **energy intake**, it will add a subtle and exotic note to your daily meals.



A CACTUS-BASED TREATMENT

*Rich in **dietary fiber**, **nopal leaves** are similar in nutritional values to lettuce and spinach.*

*Excellent jams and jellies are made from the prickly pear nopal leaves with a mix of other fruits, syrups and sweets. **Dehydrated**, the nopal leaves are processed into **powder** used in brine and in the preparation of cookies, puddings, cereals and tortillas. They also come in the form of capsules or tablets as a food supplement. The mucilages and pectin contained in the nopal leaf confer thickening and emulsifying properties to this powder that will impart a velvety finish to your recipes.*

BOILED OR GRILLED NOPAL LEAVES



Highly **nutritious** and **energetic**, cooked **nopal leaves** have a slightly tangy **taste** reminiscent of sorrel, asparagus and green beans; their texture is that of okra.

Depending on what you want to use the nopal leaves for, you can **slice** them (clean the blade of the knife after each cut, as small thorns could stick on it) or keep them **whole**.

Once **grilled**, they are ready when they have turned sufficiently tender and lightly browned; you can sprinkle them generously with pepper, salt and other spices. If you boil them, you may need to drain them and **boil** them **again** once or twice (the thicker the nopal leaf, the thicker the sap in it). Once boiled, drain and rinse with cold water. To cook the nopal leaves cut them into thin strips of half a centimeter to one centimeter wide each; simply fry them in a little olive oil and a drizzle of lemon juice. When cooked, they become slightly viscous. However, they will lose their viscosity with further cooking.

Suggestion :

Mix the cooked nopal leaves into a soup, salad or omelet, or eat them plain.



■ Before eating the **nopal leaves**, the **thorns** must be **removed** by turning the leaves over with tongs on a burner. **Otherwise**, use a well-sharpened knife to cut off the rough edges which contain the thorns, without removing the green outer layer, and remove the thick base of each nopal leaf. Rinse the leaf.

■ **Choose** young, light green, tough and small nopal leaves (about twenty centimeters long) for their more intense taste. The older the nopal leaf, the thicker it is.

■ **To keep** the nopal leaves in the refrigerator for up to two weeks, make sure they are fresh and unwrinkled. Wrap them in plastic film and tighten well.

Exotic salad

Ingredients:

½ kg of prickly pear tree nopal leaves
4 tomatoes
2 sweet peppers
1 bunch of coriander
2 medium onions
1 pinch of salt.

Suggestion:

Add other ingredients such as chickpeas, avocado...
You can prepare nopalitos: smaller cut strips of toasted nopal leaves seasoned with lime juice and a little olive oil.

Preparation:

■ After removing the thorns, wash the nopal leaves and cut into thin strips.
■ Finely chop the tomatoes, chili peppers onions and coriander.
■ In a saucepan filled of water; put the strips, a half onion and coriander.
■ Let cook for forty minutes, then take off the heat, strain, and remove the coriander and onion.
■ Add the tomatoes, chili peppers, onion to the strips. Mix well.
■ Serve as a salad or as a topping for red meats, poultry, fish and seafood.

Bean soup with nopal leaves

Ingredients:

3 prickly pear tree nopal leaves
4 cups of fresh peeled beans
1 chicken or vegetable stock (bouillon) cube
½ onion
1 peeled tomato
½ cup of cilantro cut into small pieces
½ cup of sour cream
2 tbsp. of olive oil
Salt and pepper.

Preparation:

■ Finely chop the onion; fry it in a very hot frying pan with olive oil.
■ Add the beans and fry for two to three minutes.
■ Stir in the finely chopped peeled tomato. Reduce the heat and add the coriander and half of the stock (bouillon) cube. For about ten to fifteen minutes, make simmer over low heat until the beans are tender. Mix it all with the cream.
■ In another frying pan, fry the nopal leaves cut in strips. Set aside.
■ Put the remaining ingredients in a saucepan, add salt and pepper to taste. Let thicken then add the nopal leaf strips.



