

# Fruit preserves



*Jams , jellies and honeys ,  
Minnesota State Fair*



*Five fruit preserves*

*( clockwise from top ) :*

*apple , quince , plum , squash ,  
orange (in the center)*

## **Contents :**

- 1 Introduction
- 2 Variations
  - 2.1 Confit
  - 2.2 Conserves
  - 2.3 Fruit butter
  - 2.4 Fruit curd
  - 2.5 Fruit spread
  - 2.6 Jam
  - 2.7 Jelly
  - 2.8 Marmalade
- 3 Regional terminology
- 4 Production
- 5 Legal definitions
  - 5.1 US FDA definitions
  - 5.2 European Union directives on 'jam'
- 6 Jelly world wide

## 1 – Introduction :

**Fruit preserves** are fruits, or vegetables, that have been prepared and canned for long term storage. The preparation of fruit preserves traditionally involves the use of pectin as a gelling agent, although sugar or honey may be used as well. The ingredients used and how they are prepared will determine the type of preserves; jams, jellies and marmalades are all examples of different styles of fruit preserves that vary based upon the ingredients used.

There are various varieties of fruit preserves made globally, and they can be made from sweet or savory ingredients. In North America, the plural form preserves is used, while the singular preserve is used in British and Commonwealth English. Additionally, the name of the type of fruit preserves will also vary depending on the regional variant of English being used.

## 2 – Variations :

### 2 – 1 – Confit :

**Confit** : which is the past participle form of the French verb "confire" or "to preserve", is most often applied to preservation of meats, especially poultry and pork, by cooking them in their own fat or oils and allowing the fats to set . However, the term can also refer to fruit or vegetables which have been seasoned and cooked with honey or sugar until it has reached a jam - like consistency . Savory confits, such as ones made with garlic or tomatoes, may call for a savory oil such as virgin olive oil as the preserving agent .

### 2 – 2 – Conserves :

A **conserve** is a jam made of fruit stewed in sugar . conserves are some times referred to as whole fruit jam .

Often the making of conserves can be trickier than making a standard jam, because the balance between cooking, or sometimes steeping in the hot sugar mixture for just enough time to allow the flavor to be extracted from the fruit , and sugar to penetrate the fruit,

and cooking too long that fruit will break down and liquefy. This process can also be achieved by spreading the dry sugar over raw fruit in layers, and leaving for several hours to steep into the fruit then just heating the resulting mixture only to bring to the setting point . As a result of this minimal cooking, some fruits are not particularly suitable for making into conserves, because they require cooking for longer periods to avoid issues such as tough skins . Currants & goose berries , and a number of plums are among these fruits.

Due to this shorter cooking period, not as much pectin will be released from the fruit, and as such, conserves ( particularly home - made conserves ) will sometimes be slightly softer set than some jams

An alternate definition holds that conserves are preserves made from a mixture of fruits and / or vegetables. Conserves may also include dried fruit or nuts .

### **2 – 3 – Fruit butter**

**Fruit butter**, in this context, refers to a process where the whole fruit is forced through a sieve or blended after the heating process.

" Fruit butters are generally made from larger fruits, such as apples, plums, peaches or grapes. Cook until softened and run through a sieve to give a smooth consistency. After sieving, cook the pulp ... add sugar and cook as rapidly as possible with constant stirring... The finished product should mound up when dropped from a spoon, but should not cut like jelly. Neither should there be any free liquid " .

### **2 – 4 – Fruit curd :**

**Fruit curd** is a dessert topping and spread usually made with lemon, lime, orange, or raspberry . The basic ingredients are beaten egg yolks, sugar, fruit juice and zest which are gently cooked together until thick and then allowed to cool, forming a soft, smooth, intensely flavored spread. Some recipes also include egg whites and/or butter .

## **2 – 5 – Fruit spread :**

**Fruit spread** refers to a jam or preserve with no added sugar.

## **2 – 6 – Jam :**

**Jam** contains both fruit juice and pieces of the fruit's ( or vegetable's ) flesh , however some cookbooks define jam as cooked and gelled fruit ( or vegetable ) purees .

Properly, the term jam refers to a product made with whole fruit, cut into pieces or crushed. The fruit is heated with water and sugar to activate the pectin in the fruit. The mixture is then put into containers. The following extract from a US cookbook describes the process.

" Jams are usually made from pulp and juice of one fruit, rather than a combination of several fruits. Berries and other small fruits are most frequently used, though larger fruits such as apricots, peaches, or plums cut into small pieces or crushed are also used for jams. Good jam has a soft even consistency without distinct pieces of fruit, a bright color, a good fruit flavor and a semi-jellied texture that is easy to spread but has no free liquid " .

*Variations* Uncooked or minimally cooked ( less than 5 minute ) jams , called freezer jam, because they are stored frozen, are popular in parts of North America for their very fresh taste .

## **2 – 7 – Jelly :**

**Jelly** is a clear or translucent fruit spread made from sweetened fruit ( or vegetable ) juice and set using naturally ocuring pectin. Additional pectin may be added where the original fruit does not supply enough, for example with grapes . Jelly can be made from sweet, savory or hot ingredients. It is made by a process similar to that used for making jam, with the additional step of filtering out the fruit pulp after the initial heating. A muslin or stockinet " jelly bag " is traditionally used as a filter, suspended by string over a bowl to allow the straining to occur gently under gravity. It is important not to

attempt to force the straining process, for example by squeezing the mass of fruit in the muslin , resulting jelly will be compromised .

" Good jelly is clear and sparkling and has a fresh flavor of the fruit from which it is made. It is tender enough to quiver when moved, but holds angles when cut .

*Extracting Juice* — Pectin is best extracted from the fruit by heat, therefore cook the fruit until soft before straining to obtain the juice ... Pour cooked fruit into a jelly bag which has been wrung out of cold water. Hang up and let drain. When dripping has ceased the bag may be squeezed to remove remaining juice, but this may cause cloudy jelly" .

## 2 – 8 – Marmalade :

British - style **marmalade** is a sweet preserve with a bitter tang made from fruit, sugar, water, and ( in some commercial brands ) a gelling agent. American - style marmalade is sweet, not bitter. In English-speaking usage, "marmalade" almost always refers to a preserve derived from a citrus fruit, most commonly oranges, although onion marmalade is also used as an accompaniment to savory dishes.

The recipe includes sliced or chopped fruit peel, which is simmered in fruit juice and water until soft; indeed marmalade is sometimes described as jam with fruit peel ( although many companies now also manufacture peel - free marmalade ) . Such marmalade is most often consumed on toasted bread for breakfast. The favored citrus fruit for marmalade production in the UK is the "Seville orange," *Citrus aurantium* var . *aurantium* , thus called because it was originally imported from Seville in Spain; it is higher in pectin than sweet oranges, and therefore gives a good set. Marmalade can also be made from lemons, limes, grapefruit, strawberries or a combination.

## 3 - Regional terminology

The term **preserves** is usually interchangeable with **jam**. Some cookbooks define **preserves** as cooked and gelled whole fruit ( or

vegetable ) , which includes a significant portion of the fruit . The terms jam and jelly are used in different parts of the English - speaking world in different ways. In the United States, both jam and jelly are sometimes popularly referred to as "jelly", whereas in the United Kingdom, Canada, India and Australia, the two terms are more strictly differentiated. In Australia and South Africa, the term jam is more popularly used as a generic term for both jam and jelly .

To further confuse the issue, the term jelly is also used in the UK, South Africa, Australia, India and New Zealand to refer to a gelatin dessert, known in North America as **jello**, derived from the brand name Jell - O .

