

# **Iberian-American Fruits Rich in Bioactive Phytochemicals for Nutrition and Health**



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## CHERIMOYA

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**Scientific name:** *Annona cherimola* Mill (Family Annonaceae)

**Common name:** cherimoya, annona



### Origin

Cherimoya (*Annona cherimola* Mill.) is known to be native to the Andes, probably in a zone between the south of Ecuador and the north of Peru, where it is found growing at altitudes between 1300 and 2200 meters above sea level.

### Production

Its fruit has commercial importance in Andean countries, mainly Ecuador, Peru and Chile. It is also commercially grown in the subtropical region from Australia, Spain Italy and California (USA). Production in Ecuador is estimated only around 2000 tons in a cultivated surface of around 1500 hectares.

### Varieties

Five fruit shapes are known: plain, tuberculata, printed, umbonate and mamillata. Four varieties known as Fina de Jete, Campa, Lanca and Bays are grown in Peru. There are no established cultivars with only one variety in Ecuador, the major ones have trees developed by seedling, in some cultivars grafted plants with ecotypes known by farmers as Jaramillo, Chumina (Viteri, *et al.*, 2007) are found. The Fruit Farming Program has defined that five ecotypes may be recommended for propagation due to their major potential based on outstanding pomological characteristics like: size, flavor, fruit shape, fruit color, seed content, skin thickness and yield, they are identified as M4 San José de Minas, T61 MAG- Tumbaco, L5 Loja, F3 Fabulosa and P3 Paute (Sosa and Albuja 2006). The cherimoya fruit is a fleshy whole (syncarpous) of native form with the carpels spirally arranged which are joined after fructification. Each segment of

flesh, in other words each of the fruits contains a unique hard seed bean shaped of black color. The fruit is conic or heart shaped, having between 10 and 25 cm long, reaching a maximum of 15 cm wide and weighing around 250 to 800g. When it is ripe the fruit turns into a pale or cream green color; it is considered too ripe when the skin presents a dark brown or black color. The skin thin or thick, may be soft with marks similar to finger prints or maybe covered soft with marks similar to fingerprints or may be covered with conic or circular protuberances that are left from the flowers (Van Damme and Scheldelman 1998).

Their seeds have been found in peruvian archeological places hundreds of kilometers from its native habitat where the fruit has been well used by pre-incaic populations. Wild trees generally have been found at the south east from Loja in Ecuador. Cherimoya is a climacteric fruit, very soft and delicate, with fast ripening and tendency to skin scald mainly due to the enzymatic activity of polyphenoloxidases.

### Nutrition

Cherimoya is a fruit rich in protein, minerals, vitamin C, carbohydrate and aminoacids. The content of vitamina C (12.6 mg/ 100 g fresh basis) is an interesting source for human diet. (Barreca *et al.*, 2011; Brito, 2006).

According to the National Nutritional Mineral Data (USDA, 2013), the cherimoya is rich in potassium and phosphorus and low in sodium, it is adequate for persons with anemia due to its iron contribution, for decalcified persons or osteoporosis its calcium is important, to improve memory of students and old people its phosphorus content also contributes.

Its subtle arome, its flavor and its white pulp are the main attributes of the fruit, giving them a high comercial potential mainly for exportation markets.

Cherimoya	
Energy	75 kcal
Protein	1.57 g
Carbohydrates	15.4 g
Fat	0.68 g
Cholesterol	0.0 g
Fiber	3 g
Ash	0.87 g
Sodium	7 mg
Potassium	287 mg
Magnesium	17 mg
Calcium	10 mg
Iron	0.27 mg
Zinc	0.36 mg
Copper	0.07 mg
Phosphorous	26 mg
Manganese	0.09 mg
Zinc	0.16 mg
Folates	23 µg
Niacin	0.64 mg
Pantothenic acid	0.35 mg
Pyridoxine	0.26 mg
Riboflavin	0.13 mg
Thiamin	0.10 mg
Vitamin A	5 IU
Vitamin C	12.6 mg
Vitamin D	0.27 mg
Food values on 100g of fresh weight	
Sources: USDA (2013), Brito <i>et al.</i> (2006)	

Cherimoya is a fruit much smaller than its close relative soursop (*Annona muricata* L.), which is considered to have more flavor.

### **Culinary uses**

The cherimoya is the finest fruit of all the *Annona* species and is considered one of the most exquisite fruits in the world. The subacid flesh is creamy white, soft, juice, sweet and very fragrant with a custard-like consistency. The flavor is reach and aromatic, a blend of sweetness and mild acidity resembling a cross between banana, passion fruit, papaya and pineapple (Barreca *et al.*, 2011). Cherimoya is eaten fresh, besides it may also be pureed and used in sauces, meringues, custards and as natural flavoring in yogurt; in production of essences, aromas, concentrates, ice creams, juices and nectars, the flesh may be mixed with milk to get beverages. The white color of the flesh gives an extra potential since it may be added to numerous foodstuffs without change of its color.

Cherimoya flesh is consumed whole alone or in salads; juices, ice creams and home made milk shakes may be prepared. The fruit may ferment and an alcoholic beverage may be obtained. The flesh may be dehydrated and frozen.

### **Phytochemistry and health**

It is the fruit of *Annona cherimola* Mill, a subtropical tree indigenous to Ecuador and Peru cultivated in Taiwan, Spain and south of Italy too. The cherimoya and its relatives are becoming increasingly important exotic fruit on tropical and subtropical regions, due to its implication in commercial and folk medicine, especially for the treatment of the skin disease. This latter is also supported by its richness in health promoting compounds, as cherimoline, cherinonaine, kauranes, lignans, lactam amide, purines, p-quinone, benzenoids and polyamine among the main bioactive compounds (Barreca *et al.*, 2011) .

It has been used since pre-hispanic times for therapeutic purposes: the ground seed was used as antiparasitary, infusion of leaves and skin to treat skin diseases and cancer, in addition to its behaviour as plaguicide. It is convenient to ingest in the growing age, during pregnancy and during old age.

Cherimoya is also recommended for slimming diets since it has effects of satiating and of glucose level regulation in the blood due to the fiber content which acts as an intestinal laxative and at the same time increases the time to assimilate

sugars, by this way eating cherimoyas retards the hungry feeling. Vitamin C together gives an antioxidant effect, important to maintain a smooth skin and unwrinkled. Cherimoya has a tonic action which avoids tiredness and fatigue, also helps to fight with depressions. This fruit is credited with an action to equilibrate the nervous system, so it would be an excellent ansiolitic and tranquilizer adequate for the treatment of compulsive persons.

Its fiber content provides laxative properties. Fiber prevents constipation, contributes to reduce cholesterol content in the blood and to a good control of blood sugar in diabetics. It is convenient to select small fruits or have only a portion in the case of diabetes or obesity.

Since it is rich in potassium and low in sodium, cherimoya is recommended for persons with arterial hypertension or affected by blood vessels and heart. Potassium contribution must be considered by persons with renal failure that are under controlled diets of this mineral. However those who take diuretics which eliminate potassium will be benefited of this consuming since cherimoyas are plenty of this mineral.

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