PRICKLY PEAR FRUITS blend particularly well with **poultry** or grenadine of **veal**. Add the peeled prickly pears cut in two ten minutes before the end of the cooking time, and finish cooking on very low heat. When they melt, they give a succulent and sweet taste to the sauce.

Poultry and prickly pear fruits

Ingredients:

6 prickly pear fruits

1 duck (or other poultry)

1 onion

1 glass of full-bodied wine (optional)

1 stock (bouillon) cube

Pepper and salt.

■ Brush the meat with this preparation and put it back into the casserole with six prickly pear fruits cut in half, coriander, salt, pepper and two glasses of water. Simmer for forty-five minutes. Serve.

Preparation:

■ Brown the duck cut into pieces in a cast iron casserole and set aside.

■ Mince and brown the onion, add a small glass of full-bodied red wine. After evaporation, add half a stock (bouillon) cube and a glass of water.



Chriha Hindi (Dried prickly pear fruits)

It is the food of the traveler, the peasant and the shepherd.

Ingredients:

Beautiful, ripe, healthy and whole prickly pear fruits, the ones picked at the end of the summer season.

become sticky.

■ In a stoneware or pottery utensil, arrange them in fours, with the last one having the skin on top.

Preparation:

■ Wash the prickly pear fruits. Remove the crown and the tail. Open the fruits one by one without cutting off the skin and trim them.

■ Let them dry four to five days in the sun, until they

The prickly pear fruit keeps the nomad alive from the beginning of July to the end of September. In transhumance, in regions where prickly pear fruits abound, the nomad consumes them night and day, keeping his other supplies for the winter season.



«O rain fall, fall,
tonight we'll have Robb
for dinner,
O rain, again, again
tonight we'll have
Kadid for dinner.»

(Tunisian folk ditty)

The robb (molasses) of prickly pear fruits keeps all the flavor, aroma, and nutrients of the fruit. Enjoy alone, with a plain yogurt, or a glass of milk or to garnish a pie. Keep in a cool place.

THE PRICKLY PEAR JUICE



A juice with a smooth and tasty texture and a subtle, soft and slightly sweet flavor can be prepared from **THE PULP** of the prickly pear fruit. No need to add water or sugar. The juice which is consumed fresh, can be found in stores selling "100% Organic fruit juice" or you can prepare it yourself.

A smooth juice

Ingredients:

- 8 prickly pear fruits
- 1 plain yogurt (optional)
- 1 tsp. of lemon juice.

Preparation:

- Peel the thorn-free prickly pear fruits beforehand.
- In a centrifuge (or, alternatively, a blender), put the prickly pear fruits, the lemon juice and the yogurt if yogurt is used. Mix.
- Filter through a strainer to remove the seeds from the juice. Drink.



Suggestion:

Pour the juice into ice cube trays and freeze. Add the ice cubes to your cold drinks. The juice can be consumed plain, in cocktails, or as a topping on a cottage cheese, yogurt or dessert.

Prickly pear granita

Ingredients:

Approximately 800 g of prickly pear fruits
130 g of water
70 g of sugar.

Preparation:

- Peel the prickly pear fruits, after having removed their thorns, and get the pulp. Sieve to remove the seeds.
- Pour into a salad bowl, cover with plastic film and set aside in a cool place.
- In a saucepan, pour the sugar and water.

Bring to a boil. Cook until the mixture thickens, about ten minutes. Let the syrup cool.

- Whisk the syrup and the pulp together until you get a homogeneous mixture.
- Pour into a large container with a lid. Close and put in the freezer for two hours, scraping the granita with a fork every 30 minutes.
- Serve in bowls.



Suggestion:

If you love smoothies, put in a blender: a glass of prickly pear juice, a banana and three slices of pineapple, honey and ginger.

An energizing juice, rich in vitamins and minerals

Ingredients:

1 l. of prickly pear juice
1 lemon
Ginger powder
1 tbsp. of honey.