#### **4 – Production :**

In general, jam is produced by taking mashed or chopped fruit or vegetable pulp and boiling it with sugar and water. The proportion of sugar and fruit varies according to the type of fruit and its ripeness, but a rough starting point is equal weights of each. When the mixture reaches a temperature of 104 °C , the acid and the pectin in the fruit react with the sugar, and the jam will set on cooling. However, most cooks work by trial and error, bringing the mixture to a "fast rolling boil", watching to see if the seething mass changes texture, and dropping small samples on a plate to see if they run or set.<sup>[16]</sup>

Commercially produced jams are usually produced using one of two methods. The first is the open pan method, which is essentially a larger scale version of the method a home jam maker would use. This gives a traditional flavor, with some caramelization of the sugars. The second commercial process involves the use of a vacuum vessel, where the jam is placed under a vacuum, which has the effect of reducing its boiling temperature to anywhere between 65 - 80 °C depending on the recipe and the end result desired. The lower boiling temperature enables the water to be driven off as it would be when using the traditional open pan method, but with the added benefit of retaining more of the volatile flavor compounds from the fruit, preventing caramelization of the sugars, and of course reducing the overall energy required to make the product. However, once the

desired amount of water has been driven off, the jam still needs to be heated briefly to 95 - 100 °C to kill off any micro-organisms that may be present; the vacuum pan method does not kill them all. During the commercial filling of the jam into jars, it is common to use a flame to sterilize the rim of the jar and the lid to destroy any yeasts & molds which may cause spoilage during storage. It is also common practice to inject steam into the head space at the top of the jar immediately prior to the fitting of the lid, in order to create a vacuum. Not only does this vacuum help prevent the growth of spoilage organisms, it also pulls down the tamper evident safety button when lids of this type are employed.

How easily a jam sets depends on the pectin content of the fruit. Some fruits, such as gooseberries, redcurrants, blackcurrants, most citrus fruits, apples, and raspberries, set very well; others, such as strawberries and ripe blackberries, often need to have pectin added. There are commercial pectin products on the market, and most industrially-produced jams use them. Home jam-makers sometimes rely on adding a pectin - rich fruit to a poor setter, for example apple to blackberries. Other tricks include extracting juice from lemons, redcurrants or gooseberries, or making a pectin stock with whole apples or just the cores and skins; once cooled, this 'stock' can then be frozen for later use.<sup>[7]</sup> Making jam at home is a popular handicraft activity, and many take part in this. Homemade jam may be made for personal consumption, or as part of a cottage industry.

## **5 - Legal definitions :**

### **5 – 1 - US FDA definitions :**

The U.S. Food and Drug Administration ( FDA ) published standards of identity in 21 CFR 150, and treats jam and preserves as synonymous, but distinguishes jelly from jams and preserves. All of these are cooked and pectin-gelled fruit products, but jellies are based entirely on fruit juice or other liquids, while jams and preserves are gelled fruit that may include the seeds and pulp. The United States Department of Agriculture offers grading service based on these standards .

## 5 – 2 - European Union directives on ' jam ' :

In the European Union , the jam directive ( Council Directive 79 / 693 / EEC , 24 July 1979 ) set minimum standards for the amount of "fruit" in jam, but the definition of fruit was expanded to take account of several unusual kinds of jam made in the EU. For this purpose, "fruit" is considered to include fruits that are not usually treated in a culinary sense as fruits, such as tomatoes; fruits that are not normally made into jams; and vegetables that are sometimes made into jams, such as: rhubarb (the edible part of the stalks), carrots, sweet potatoes, cucumbers, and pumpkins. This definition continues to apply in the new directive, Council Directive 2001 /113/ EC (20 December 2001) .

*'Extra jam'* is subject to some what stricter rules that set higher standards for the minimum fruit content ( 45 % instead of 35 % as a general rule, but lower for some fruits such as redcurrants and blackcurrants ) , as well specifying as the use of unconcentrated fruit pulp, and forbidding the mixture of certain fruits and vegetables with others .

## 6 - Jelly world wide :

- Jellied cranberry sauce is primarily a holiday treat in the U.S. and U.K.
- Mayhaw jelly is a delicacy in parts of the American South
- Grass jelly, a food from China and Southeast Asia, often served in drinks
- Almond jelly, a sweet dessert from Hong Kong
- Nata de coco, jelly made from coconuts originating from the Philippines
- Yōkan, a sweet pasty jelly dessert from Japan often made with beans, sweet potato or squash
- Muk, a variety of Korean jelly, seasoned and eaten as a cold salad
- Konjac, a variety of Japanese jelly made from konnyaku

There are a variety of jellies in the cuisines of East and Southeast Asia. Depending on the type, they may be sweet or unsweetened, or neither.



## List of culinary fruits



*Common culinary fruits.*

### Contents :

- 1 Introduction
- 2 List of culinary fruits by climate
  - 2.1 Temperate fruits
    - 2.1.1 Berries
      - 2.1.1.1 Rubus
      - 2.1.1.2 True berries
      - 2.1.1.3 Other
  - 2.2 Mediterranean and subtropical fruits
  - 2.3 Tropical fruits
    - 2.3.1 A
    - 2.3.2 B
    - 2.3.3 C
    - 2.3.4 D
    - 2.3.5 E
    - 2.3.6 F
    - 2.3.7 G
    - 2.3.8 H
    - 2.3.9 I
    - 2.3.10 J
    - 2.3.11 K
    - 2.3.12 L
    - 2.3.13 M

- 2.3.14 N
- 2.3.15 O
- 2.3.16 P
- 2.3.17 Q
- 2.3.18 R
- 2.3.19 S
- 2.3.20 T
- 2.3.21 V
- 2.3.22 W
- 2.3.23 Y
- 3 List of culinary fruits by geographical origin
  - 3.1 Fruits of African origin
  - 3.2 Fruits of Asian origin
  - 3.3 Fruits of Latin American origin
  - 3.4 Fruits of North American origin
  - 3.5 Fruits of Oceanian origin
- 4 List of culinary fruits by type of flora
  - 4.1 Rosaceae family
  - 4.2 Berries
  - 4.3 Cacti and other succulents
  - 4.4 Podocarps
    - 4.4.1 Melons and other members of Cucurbitaceae family
  - 4.5 Accessory fruits

## 1 – Introduction :

This **list of culinary fruits** contains the names of some fruits that are considered edible in some cuisines. The definition of fruit for these lists is a culinary fruit, i.e. "Any sweet, edible part of a plant that resembles fruit, even if it does not develop from a floral ovary; also used in a technically imprecise sense for some sweet or sweetish vegetables, some of which may resemble a true fruit or are used in cookery as if they were a fruit, for example rhubarb "

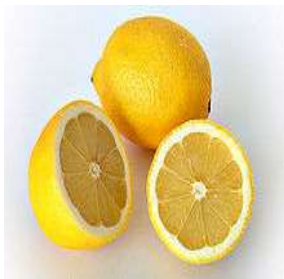
Note that many edible plant parts that are true fruits botanically speaking, are not considered culinary fruits. They are classified as vegetables in the culinary sense , ( for example: the tomato,

cucumber, zucchini, and so on ) , and hence they do not appear in this list. There also exist many fruits which are edible and palatable but for various reasons have not become popular.

## **2 - List of culinary fruits by climate :**

### **2 – 1 - Temperate fruits :**

Fruits of temperate climates are almost always borne on trees or woody shrubs or lianas. They will not grow adequately in the tropics, as they need a period of cold (a chilling requirement) each year before they will flower. The apple, pear, cherry, and plum are the most widely grown and eaten, owing to their adaptability. Many other fruits are important regionally but do not figure prominently in commerce. Many sorts of small fruit on this list are gathered from the wild, just as they were in Neolithic times.



