

**THE PRESENT AND POTENTIAL MARKET CONDITIONS OF BOTH
CACTUS LEAVES AND CACTUS PEAR IN MEXICO, AND THE
EXPORTATION POSSIBILITIES TO UNITED STATES
AND OTHER COUNTRIES**

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PREFACE

The Cactaceae family is endemic to America. The genera *Opuntia* and *Nopalea*, which produce nopales, are the most common. The genus *Opuntia* is the most important and has many species in the northern and southern parts of the continent. Very few other *Cactaceae* genera are as widespread. The genus *Opuntia* has 258 species of which 100 species are found in Mexico.

Nopal has been utilized for hundreds of years in Mexico. In Tamaulipas (12,000 years ago) and Tehuacan (10,000 years ago) archaeological proof of the utilization of cactus pears and cactus leaves has been found.

In Mexico, the principle uses of cactus are for fruit (cactus pears), vegetables (cactus leaves), and forage (cactus leaves of specific species). Other more minor uses are for; cochineal scarlet dyes, medicinal purposes, cosmetics, industrial products (mucilages), cattle fences, and erosion control.

CACTUS PEAR PRODUCTION, MARKETING AND EXPORTATION

CONDITIONS IN MEXICO

The production of cactus in Mexico can be classified into the following 3 systems.

- a) Cactus pears cultivated on farms. This is the most important system. Cultivated farms are used to produce the cactus fruits that can be found in all the major cities in Mexico. Similarly cultivated farms are used to supply the export markets. There are about 125,000 acres under cultivation for cactus pear production distributed in 18 states of Mexico (Pimienta B., 1990) (Table 1).
- b) Cactus pears non-cultivated. Usually the non-cultivated species is nopal-cardon (*Opuntia streptacantha*) and it is used to produce "Queso de tuna" and other processed products. In 1960 this species was grown on over 14,700 square miles in the states of San Luis Potosi, Zacatecas, Aguascalientes, Jalisco, Guanajuato, Hidalgo and Mexico.

- c) Home orchards of cactus pears. This type of production was very important in 1970's but this system declined with the introduction of cultivated farms. The production of tunas from home orchards is marketed only in small towns and does not go to the big cities anymore. With the lack of demand for cactus pears from home orchards, rural people have eliminated their home cactus pear gardens and thus have greatly reduced the genetic diversity of this resource.

The principle problem in the production of tunas stem from the varieties. The white fruited varieties are most common and most appreciated in local markets, but the red fruited varieties are in most demand for export. Other production problems result from poor cultural practices, no fertilization, and not very good pest management. In some regions (for example in San Martin de las Piramides, Mexico State), the harvest is by hand without knife which damages the fruit and reduces its storage capability.

The Cactus Pear Marketing

The cactus pear demand is the same through the year but the supply is only for 5 months (from July to November). The greatest production is from August to October. This situation results in low prices in the season of high production. Some farmers store the cactus pears for 2 or 3 months after the season (without refrigeration) to take advantage of high prices. Other farmers store the fruits "on the plant" and sell them several months later in December or January. In the United States, some farmers may have production from November to May, since with cultural practices, irrigation and pruning the cactus, they are able to delay harvest to obtain higher prices.

Other problems of Mexican farmers occur in the packing. One major packing problem is the elimination of the spines. Some farmers still do this by sweeping the cactus on the ground with brooms, but many spines remain on the fruits with this method. Another problem is the waxing. Some farmers wax the fruits to enhance shelf life, but the majority of the farmers know that is not a good system. Finally, in the packing there are problems with the boxes because there are no standard conditions. Packers use a special carton for exportation but in the local Mexican market fruits are packed in bulk in wooden crates.

The main problem in the local market is the short period of supply and short shelf life. The main problem in exportation are a few dishonest brokers who do not make payments to the farmers.

Processed Products from Cactus Pears

The most important cactus type from which products are made is the "cardona". This is used to produce "queso de tuna", taffy, and an alcoholic drink is called "colonche". It is also possible to develop the cactus pear industry with jellies and concentrated juices.

Production, Marketing and Exportation of Cactus Leaves (Nopalitos) from Mexico

There are three systems of cactus leaf production in Mexico:

- a) Cultivated leaf production systems of which there are two different types: The traditional system is a plantation with a row spacing of 55 to 63 inches with the cactus plants 20 inches apart in the row. The cactus height is between 39 and 55 inches. This system is dominant in Milpa Alta D.F. (18,600 acres) and Tlanepantia, Morelos (990 acres).

The other system is a microtunnel system that was developed in the 60's in Chapingo, Mexico. This system is now being widely used to produce cactus leaves in the winter. The beds are 39 to 47 inches wide with a minimum separation between plants and 10 inches between rows. These plants are only allowed to grow to one or two leaves in height. As soon as the second leaf is produced it is harvested. A plastic microtunnel is used to cover the plants in the winter. The area of utilization is in Puebla, Mexico State, Tlaxcala, Hidalgo, and Distrito Federal where the winter has low temperatures.