Preparation:

- Fill three-quarters of a glass with fresh prickly pear juice; add two to three tablespoons of lemon juice, according to taste, honey and one to two pinches of powdered ginger.
- Stir with a spoon.
- Taste; if not cold enough add one or two ice cubes.

Prickly pear «fruit water»

Excellent for hydration during the day

Ingredients:

4 prickly pear fruits
2 limes
A ¼ cup of sugar
2 l. of water.

Preparation:

- Peel the prickly pear fruits, after removing their thorns and get the pulp. Cut it into

pieces and put in a blender with a liter of water.

- Sieve to remove seeds. Strain to get rid of the remaining seeds.
- Add the lime juice, sugar and a liter of water. Mix until the sugar dissolves.
- Serve at room temperature or cold.



PRICKLY PEAR JAM



Prickly pear jam

Ingredients:

1 kg of ripe prickly pear fruits

Sugar (80% of the weight of peeled figs)

1 lemon juice

Cinnamon or vanilla (according to taste).

Preparation:

■ Get the pulp of the prickly pear fruits (see above recipes to know how to do so). Cut into pieces and put in a saucepan.

■ Pour a glass of water and cook over low heat. Bring to a boil until you obtain a puree.

■ Put through a food mill (large grill). Return to the pan, add sugar and bring to a boil.

■ Pour the lemon juice and mix. Cook for about forty

minutes. To know if the jam is ready, pour a little jam on a slightly sloping plate, if the jam slips gently, it is ready; otherwise it needs a little more cooking.

■ Pour into sterilized jars. Close and let cool.

Suggestion:

Spread the prickly pear jam on toast, with fresh cheese or use it as a basic preparation for pies.



PRICKLY PEAR SWEETS



Prickly pear crumble cookies

Ingredients:

400 g of prickly pear pulp

Cookies

1 tbsps. of honey

150 g of flour

100 g of brown sugar

75 g of butter

1 tsp. of powdered cinnamon

Butter.

Preparation:

■ Brown the prickly pear pulp in a frying pan for about ten minutes.

■ In a salad bowl, mix the flour, the brown sugar and add the cinnamon then the butter cut into cubes.

■ Knead the mixture with your fingers to obtain short bread dough. Set aside.

■ In an oven dish, place the pulp in a layer 3 to 4 centimeters thick and spread the dough over it.

■ Bake in a hot oven (220°) for fifteen minutes. Serve preferably warm.

■ Cut directly in the dish with a wooden spatula and serve in saucers while still warm.

Suggestion:

Serve the prickly pear crumble with whipped cream and enjoy with a mint tea.

Prickly pear and ricotta tarts

Ingredients:

Eight prickly pear fruits

Pure butter shortcrust pastry

35 g of corn starch

50 g of cane sugar

50 g of thick cream

200 g of ricotta cheese.

Preparation:

■ Cut out four discs in the pure butter shortcrust pastry and precook at 210 degrees (th. 7).

■ After removing the skin, cut out the prickly pear fruits into slices.

■ In a salad bowl, mix the

corn starch, cane sugar, heavy cream and ricotta cheese.

■ Pour the preparation into the four tarts then arrange the prickly pear slices. Put them in the oven for twenty minutes.

Taste cold.

THE “GREEN GOLD”



The prickly pear crop is destined for a great **future in pharmaceuticals** and **cosmetics**.

All parts of the plant, be it the flowers, the fruits, the mucilage, the fibers or the nopal leaves, are used in **phytotherapy**.

The plant known for its medicinal properties is already available in capsules, extracts, and powder; etc. Because of its many healing and anti-aging properties, it is processed into oil, shampoo, day moisturizers, after-sun, anti-wrinkle, anti-stretch marks, soaps, etc. ...



THE PRICKLY PEAR TREE IN TRADITIONAL MEDICINE

■ **The juice of the nopal fruit** was used to treat fevers and chapped lips. Applied to burns and wounds, it also serves as a healing agent.