*Lemon*



*Grapes*



*Rasp berries*



*Apple*

### ***The pome fruits :***

- Apple and crabapple (*Malus*)
- Chokeberry (*Aronia*)
- Hawthorn (*Crataegus* and *Rhaphiolepis*)
- Loquat (*Eriobotrya japonica*)
- Medlar (*Mespilus germanica*)
- Pear, European and Asian species (*Pyrus*)
- Quince (*Cydonia oblonga* and *Chaenomeles*)
- Rose hip, the fruitlike base of roses (*Rosa*); used mostly for jams and herbal teas
- Rowan (*Sorbus*)

- Service tree (*Sorbus domestica*), bears a fruit known as a sorb or sorb apple
- Serviceberry or Saskatoon (*Amelanchier*)
- Shipova ( $\times$  *Sorbopyrus auricularis*)

***The stone fruits, drupes of genus Prunus :***

- Apricot (*Prunus armeniaca* or *Armeniaca vulgaris*)
- Cherry, sweet, black, sour, and wild species (*Prunus avium*, *Prunus serotina*, *Prunus cerasus*, and others)
- Chokecherry (*Prunus virginiana*)
- Greengage, a cultivar of the plum
- Peach (of the normal and white variety) and its variant the nectarine (*Prunus persica*)
- Plum, of which there are several domestic and wild species; dried plums are called **prunes**
- Hybrids of the preceding species, such as the pluot, aprium and peacotum

***Other Temperate fruits :***

- Boquila (*Boquila trifoliata* ; Lardizabalaceae)
- Goumi (*Elaeagnus multiflora*; Elaeocarpaceae)
- Keule (*Gomortega keule*; Gomortegaceae)
- Lardizabala (*Lardizabala biternata*; Lardizabalaceae)
- Maqui (*Aristotelia chilensis*; Elaeocarpaceae)
- Pawpaw (*Asimina triloba*; Annonaceae)
- Peumo (*Cryptocarya alba*; Lauraceae)

**2 – 1 - 1 -Berries**

In non - technical usage, **berry** means any small fruit that can be eaten whole and lacks objectionable seeds. The **bramble fruits**, compound fruits of genus *Rubus* (blackberries), are some of the most popular pseudo – berries :

## **2 – 1 - 1 - 1 - Rubus :**

- Black berry, of which there are many species and hybrids, such as dew berry , boysen berry , olallie berry , and tay berry ( genus Rubus )
- Cloudberry (Rubus chamaemorus)
- Loganberry (Rubus loganobaccus)
- Raspberry, several species (genus Rubus)
- Salmonberry (Rubus spectabilis)
- Thimbleberry (Rubus parviflorus)
- Wineberry (Rubus phoenicolasius)

## **2 -1 -1 -2 - True berries :**

The true berries are dominated by the family Ericaceae, many of which are hardy in the subarctic:

- Bear berry (Arctostaphylos spp.)
- Bilberry or whortleberry (Vaccinium spp.)
- Blue berry (Vaccinium spp.)
- Crow berry (Empetrum spp.)
- Cran berry (Vaccinium spp.)
- Fal berry (Vaccinium spp.)
- Huckle berry (Vaccinium spp.)
- Lingon berry (Vaccinium vitis-idaea)
- Straw berry Tree ( Arbutus unedo ) , not to be confused with the Strawberry ( Fragaria ) .

## **2 – 1 – 1 – 3 – Other :**

- Bar berry (Berberis; Berberidaceae)
- Currant (Ribes spp.; Grossulariaceae), red, black, and white types
- Elder berry (Sambucus; Caprifoliaceae)
- Goose berry (Ribes spp.; Grossulariaceae)
- Hack berry (Celtis spp.; Cannabaceae)

- Honeysuckle: the berries of some species (called **honeberries**) are edible, others are poisonous (*Lonicera* spp.; Caprifoliaceae)
- Mulberry (*Morus* spp.; Moraceae) including:
  - Red Mulberry (*Morus rubra*)
  - White Mulberry (*Morus alba*)
- Mayapple (*Podophyllum* spp.; Berberidaceae)
- Nannyberry or sheepberry (*Viburnum* spp; Caprifoliaceae )
- Oregon grape (*Mahonia aquifolium*; Berberidaceae)
- Sea-buckthorn (*Hippophae rhamnoides*; Elaeagnaceae)
- Ugniberry (*Ugni molinae*; Myrtaceae)
- Wolfberry (*Lycium barbarum*, *Lycium* spp.; Solanaceae)

## 2 – 2 - Mediterranean and sub tropical fruits :

Fruits in this category are not hardy to extreme cold, as the preceding temperate fruits are, yet tolerate some frost and may have a modest chilling requirement. Notable among these are natives of the Mediterranean : Black mulberry (*Morus nigra*; Moraceae)

- Cornelian cherry (*Cornus mas*; Cornaceae)
- Date (*Phoenix dactylifera*; Arecaceae)
- Fig (*Ficus* spp. Moraceae)
- Grape, called raisin, sultana when it is dried. (*Vitis* spp.; Vitaceae)
- Jujube (*Ziziphus zizyphus*; Rhamnaceae)
- Pomegranate (*Punica granatum*; Punicaceae)
- Sycamore fig (*Ficus sycomorus*. Moraceae) also called old world sycamore or just sycamore.

In the important genus *Citrus* (Rutaceae), some members are tropical, tolerating no frost. All common species of commerce are somewhat hardy:

- Blood Orange
- Citron (*Citrus medica*)
- Clementine (*Citrus reticulata* var. *clementine*),
- Grapefruit (*Citrus paradisi*)
- Kumquat (*Fortunella* spp.)

- Lemon (*Citrus limon*)
- Limes
  - Key Lime (*Citrus aurantifolia*)
  - Persian lime Also known as tahiti lime.
  - Kaffir lime (*Citrus hystix*)
- Mandarin (*Citrus reticulata*)
- Naartjie (*Citrus reticulata*, *Citrus nobilis*)
- Orange, of which there are sweet (*Citrus sinensis*) and sour (*Citrus aurantium*) species
- Pomelo (also known as the shaddock) (*Citrus maxima*)
- Sweet Lemon (*Citrus limetta*)
- Kabosu (*Citrus Sphaerocarpa*) Rutaceae
- Oroblanco (*Citrus paradisi* x *C. grandis*) Rutaceae (Also called the sweetie)
- Tangerine, and similar
- Hybrids of the preceding species, such as the Orangelo, Tangelo, Rangpur (fruit) and Ugli fruit

***Other subtropical fruits :***

- Avocado (*Persea americana*; Lauraceae)
- Carob (*Ceratonia siliqua*; Fabaceae)
- Feijoa (*Feijoa sellowiana*; Myrtaceae)
- Guava (*Psidium guajava*; Myrtaceae)
- Longan (*Dimocarpus longan*; Sapindaceae)
- Lúcumá (*Pouteria lucuma*; Sapotaceae)
- Lychee (*Litchi chinensis*; Sapindaceae)
- Passion fruit or Granadilla (*Passiflora edulis* and other *Passiflora* spp.; Passifloraceae)
- Peanut (*Arachis hypogaea*; Fabaceae)
- Pond-apple (*Annona glabra*; Annonaceae) Also called Alligator-apple and Monkey-apple
- Strawberry guava (*Psidium littorale*; Myrtaceae)
- Tamarillo or Tree Tomato (*Cyphomandra betacea*; Solanaceae)
- Yangmei (*Myrica rubra*; Myricaceae) Also called Yumberry, Yamamomo, Chinese Bayberry, Japanese Bayberry, Red Bayberry, or Chinese strawberry tree

- Néré ( *Parkia biglobosa* ) .

### 3 – 2 - Tropical fruits :

Tropical fruits grow on plants of all habitats . The only characteristic that they share is an intolerance of frost.



*An array of tropical fruits at University of Hyderabad, India*



*Papayas*

### 2 - 3 – 1 – A :

- Abiu (*Pouteria caimito*; Sapotaceae)
- Açai (*Euterpe oleracea*; Arecaceae), or Assai
- Acerola (*Malpighia glabra*; Malpighiaceae), also called West Indian Cherry or Barbados Cherry
- Ackee (*Blighia sapida* or *Cupania sapida*; Sapindaceae)
- African cherry orange (*Citropsis schweinfurthii*; Rutaceae)
- Allspice (*Pimenta dioica*; Myrtaceae)
- Almond, Indian
- Almond, Tropical (*Terminalia catappa*; Combretaceae)
- Ambarella (*Spondias cytherea*; Anacardiaceae)
- Amra (*Spondias pinnata*; Anacardiaceae)
- Apple, Custard (*Annona reticulata*; Annonaceae), also called Bullock's Heart
- Apple, Elephant (*Dillenia indica*; Dilleniaceae)
- Apple, Golden



- Apple, Kei (*Dovyalis caffra*; Flacourtiaceae)
- Apple, Malay (*Syzygium malaccense*; Myrtaceae)
- Apple, Mammee (*Mammea americana*; Guttiferae)
- Apple, Rose (*Syzygium jambos*; Myrtaceae)
- Apple, Star (*Chrysophyllum cainito*; Chrysobalanaceae), also called caimito or caimite
- Apple, Sugar (*Annona squamosa*; Annonaceae); ata in Portuguese
- Apple, Water (*Syzygium aqueum*; Myrtaceae)
- Araza
- Atemoya (*Annona cherimola* X *Annona squamosa*; Annonaceae)
- Avocado (*Persea americana*; Lauraceae)