- b) Cactus leaves in home orchards. This system is located in the homes of central Mexico where the cactus are utilized as fences between homes. In some cases this fence is used to produce both tunas and nopalitos. This production does not go to market and is consumed by the farmer's family.
- c) Cactus leaves in non-cultivated conditions. Only a few regions of the country use this system for commercial purposes. In the surroundings of San Luis Potosi city the wild cactus are harvested for nopalitos. After the spines are cut off, the cactus leaves are processed by one of the five factories of the zone. The product preparation is a pickled preparation for the export market. The principle problems with the cactus leaf production are due to pests, diseases, and fertilization levels.

Marketing of Cactus Leaves

While there is a uniform demand throughout the year, there is an increased demand during Christmas and Holy Week. However this demand only occurs in the Mexican central states. In the northern border and the coasts, the consumption is minimal.

The Cactus leaves are in over-supply almost all the year except in winter. In this season the production declines in Milpa Alta (the major region) because of frost. Therefore in the winter it is necessary to either grow nopalitos or microtunnels in Tlanepantla, Morelos where there is a tropical climate. For marketing in the Mexico City wholesale market, the cactus leaves are packed in big rolls 28 inches diameter, 5.6 feet high, and with a weight around 550 to 660 pounds.

The principle problem in marketing is the over-supply almost all the year and the localization for the demand only in Central Mexico. The export market is limited since it is necessary to transport nopalitos with spines (Nopalitos that have been cleaned to remove spines become oxidized during shipment and are not acceptable to the consumer). Also, cactus leaf production is developing in California and Texas.

In terms of numbers of firms processing nopalitos, there are 120 enterprises registered. Most of them have low scale production. Only 15 of the firms have exported processed nopalitos. The principle products are nopalitos pickled in vinegar with and without carrots, onions, garlic, and jalapenos (escabeche).

Production and Marketing Cactus Leaves as Forage

There are two systems for cactus forage:

- a) Cactus forage in non-cultivated natural areas. This is the most important and is located in northern Mexico (Zacatecas, San Luis Potosi, Durango, Coahuila, Nuevo Leon, and Tamaulipas). The cactus is used to feed cattle, sheep, and goats. The spines can be burned off in the field so the cattle can eat it; or it can be cut, burned, and chopped for consumption in feedlots for dairy production.
- b) Cactus forage in cultivated farms. Research results from Chapingo, Mexico, Monterrey Tech and Saltillo Agricultural University strongly suggest this would be a good production system, but the farmers have not yet adopted this technology.

Table 1. Cultivated area of cactus pears in Mexico (Pimienta, 1991).

STATE	Area	
	Hectares	Acres
Zacatecas	13,000	32,123
San Luis Potosi	9,000	22,239
Aguascalientes	6,100	15,073
Guanajuato	6,084	15,034
Mexico	5,968	14,747
Nuevo Leon	5,359	13,242
Hidalgo	4,000	9,884
Durango	2,068	5,110
Coahuila	1,161	2,869
Tamaulipas	1,000	2,471
Puebla	1,000	2,471
Queretaro	1,000	2,471
Jalisco	1,000	2,471
Oaxacaq	367	907
Sinaloa	268	662
Guerrero	300	741
Tlaxcala	130	321
Baja California	52	128
Total Area	57,857	142,964

Table 2. Exportation of cactus leaves and cactus pears under CNPH control, by states. 88-89 season. (Kg)

State	Cactus leaves	Cactus pears
Jalisco	11,337	106,288
Zacatecas	----	11,808
Mexico	16,755	3,011
Guanajuato	----	149,829
Puebla	4,118	3,440
Sinaloa	----	32,000
Tamaulipas	5,180	30,146
Aguascalientes	----	35,994
Nuevo Leon	7,204	2,000
Coahuila	920	----
Total	45,514	354,516

Table 3. Exportation of cactus leaves and cactus pears under CNPH control by months.
88-89 season. (Kg)

Months	Cactus leaves	Cactus pears
October	7,943	91,300
November	1,767	----
December	3,015	----
January	6,179	----
February	6,891	----
March	9,730	----
April	1,645	----
May	1,538	1,440
June	1,377	1,440
July	671	12,331
August	3,540	164,829
September	1,218	83,176
Total	45,514	354,516

Table 4. Exportation of cactus leaves and cactus pears under CNPH control by port of entry. 88-89 season. (Kg)

Custom	Cactus leaves	Cactus pears
Tijuana B.C.	11,337	3,850
Mexicali B.C.	----	----
San Luis R.C. Sonora	----	----
Nogales, Sonora	----	102,438
Ciudad Juarez, Chih.	----	----
Nuevo Laredo, Tamaulipas	8,850	32,000
Reynosa, Tamaulipas	24,317	121,836
Matamoros, Tamaulipas	1,000	----
Interior Guanajuato	----	94,392
Total	45,514	54,516