■ Old Berber women prepared a **decoction** of prickly pear **blossoms**; applied to a wound, it slows bleeding and promotes healing while limiting infection. The flowers were also used to treat many ailments: diarrhea and hemorrhoids (in decoction), stomach ailments (in powder form), kidney ailments (in infusion), prostate dysfunction (dried flowers), and as a diuretic (in decoction).



Very rich in vitamin C, potassium, calcium, magnesium, iron and zinc, **the prickly pear blossoms**, dried or powdered, are both an effective health product and a fabulous beautifying agent. Dried flowers are used in medicine as anti-inflammatory and anti-hemorrhoid, to treat prostate dysfunction and as a diuretic regulator. The omega-6 they contain promotes the natural skin repair process.

DO-IT-YOURSELF

■ **In infusion.** In the Berber tradition, the dried flowers of the prickly pear tree are used in infusion to relieve gastrointestinal pain, prevent ulcers, and also for their diuretic properties. They delay the premature aging of the body by protecting it from oxidative stress. For an infusion, use two to three flowers for three cups.

■ **In flower lotion.** Pour a handful of dried flowers in a quarter of liter of boiling mineral water. Let infuse until it cools and then filter by pressing the flowers. Apply the lotion in the morning and at night on the face and neck. Store in a cool place for four to five days.

■ **A homemade maceration of prickly pear blossoms!** Macerate the dry flowers in argan oil or another vegetable oil or mix several oils. A nourishing macerate that protects the skin from dehydration, restores firmness and tone.

THE STAR OF OILS



The **seeds** of the prickly pear represent 15% of the edible part of the fruit; after separating them from the pulp, they produce **rare** and **precious oil**, much sought after by the cosmetic and pharmaceutical industries, which is extracted by cold pressing.

It takes almost **a ton** of prickly pears to make **one liter** of this elixir.

Extremely rich in **linoleic acid** (present at 60%) and **vitamin E** (1000 mg/Kg), very **fluid** and **light**, with fast penetration, the active ingredients of this elixir are a true miracle. It is suitable for **all skin types** for an instant healthy glow effect.

A powerful anti-wrinkle oil: prickly pear seed oil improves elasticity and fights against skin sagging while providing extreme hydration. It reduces spots and reveals the beauty of the complexion.



An effective anti-acne oil: Prickly pear seed oil is an undeniable asset for young people's skin problems. It regulates the sebum level of oily skin. It helps reduce **scars, acne pimples, redness** (rosacea), and **stretch marks**, and soothes **sunburns**. For a long time, Berber women have used it to protect themselves from the burning desert wind. It is an astounding treatment on **dark circles**.

Thanks to its high content of unsaturated acids, prickly pear seed oil could create promising opportunities in the pharmaceutical and cosmetic industries.

Do not confuse pure prickly pear **seed** oil with prickly pear oily **maceration** (softening due to soaking or steeping), which is obtained by the steeping of prickly pears in sunflower oil.

PRICKLY PEAR SEED FLOUR

■ It is obtained by crushing the seeds of the fruit which contains 16.5% protein and 48% fiber. Thanks to its high nutritional value, it is used in the food industry.

■ Because it is rich in essential fatty acids, sterols, and vitamin E, it is present in cosmetics as a scrub, and as an anti-aging and antioxidant product.



A SLIMMING ALLY

THE PRICKLY PEAR FRUIT helps fight **obesity** thanks to its vegetable proteins that reduce water retention and cellulite. Carbohydrates provide the essential part of the fruit's energy intake of (44 kcal, or 182 kJ), thus making of the prickly pear fruit a moderately energetic fruit.

PRICKLY PEAR VINEGAR is an effective and natural **slimming aid**. Thanks to its hypoglycemic properties, it regulates appetite and helps to fight against snacking. It stimulates the intestinal flora and improves digestion, thus avoiding bloated feelings and swollen stomachs. Its double action as fat-burner and drainer makes it the ideal ally in your food rebalancing.

Tips for use: dilute two teaspoons of prickly pear vinegar in a large glass of water before the meals in the morning and evening. Alternatively, put two caps of vinegar in one liter and a half of water and drink all day long.