### **2 - 3 – 2 – B :**

- Babaco (*Carica pentagona*; Caricaceae)
- Bacupari (*Garcinia gardneriana*)
- Bacuri (*Platonia esculenta*; Guttiferae)
- Bael (*Aegle marmelos*; Rutaceae)
- Banana (*Musacea* spp.; Musaceae); its starchy variant is the plantain
- Barbadine (granadilla; maracujá-açu in Portuguese)
- Barbados Cherry (*Malpighia glabra* L.; Malpighiaceae), also called Acerola, West Indian Cherry
- Betel Nut (“*Areca catechu*”; Arecaceae)
- Bignay (*Antidesma bunioides*; Euphorbiaceae)
- Bilimbi (*Averrhoa bilimbi*; Oxalidaceae) Also called cucumber tree or tree sorrel
- Biribi (*Rollinia deliciosa*; Annonaceae)
- Bitter Gourd
- Black Sapote
- Bottle Gourd also known as Calabash (*Lagenaria siceraria*; Cucurbitaceae)
- Brazil Nut
- Breadfruit (*Artocarpus altilis*; Moraceae)
- Breadnut (*Artocarpus camansi*; Moraceae)
- Breadnut, Mayan (*Brosimum alicastrum*; Moraceae)

- Burmese grape, or Latka ( *Baccaurea sapida* ; *Phyllanthaceae* ) .

## 2 - 3 – 3 – C :

- Caimito (*Pouteria caimito*; *Sapotaceae*)
- Calabash Tree (*Crescentia cujete*)
- Calamansi
- CamuCamu (*Myrciaria dubia*; *Myrtaceae*)
- Candlenut Tree (*Aleurites moluccana*; *Euphorbiaceae*)
- Canistel (*Pouteria campechiana*; *Sapotaceae*), also called yellow sapote or "eggfruit"
- Cape Gooseberry (*Physalis peruviana*; *Solanaceae*)
- Capulin Cherry (*Prunus salicifolia*; *Rosaceae*)
- Carambola (*Averrhoa carambola*; *Oxalidaceae*), also called star fruit or five fingers
- Caranda (*Carissa carandas*; *Apocynaceae*)
- Cardamom (*Elettaria cardamomum*; *Zingiberaceae*)
- Carob (*Ceratonia siliqua*; *Leguminosae*)
- Cashew (*Anacardium occidentale*; *Anacardiaceae*)
- Cassabanana (*Sicana odorifera*; *Cucurbitaceae*)
- Cassava (*Manihot esculenta*; *Euphorbiaceae*)
- Cawesh (*Annona scleroderma*; *Annonaceae*)
- Ceriman (*Monstera deliciosa*; *Araceae*)
- Ceylon Gooseberry (*Dovyalis hebecarpa*; *Flacourtiaceae*)
- Chayote (*Sechium edule*; *Cucurbitaceae*)
- Chempedak or Champedak (*Artocarpus integer*; *Moraceae*)
- Chenet (guinep or ackee; pitomba-das-Guinas in Portuguese), also known as Spanish Lime or mamoncillo
- Chupa-Chupa (*Quararibea cordata*; *Malvaceae*)
- Cinnamon (*Cinnamomum zeylanicum*; *Lauraceae*)
- Clove (*Syzygium aromaticum*; *Myrtaceae*)
- Coco Plum (*Chrysobalanus icaco*; *Chrysobalanaceae*)
- Cocona (*Solanum sessilifolium*; *Solanaceae*)
- Coconut, Double or Coco-de-mer (*Lodoicea maldivica*’; *Arecaceae*)
- Coconut (*Cocos nucifera*; *Arecaceae*)

- Cola Nut (*Cola acuminata*; Sterculiaceae)
- Cupuassu (*Theobroma grandiflorum*; Malvaceae)
- Curry Leaf Tree (*Murraya koenigii*; Rutaceae)
- Cherimoya (*Annona cherimola*; Annonaceae)
- Cherry of the Rio Grande (*Eugenia aggregata*; Myrtaceae)
- Chili pepper
- Chinese Jujube (*Ziziphus zizyphus*; Rhamnaceae)
- Chinese Olive (*Canarium album*; Burseraceae)
- Caimito (caimite; related to the yellow abiu - egg fruit)
- Clove (*Syzygium aromaticum*; Myrtaceae)
- Cocoa (*Theobroma cacao*; Sterculiaceae)
- Cocoplum (*Chrysobalanus icaco*; Chrysobalanaceae)
- Coffea (*Coffea arabica*; Rubiaceae)
- Cupuaçu
- Custard Apple (*Annona reticulata*; Annonaceae), also called Bullock's Heart

#### **2 - 3 - 4 - D :**

- Damson plum (*Chrysophyllum oliviforme*; Sapotaceae), also called Satin Leaf
- Date (*Phoenix dactylifera*; Arecaceae)
- Date Plum (*Diospyros lotus*; Ebenaceae)
- Dragonfruit / Pitaya (*Hylocereus* spp.; Cactaceae)
- Duku (*Lansium domesticum*; Meliaceae)
- Durian (*Durio zibethicus*; Bombacaceae)

#### **2 - 3 - 5 - E :**

- Elephant Apple (*Dillenia indica*; Dilleniaceae)
- Emblica (*Phyllanthus emblica*/*Emblica officinalis*; Euphorbiaceae)

#### **2 - 3 - 6 - F :**

- Feijoa (aka Pineapple Guava or Guavasteen)

**2 - 3 – 7 – G :**

- Gamboge (*Garcinia xanthochymus*; Guttiferae)
- Genip (*Melicoccus bijugatus*; Sapindaceae)
- Giant Granadilla ( *Passiflora quadrangularis* ; Passifloraceae )
- Golden Apple
- Gooseberry, Cape (*Physalis peruviana*; Solanaceae)
- Gooseberry, Ceylon (*Dovyalis hebecarpa*; Flacourtiaceae)
- Gooseberry, Indian (*Phyllanthus emblica/Emblia officinalis*; Euphorbiaceae)
- Gooseberry, Otaheite (*Phyllanthus acidus*; Phyllanthaceae)
- Governor's Plum (*Flacourtia indica*; Flacourtiaceae)
- Granadilla, Giant (*Passiflora quadrangularis*; Passifloraceae)
- Granadilla, Montessa (*Passiflora platyloba*; Passifloraceae)
- Granadilla, Purple (*Passiflora edulis f edulis*; Passifloraceae)
- Granadilla, Red (*Passiflora coccinea*; Passifloraceae)
- Granadilla, Sweet (*Passiflora ligularis*; Passifloraceae)
- Granadilla, Yellow (*Passiflora edulis f flavicarpa*; Passifloraceae)
- Grapefruit (*Citrus X paradisi*; Rutaceae)
- Grumichama (*Eugenia brasiliensis*; Myrtaceae)
- Guanabana (*Annona muricata*; Annonaceae)
- Guarana (*Paullinia cupana*; Sapindaceae)
- Guava (*Psidium guajaba*; Myrtaceae)
- Guava, Brazilian (*Psidium guineense*; Myrtaceae)
- Guava, Cattley (*Psidium cattleianum*; Myrtaceae)
- Guava, Chilean (*Ugni molinae*; Myrtaceae)
- Guava, Costa Rican (*Psidium friedrichsthalianum*; Myrtaceae)
- Guava, Pineapple (*Feijoa sellowiana*; Myrtaceae)
- Guava, Purple (*Psidium rufum*; Myrtaceae)
- Guava, Strawberry (*Psidium littorale*; Myrtaceae)
- Guavaberry / Rumberry; (*Myrciaria floribunda*; Myrtaceae)