■ IN COSMETICS:

The prickly pear vinegar shampoo restores radiance and volume to hair without drying it out or damaging the hair.

If no prickly pear vinegar shampoo is available, you can dilute a few drops of prickly pear vinegar in shampoo or in your rinse water.



THE VIRTUES OF THE FRUIT'S VINEGAR

■ The prickly pear vinegar is made from the juice of late-picked, sugar-rich prickly pear fruits. The maturation is done according to a slow process of fermentation that could last up to one year, in pottery jars or in barrels.

■ **IN COOKING:** This very mild, acidity-free, sweet and fruit-flavored vinegar is a healthy, original and refined accompaniment for your salads and dishes.

Prickly pear vinegar abounds in therapeutic effects. It is a good antiseptic (sore throat, cold, flu); it relieves some digestive disorders (constipation); it is a natural drainage (intestinal cleansing), and it soothes muscular pain.

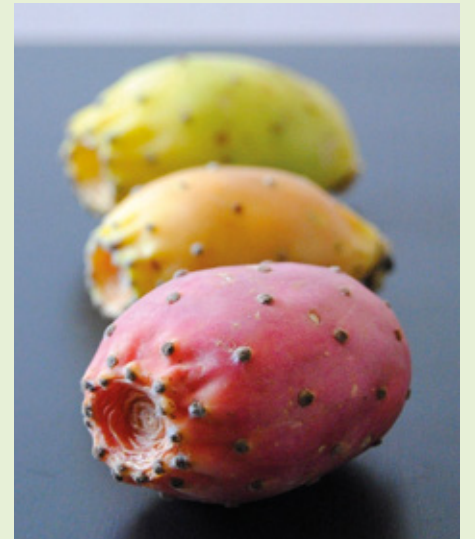
THE MEDICINAL PLANT OF THE FUTURE



Though a great deal is already known about the properties of the prickly pear fruit, scientists are **digging further into** the properties of this plant, especially regarding its potential in the treatment of **diabetes**, **obesity**, and **arteriosclerosis**.

Some ongoing studies focus more specifically on the fruit's action on triglycerides and bad cholesterol (LDL), others on its effects on blood glucose levels.

Prickly pear fruits have a **soothing effect**. This fruit may help fight **against cancer**. American scientists have just noted the benefits of “resiniferatoxin”, a substance extracted from prickly pears, and they are conducting further research in its **treatment of pain**. Finally, the anti-inflammatory and antispasmodic properties of the prickly pear tree, as well as all of its antioxidant virtues, are yet to be fully unveiled.





A VERSATILE CACTUS

ENERGY - ECOLOGY

In the face of global warming, due to human dependence on fossil fuels that emit greenhouse gases and human degradation of ecosystems and agro-ecosystems, the **bio-energy crop** of the prickly pear (*Opuntia ficus indica*) is receiving increasing attention from researchers due to its multiple uses and promising potential.

Its cultivation, which represents an important economic resource, is also considered as an efficient way to fight **against soil degradation** and to **reclaim** depleted soils.

A **natural water reservoir**, the prickly pear tree is “a botanical well capable of providing up to 180 tons of water per hectare”, its roots improve soil fertility. It could also function as a **carbon reservoir** to reduce the accumulation of CO₂ in the atmosphere. Nopal leaves are used today in water treatment.

OTHER INDUSTRIAL USES

All parts of the plant may be used.

- Natural food coloring can be extracted from the fruit.
- Production of a red dye by breeding the cochineal (natural parasite of the nopal fruit).
- Anti-rust in oil wells.
- Raw material in the production of biogas and ethanol.
- Cotton clothing weaving reinforcer.
- A component of chewing gum and wax.
- Manufacture of a biodegradable packaging plastic from nopal juice.
- **Water Purifier**
The mucilage, contained in the nopal leaves, immersed in water contaminated with sediment and bacteria, purifies the water by agglomerating the sediment and much of the bacteria that fall to the bottom. The water is 98% potable.



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