**2 - 3 – 8 – H :**

- Hog Plum ( taperebá in Portuguese )
- Horned melon ( *Cucumis metuliferus* ; Cucurbitaceae )
- Huito ( *Genipa americana*; Rubiaceae ) ; also called jagua, genipap, jenipapo
- Horseradish Tree, Asian (*Moringa oleifera*; Moringaceae)
- Horseradish Tree, African ( *Moringa stenopetala*; Moringaceae)
- Horseradish Tree, Malagasy ( *Moringa drouhardii*; Moringaceae )
- (Myrtaceae)

**2 - 3 – 9 – I :**

- Ice Cream Bean ( *Inga edulis* ; )
- Illama (*Annona diversifolia*; Annonaceae)
- Imbe (*Garcinia livingstonei*)
- Indian almond
- Indian fig
- Indian Gooseberry ( *Phyllanthus emblica*/*Embllica officinalis*; Euphorbiaceae)
- Indian Jujube (*Ziziphus mauritiana*; Rhamnaceae)
- Indian Prune (*Flacourtia rukam*; Flacourtiaceae)
- Myrtaceae)

**2 - 3 – 10 – J :**

- Jaboticaba (*Myrciaria cauliflora*; Myrtaceae), also called Brazilian Grape Tree
- Jackfruit (*Artocarpus heterophyllus* Moraceae), also called nangka
- Jambul (*Syzygium cumini*; Myrtaceae)
- Jatobá ( *Hymenae coubaril*; Leguminosae) Leguminosae)  
Caesalpinioideae)
- Jelly Plum (*Butia capitata*; ??)
- Jocote, also called Jamaica Plum
- Jujube, Chinese (*Ziziphus Zizyphus*; Rhamnaceae)
- Jujube, Indian (*Ziziphus mauritiana*; Rhamnaceae)

**2 - 3 – 11 – K :**

- Kaffir Lime (*Citrus hystrix*; Rutaceae)
- Kandis (*Garcinia forbesii*; Clusiaceae)
- Kapok (*Ceiba pentandra*; Bombacaceae)
- Kei Apple (*Dovyalis caffra*; Flacourtiaceae)
- Keppel fruit (*Stelechocarpus burakol*; Annonaceae)
- Kitembilla (*Dovyalis hebecarpa*; Flacourtiaceae)
- Kiwano (*Cucumis metuliferus*; ??)
- Kiwifruit (*Actinida* spp.; Actinidiaceae)
- Kwai Muk (*Artocarpus hypargyrea*; Moraceae)
- Kandis (*Garcinia forbesii*; Clusiaceae)
- Keppel fruit (*Stelechocarpus burakol*; Annonaceae)
- Korlan
- Kumquat, Meiwa (*Fortunella japonica*; Rutaceae)
- Kumquat, Nagami (*Fortunella margarita*; Rutaceae)
- Kundong (*Garcinia* sp.; Clusiaceae)

**2 - 3 – 12 – L :**

- Lablab
- Lakoocha (*Artocarpus lakoocha*; Moraceae)
- Langsat (*Lansium domesticum*), also called longkong or duku
- Lanzones (*Lansium domesticum*; Meliaceae)
- Lemon (*Citrus limon*; Rutaceae)
- Leucaena
- Lime (*Citrus aurantifolia*; Rutaceae)
- Limeberry (*Trifasia trifolia*; Rutaceae)
- Limequat (*Citrus aurantifolia* X *Fortunella* spp.; Rutaceae)
- Longan (*Euphoria longana*; Sapindaceae)
- Loquat (*Eriobotrya japonica*; Rosaceae)
- Louvi (*Flacourtia inermis*; Flacourtiaceae)
- Lucuma (*Pouteria campechiana*; Sapotaceae)
- Lychee (*Litchi chinensis*; Sapindaceae)

## 2 - 3 – 13 – M

- Mabolo (*Diospyros discolor*; Ebenaceae) also known as a velvet persimmon
- Macadamia (*Macadamia integrifolia*; Proteaceae)
- Macadamia, Rough Shell (*Macadamia tetraphylla*; Proteaceae)
- Madrono (*Rheedia acuminata*; Guttiferae)
- Malabar Spinach (*Basella alba*; ??)
- Malay Apple (*Syzygium malaccense*; Myrtaceae)
- Mammee Apple (*Mammea americana*; Guttiferae)
- Mamey (*Pouteria sapota*; Sapotaceae)
- Mamoncillo (*Melicoccus bijugatus*; Sapindaceae), also known as quenepa, genip or Fijian Longan
- Mandarin
- Mangaba (*Hancornia speciosa*; Apocynaceae)
- Mango (*Mangifera indica*; Anacardiaceae)
- Mangosteen (*Garcinia mangostana*; Guttiferae)
- Manila tamarind (*Pithecellobium dulce*; Leguminosae)
- Maprang (*Bouea macrophylla*; Anacardiaceae)
- Maypop (*Passiflora incarnata*; Passifloraceae)
- Medlar (*Mespilus germanica*; ??)
- Melinjo
- Melon Pear
- Miracle Fruit (*Synsepalum dulcificum*; Sapotaceae)
- Mombin, Purple (*Spondias purpurea*; Anacardiaceae)
- Mombin, Red (*Spondias purpurea*; Anacardiaceae)
- Mombin, Yellow (*Spondias mombin*; Anacardiaceae)
- Monstera (*Monstera deliciosa*; Araceae) also called Swiss Cheese Plant, Split-leaf Philodendron
- Morinda
- Mountain Soursop (*Annona montana*; Annonaceae)
- Monkey Jackfruit (*Artocarpus rigidus*; Moraceae)
- Mulberry, Black (*Morus nigra*; Moraceae)
- Mulberry, Red (*Morus rubra*; Moraceae)
- Mulberry, White (*Morus alba*; Moraceae)
- Mundu
- Mung Bean

- Muskmelon

### **2 - 3 – 14 – N :**

- Nance (*Byrsonima crassifolia*; Malpighiaceae)
- Naranjilla (*Solanum quitoense*; Solanaceae)
- Neem (*Azadirachta indica*; Meliaceae)
- Noni (*Morinda citrifolia*; Rubiaceae)
- Nutmeg (*Myristica fragrans*; Myristicaceae)

### **2 - 3 – 15 – O**

- Oil Palm (*Elaeis guineensis*; Arecaceae)
- Gooseberry, Otaheite (*Phyllanthus acidus*; Phyllanthaceae)

### **2 - 3 – 16 – P**

- Palmyra Palm / Toddy Palm (*Borassus flabellifer*; Arecaceae)
- Papaya (*Carica papaya*; Caricaceae)
- Passionfruit (*Passiflora* spp.; Passifloraceae)
- Paw Paw (*Asimina triloba*; Annonaceae)
- Peach Palm (*Bactris gasipaes*; Arecaceae)
- Peanut butter fruit (*Bunchosia argentea*; Malpighiaceae)
- Pecan (*Carya illinoensis*; ??)
- Pepino (*Solanum muricatum*; ??)
- Pequi (*Caryocar brasiliensis*; Caryocaraceae)
- Persimmon, American (*Diospyros virginiana*; Ebenaceae)
- Persimmon, Oriental (*Diospyros kaki*; Ebenaceae)
- Pewa (Peach palm; pupunha in Portuguese)
- Phalsa (*Grewia subinaequalis*; Tiliaceae)
- Pigeon Pea
- Pili Nut (*Canarium ovatum*; Burseraceae)
- Pindo Palm (*Butia Capitata*; Arecaceae)
- Pineapple (*Ananas comosus* ; Bromeliaceae)
- Pistachio (*Pistacia vera*; Anacardiaceae)
- Pitomba (*Eugenia luschnathiana* or *Talisia esculenta*)
- Plantain



- Pois doux (*Inga edulis*, ice-cream bean, or inga-cipó in Portuguese)
- Pomegranate (*Punica granatum*; Punicaceae)
- Pommecythere or pomcité (*Spondias cytherea*); also known as golden apple, June plum or Jew plum and ambarella, and as cajamanga in Portuguese
- Pommerac (*Eugenia malaccensis*); also known as Otaheite apple; Malay apple; jambo in Portuguese
- Pulasan (*Nephelium mutabile*; Sapindaceae)
- Pummelo (*Citrus grandis*; Rutaceae)
- Pupunha (*Bactris gasipaes*; Arecaceae); also known as Peach Plum or Pewa
- Purple Mombin (*Spondias purpurea*; Anacardiaceae)

### 2 - 3 – 17 – Q

- Quince (*Cydonia oblonga*)

### 2 - 3 – 18 – R

- Rambutan (*Nephelium lappaceum*; Sapindaceae)
- Rambutan, Hairless
- Red Mombin (*Spondias purpurea*; Anacardiaceae)
- Riberry (*Syzygium luehmannii*; Myrtaceae), also called Lilly Pilly, Lillipilli, Chinese Apple
- Ridged Gourd
- Rollinia (*Rollinia mucosa*; Annonaceae)
- Rose Apple (*Syzygium jambos*; Myrtaceae)

### 2 - 3 – 19 – S :

- Safou (*Dacryodes edulis*), also called atanga or butterfruit
- Salak (*Salacca edulis*; Arecaceae), also called snakefruit or cobrafruit
- Santol (*Sandoricum koetjape*; Meliaceae)
- Sapodilla (*Manilkara zapota*; Sapotaceae), also called chiku, mespel, naseberry, sasadilla, snake fruit, sawo
- Sea Grape (*Coccoloba uvifera*; Polygonaceae)
- Soncoya (*Annona diversifolia*; Annonaceae)

- Soursop (*Annona muricata*; Annonaceae), also called guanabana
- Soy bean
- Spanish Lime (*Melicoccus bijugatus*; Sapindaceae)
- Star Apple (*Chrysophyllum cainito*; Chrysobalanaceae), also called caimito or caimite
- Strawberry Guava (*Psidium littorale*; Myrtaceae)
- Strawberry Pear
- Sugar Apple (*Annona squamosa*; Annonaceae); ata in Portuguese
- Summer squash
- Surinam Cherry (*Eugenia uniflora*; Myrtaceae) also called Brazilian Cherry, Cayenne Cherry, Pitanga
- Sweet Granadilla
- Sweet orange
- Sweet pepper
- Sweetsop (*Annona squamosa*; Annonaceae) also called Sugar Apple

### **2 - 3 – 20 – T :**

- Tamarind (*Tamarindus indica*; Leguminosae)
- Tamarind, Manila (*Pithecellobium dulce*; Leguminosae)
- Tamarind, Monkey (*Inga edulis*; Leguminosae)
- Tamarind, Velvet (*Dialium indum*; Leguminosae)

### **2 - 3 – 21 – V :**

- Vanilla ( *Vanilla planifolia*; Orchidaceae )

### **2 - 3 – 22 – W :**

- Wampee (*Clausena lansium*; Rutaceae)
- Water Apple (*Syzygium aqueum*; Myrtaceae)
- Watermelon
- Wax Jambu (*Syzygium samarangense*; Myrtaceae)
- Wax Gourd
- White Sapote (*Casimiroa edulis*; Rutaceae)
- Winged Bean

- Wood Apple (*Feronia limonia*; Rutaceae)

## **2 - 3 – 23 – Y :**

- Yantok (*Calamus manillensis*)

## **3 - List of culinary fruits by geographical origin :**

### **3 – 1 - Fruits of African origin :**

Fruits native to Africa or of African Origin :

- Amatungulu (*Carissa macrocarpa*)
- Kiwano (*Cucumis metuliferus*)
- Marula (*Sclerocarya birrea*)
- Spiny Monkey-orange (*Strychnos spinosa*)
- Tamarind (*Tamarindus indica*)
- Miracle Fruit (*Synsepalum dulcificum*; Sapotaceae)
- Imbe (*Garcinia livingstonei*)

### **3 – 2 - Fruits of Asian origin :**

Fruits native to Asia or of Asian Origin :

- Arhat (*Siraitia grosvenorii*; Cucurbitaceae) Also called longevity fruit
- Batuan (*Garcinia morella*)
- Bignay
- Bilimbi
- Breadfruit (*Artocarpus altilis*; Moraceae)
- Buddha's Hand
- Wood apple (*Aegle marmelos*) ,commonly known as bael, found in eastern India.
- Mango (*Mangifera*) ,tropical fruit of south Asia.
- Indian gooseberry (*Phyllanthus emblica*)
- Charichuelo (*Garcinia intermedia*)
- Button Mangosteen (*Garcinia prainiana*)
- Chinese Quince (*Pseudocydonia sinensis*)
- Coconut (*Cocos nucifera*; Arecaceae)

- Che (*Cudrania tricuspidata*; Moraceae) Also called Cudrania, Chinese Mulberry, Cudrang, Mandarin Melon Berry, Silkworm Thorn, zhe
- Durian (*Durio* spp; Malvaceae)
- Gamboge (*Garcinia gummi-gutta*)
- Goumi (*Elaeagnus multiflora ovata*; Elaeagnaceae family)
- Jambul (*Syzygium cumini*; Myrtaceae)
- Hardy Kiwi (*Actinidia arguta*; Actinidiaceae family)
- Kiwifruit or Chinese gooseberry (*Actinidia* spp.; Actinidiaceae)
- Mock Strawberry or Indian Strawberry (*Potentilla indica*; Rosaceae)
- *Garcinia dulcis* (Mundu)
- Lanzones (*Lansium domesticum*; Meliaceae family)
- Lapsi (*Choerospondias axillaris* Roxb. Anacardiaceae)
- Longan (*Dimocarpus longan*; Sapindaceae family)
- Lychee (*Litchi chinensis*; Sapindaceae family)
- Mangosteen (*Garcinia mangostana*; Clusiaceae)
- Marang
- Nungu (*Borassus flabellifer*; Arecaceae)
- Peach
- Persimmon (aka Sharon Fruit) (*Diospyros kaki*; Ebenaceae)
- Pomelo
- Rambutan (*Nephelium lappaceum*; Sapindaceae family)
- Rhubarb (*Rheum rhaponticum*; Polygonaceae)
- Sageretia (*Sageretia theezans*; Rhamnaceae) Also called Mock Buckthorn
- Salak (*Salacca edulis*; Arecaceae), also called snakefruit or cobrafruit
- Santol (fruit)
- Carambola (aka Starfruit)
- Wild Mangosteen (*Garcinia indica*)

### **3 – 3 - Fruits of Latin American origin :**

Fruits native to Latin America or of Latin American Origin:

- Açai (*Euterpe*), a palm fruit native to the Amazon region.
- Avocado (*Persea americana*; Lauraceae)
- Boquila (*Boquila trifoliata* ; Lardizabalaceae)
- Calafate Barberry (*Berberis*; Berberidaceae)
- Breadnut (*Artocarpus camansi*; Moraceae)
- Cainito (Star apple)
- Feijoa (Pineapple Guava or Guavasteen)
- Keule (*Gomortega keule*; Gomortegaceae)
- Guarana (*Paullinia cupana*; Sapindaceae)
- Guava ("*Psidium guajava*"; Myrtaceae)
- Lardizabala (*Lardizabala biternata*; Lardizabalaceae)
- Mamey ("*Pouteria sapota*"; Sapotaceae)
- Maqui (*Aristotelia chilensis*; Elaeocarpaceae)
- Naranjilla (*Solanum quitoense*; Solanaceae)
- Papaya (*Carica papaya*; Caricaceae)
- Peumo (*Cryptocarya alba*; Lauraceae)
- Pineapple ("*Ananas comosus*"; Bromeliaceae)
- Sapote ("*Casimiroa edulis*"; Sapotaceae)
- Sea Grape (*Coccoloba uvifera*; Polygonaceae)
- Soursop ("*Annona muricata*"; Annonaceae)
- Sugar-apple (aka *Atis*)
- Ugniberry (*Ugni molinae*; Myrtaceae)

### **3 – 4 - Fruits of North American origin :**

Canada and the United States are home to a surprising number of edible plants, especially berries; however, only three are commercially grown/known on a global scale (grapes, cranberries, and blueberries.) Many of the fruits below are still eaten locally as they have been for centuries and others are generating renewed interest by eco-friendly gardeners (less need for bug control) and chefs of the region alike.

- American Chestnut (*Castanea dentata*; Fagaceae)
- American Black Elderberry (*Sambucus canadensis*; Adoxaceae)
- American grape: North American species (e.g., *Vitis labrusca*; Vitaceae) and American-European hybrids are grown

where grape (*Vitis vinifera*) is not hardy and are used as rootstocks

- American Hazelnut (*Corylus americana*; Betulaceae)
- American Mayapple (*Podophyllum peltatum*; Berberidaceae)
- American persimmon (*Diospyros virginiana*; Ebenaceae): Traditional for desserts and as dried fruit.
- American plum (*Prunus americana*; Rosaceae)
- American Red Elderberry (*Sambucus pubens*; Adoxaceae)
- American Red Raspberry (*Rubus strigosus*; Rosaceae)
- Beach Plum (*Prunus maritima*; Rosaceae)
- Black cherry (*Prunus serotina*; Rosaceae very popular flavoring for pies, jams, and sweets.
- Black raspberry (*Rubus occidentalis* or *Rubus leucodermis*; Rosaceae)
- Black Walnut (*Juglans nigra*; Juglandaceae)
- Blueberry (*Vaccinium*, sect. *Cyanococcus*; Ericaceae)
- Buffaloberry (*Shepherdia argenta*; Elaeagnaceae), which grows wild in the prairies of Canada
- Chokecherry (*Prunus virginiana*; Rosaceae)
- Cocoplum (*Chrysobalanus icaco*; Chrysobalanaceae)
- Cranberry (*Vaccinium oxycoccus*; Ericaceae)
- Eastern May Hawthorn (*Crataegus aestivalis*; Rosaceae, better known as mayhaw.)
- False-mastic (*Sideroxylon foetidissimum*; Sapotaceae)
- Florida strangler fig (*Ficus aurea*; Moraceae)
- Ground Plum (*Astragalus crassicaarpus*; Fabaceae), also called Ground-plum milk-vetch
- Huckleberry (*Gaylussacia*, *Vaccinium*; Ericaceae)
- Maypop (*Passiflora incarnata*; Passifloraceae, traditionally a summer treat.)
- Muscadine (*Vitis rotundifolia*; Vitaceae)
- Pawpaw (*Asimina triloba*; Annonaceae, not to be confused with Papaya (*Carica papaya*; Caricaceae), which is called pawpaw in some English dialects)
- Pecan (*Carya illinoensis* or *illinoensis*; Juglandaceae)

- Prickly pear (*Opuntia* spp.; Cactaceae) used as both a fruit and vegetable depending on part of plant.
- Pigeon plum (*Coccoloba diversifolia*; Polygonaceae)
- Red mulberry (*Morus rubra*; Moraceae)
- Salal berry (*Gaultheria shallon*; Ericaceae)
- Salmonberry (*Rubus spectabilis*; Rosaceae)
- Saskatoonberry (*Amelanchier alnifolia*, Rosaceae)
- Saw Palmetto (*Serenoa repens*; Arecaceae)
- Southern Crabapple (*Malus angustifolia*; Rosaceae)
- Texas Persimmon (*Diospyros texana*; Ebenaceae)
- Thimbleberry (*Rubus parviflorus*; Rosaceae)
- Toyon (*Heteromeles arbutifolia*; Rosaceae)

### **3 – 5 - Fruits of Oceanian origin :**

Fruits native to Oceania or of Oceanian Origin:

- Atherton Raspberry (*Rubus probus*; Rosaceae)
  - Black Apple (*Planchonella australis*; Sapotaceae)
  - Blue tongue (*Melastoma affine*; Melastomataceae)
  - Bolwarra (*Eupomatia laurina*; Eupomatiaceae)
  - Broad-leaf Bramble (*Rubus moluccanus*; Rosaceae)
  - Burdekin Plum (*Pleiogynium timorensis*; Anacardiaceae)
  - Bush tomato (Certain *Solanum* species; Solanaceae)
  - Cedar Bay cherry (*Eugenia carissoides*; Myrtaceae)
  - Cherry ballart (*Exocarpus cupressiformis*; Santalaceae)
  - Cluster fig (*Ficus racemosa*; Moraceae)
  - Cocky apple (*Planchonia careya*)
  - Common apple-berry (*Billardiera scandens*; Pittosporaceae)
  - Conkerberry (*Carissa lanceolata*; Apocynaceae)
  - Davidson's plum (*Davidsonia* spp.; Cunoniaceae)
- Davidsonia jerseyana* *Davidsonia johnsonii* *Davidsonia pruriens*
- Desert banana (*Marsdenia australis*)
  - Desert fig (*Ficus platypoda*; Moraceae)
  - Desert lime (*Citrus glauca*; Rutaceae)
  - Dodder laurel (*Cassytha melantha*)
  - Doubah (*Marsdenia australis*; Apocynaceae)

- Emu Apple (*Owenia acidula*; Meliaceae)
- Emu berry (*Grewia retusifolia*)
- Fibrous Satinash (*Syzygium fibrosum*; Myrtaceae)
- Finger Lime (*Citrus australasica*; Rutaceae)
- Illawarra Plum (*Podocarpus elatus*; Podocarpaceae)
- Kakadu lime (*Citrus gracilis*; Rutaceae)
- Kakadu plum (*Terminalia ferdinandiana*; Combretaceae)
- Karkalla (*Carpobrotus rossii*; Aizoaceae)
- Kutjera (*Solanum centrale*; Solanaceae)
- Lady apple (*Syzygium suborbiculare*; Myrtaceae)
- Lemon aspen (*Acronychia acidula*; Rutaceae)
- Lillypilly (*Acmena* spp., *Syzygium* spp.) Used raw and in jam
- Little gooseberry tree (*Buchanania arborescens*; Anacardiaceae)
- Midyim (*Austromyrtus dulcis*; Myrtaceae)
- Morinda citrifolia
- Mountain pepper (*Tasmania* spp.; Winteraceae )
- Muntries (*Kunzea pomifera*; Myrtaceae)
- Native currant (*Acrotriche depressa*; Ericaceae)
- Native gooseberry (*Physalis minima*; Solanaceae)
- Native raspberry (*Rubus parviflorus*)
- Nonda plum (*Parinari nonda*)
- Pigface (*Carpobrotus glaucescens*; Aizoaceae)
- Pink-flowered Native Raspberry (*Rubus parvifolius*; Rosaceae)
- Purple apple-berry (*Billardiera longiflora*; Pittosporaceae)
- Quandong (*Santalum acuminatum*; Santalaceae)
- Queensland Ebony (*Diospyros humilis*)
- Riberry (*Syzygium luehmannii*; Myrtaceae)
- Rose-leaf Bramble (*Rubus rosifolius*; Rosaceae)
- Rose myrtle (*Archirhodomyrtus beckleri*; Myrtaceae)
- Sandpaper Fig (*Ficus coronata*; Moraceae)
- Small-leaf tamarind (*Diploglottis campbellii*; Sapindaceae)
- Snow berry (*Gaultheria hispida*; Ericaceae)
- Sweet apple-berry (*Billardiera cymosa*; Pittosporaceae)
- Tanjong (*Mimusops elengi*; Sapindaceae)



- White aspen (*Acronychia oblongifolia*; Rutaceae)
- Wild grape (*Ampelocissus acetosa*)
- Wild orange (*Capparis mitchellii*; Capparaceae)
- Wild peach (*Terminalia carpentariae*)
- Wild plum (munydjudj) (*Buchanania obovata*)
- Wild plum (*Santalum lanceolatum*)
- Wongi (*Manilkara kaukii*; Sapotaceae)
- Yellow plum (*Ximenia americana*; Olacaceae)
- Zig Zag Vine (*Melodurum leichhardtii*; Annonaceae)

#### **4 - List of culinary fruits by type of flora :**

##### **4 – 1 - Rosaceae family :**

The family Rosaceae dominates the temperate fruits, both in numbers and in importance. The pome fruits, stone fruits and brambles are fruits of plants in Rosaceae.

##### ***The pome fruits :***

- Apple and crabapple (*Malus*)
- Chokeberry (*Aronia*)
- Hawthorn (*Crataegus* and *Rhaphiolepis*)
- Loquat (*Eryobotrya japonica*)
- Medlar (*Mespilus germanica*)
- Pear, European and Asian species (*Pyrus*)
- Quince (*Cydonia oblonga* and *Chaenomeles*)
- Rose hip, the fruitlike base of roses (*Rosa*); used mostly for jams and herbal tea
- Rowan (*Sorbus*)
- Service tree (*Sorbus domestica*), bears a fruit known as a sorb or sorb apple
- Serviceberry or Saskatoon (*Amelanchier*)
- Shipova ( $\times$  *Sorbopyrus auricularis*)

##### ***The stone fruits, drupes of genus Prunus:***

- Apricot (*Prunus armeniaca* or *Armeniaca vulgaris*)
- Cherry, sweet, black, sour, and wild species (*Prunus avium*, *Prunus serotina*, *P. cerasus*, and others)
- Chokecherry (*Prunus virginiana*)
- Greengage, a cultivar of the plum
- Peach (of the normal and white variety) and its variant the nectarine (*Prunus persica*)
- Plum, of which there are several domestic and wild species; dried plums are called **prunes**
- Hybrids of the preceding species, such as the pluot, aprium and peacotum

#### **4 – 2 – Berries :**

In non-technical usage, **berry** means any small fruit that can be eaten whole and lacks objectionable seeds. The **bramble fruits**, compound fruits of genus *Rubus* (blackberries), are some of the most popular pseudo-berries:

- Black berry, of which there are many species and hybrids, such as dewberry, boysenberry, olallieberry, and tayberry (genus *Rubus*)
- Cloudberry (*Rubus chamaemorus*)
- Loganberry (*Rubus loganobaccus*)
- Raspberry, several species (genus *Rubus*)
- Salmonberry (*Rubus spectabilis*)
- Thimbleberry (*Rubus parviflorus*)
- Wineberry (*Rubus phoenicolasius*)

*The true berries are dominated by the family Ericaceae, many of which are hardy in the subarctic:*

- Bearberry (*Arctostaphylos* spp.)
- Bilberry or whortleberry (*Vaccinium* spp.)
- Blueberry (*Vaccinium* spp.)
- Crowberry (*Empetrum* spp.)
- Cranberry (*Vaccinium* spp.)
- Falberry (*Vaccinium* spp.)
- Huckleberry (*Vaccinium* spp.)

- Lingonberry (*Vaccinium vitis-idaea*)
- Strawberry Tree (*Arbutus unedo*), not to be confused with the Strawberry (*Fragaria*)

***Other berries not in the Rosaceae or Ericaceae:***

- Açáí (*Euterpe*), a palm fruit native to the Amazon region
- Barberry (*Berberis*; *Berberidaceae*)
- Currant (*Ribes* spp.; *Grossulariaceae*), red, black, and white types
- Elderberry (*Sambucus*; *Caprifoliaceae*)
- Gooseberry (*Ribes* spp.; *Grossulariaceae*)
- Hackberry (*Celtis* spp.; *Cannabaceae*)
- Honeysuckle: the berries of some species (called **honeyberries**) are edible, others are poisonous (*Lonicera* spp.; *Caprifoliaceae*)
- Mulberry (*Morus* spp.; *Moraceae*) including:
  - Red Mulberry (*Morus rubra*)
  - White Mulberry (*Morus alba*)
- Mayapple (*Podophyllum* spp.; *Berberidaceae*)
- Nannyberry or sheepberry (*Viburnum* spp.; *Caprifoliaceae*)
- Oregon grape (*Mahonia aquifolium*; *Berberidaceae*)
- Sea-buckthorn (*Hippophae rhamnoides*; *Elaeagnaceae*)
- Sea Grape (*Coccoloba uvifera*; *Polygonaceae*)
- Ugniberry (*Ugni molinae*; *Myrtaceae*)
- Wolfberry (*Lycium barbarum*, *Lycium* spp.; *Solanaceae*)

**4 – 3 – Cacti and other succulents :**

Several cacti yield edible fruits, which are important traditional foods for some Native American peoples:

- Cardón (*Pachycereus pringlei*; *Cactaceae*)
- Dragonfruit (*Hylocereus undatus*; *Cactaceae*), also called pitaya
- Prickly pear (*Opuntia* spp.; *Cactaceae*)
- Saguaro (*Carnegiea gigantea*; *Cactaceae*)
- *Cereus peruvianus*

- numerous other species of cacti

#### **4 – 4 – Podocarps :**

Podocarps are conifers in the family Podocarpaceae. The seed cones are highly modified and, in some, the seed is surrounded by fleshy scale tissue, resembling a drupe. These berry-like cone scales are eaten by birds which then disperse the seeds in their droppings and the cones can be eaten in many species. Podocarps are either half-hardy or frost tender, depending on species. Many genera are similar in that they have edible "fruits" and often don't have a common name.

- Kahikatea (*Dacrycarpus dacrydioides*)
- Manoa (*Manoa colensoi*)
- Nageia (*Nageia* spp.)
- Podocarpus (*Podocarpus* spp.)
- Prumnopitys (*Prumnopitys* spp.)
- Rimu (*Dacrydium cupressinum*)
- Tōtara (*Podocarpus totara*)

#### **4 - 1 – 1- Melons and other members of Cucurbitaceae family :**

Some exceptions to the statement that temperate fruits grow on woody perennials are :

- Gourd, (usually regarded as vegetables in cuisine) including, but not limited to:
  - Butternut squash (*Cucurbita moschata*)
  - Cushaw squash (*Cucurbita mixta*)
  - Hubbard squash, Buttercup squash (*Cucurbita maxima*)
  - Pumpkin, Acorn squash, Zucchini, Summer squash (*Cucurbita pepo* varieties)
- Horned melon (*Cucumis metuliferus*)
- Melon (*Cucumis melo*): cantaloupe, galia, and other muskmelons, honeydew

#### **5 - Accessory fruits :**

The accessory fruits, seed organs which are not botanically berries at all:

- Raisin tree (*Hovenia dulcis*, Rhamnaceae) Also called Japanese Raisin Tree
- Strawberry (*Fragaria* spp.; Rosaceae)
- Cashew apple
  - Yew arils (*Taxus* spp.)

# Marmalade



*Marmalade jars*



*Antique marmalade  
cutter*



*Seville orange  
marmalade*

## Contents :

- 1 Introduction
- 2 Origins
- 3 Etymology
- 4 Dundee Marmalade

### 1 – Introduction :

**Marmalade** is a fruit preserve, made from the peel of citrus fruits, sugar, and water. The traditional citrus fruit for marmalade production is the "Seville orange" from Spain, *Citrus aurantium* var. *aurantium*, thus called because it was originally only made in Seville in Spain; it is higher in pectin than sweet oranges, and therefore gives a good set. The peel has a distinctive bitter taste which it imparts to the marmalade. Marmalade can be made from lemons, limes, grapefruits, sweet oranges or any combination thereof. For example, California-style marmalade is made from the peel of sweet oranges and consequently lacks the bitter taste of Spanish style marmalade.

In languages other than English, marmalade can mean preserves made with fruit other than citrus . For example, in Spanish all preserves are known generically as mermelada ( There is no distinction made between jam, jelly, preserves or marmalade ) .

The recipe for marmalade includes sliced or chopped fruit peel simmered in sugar, fruit juice and water until soft; indeed marmalade is sometimes described as jam with fruit peel ( although manufacturers also produce peel - free marmalade ) . Marmalade is often eaten on toast for breakfast.

## **2 – Origins :**

The Romans learned from the Greeks that quinces slowly cooked with honey would "set" when cool ( though they did not know about fruit pectin ) . Greek melimēlon or "honey fruit"—for most quinces are too astringent to be used without honey, and in Greek mēlon or "apple" stands for all globular fruits—was transformed into "marmelo." A Roman cookbook attributed to Apicius gives a recipe for preserving whole quinces, stems and leaves attached, in a bath of honey diluted with defrutum—Roman marmalade . Preserves of quince and lemon appear—along with rose, apple, plum and pear—in the Book of ceremonies of the Byzantine Emperor Constantine VII Porphyrogennetos , "a book that is not only a treatise on the etiquette of imperial banquetting in the ninth century, but a catalogue of the foods available and dishes made from them " .

Medieval quince preserves, which went by the French name cotignac, produced in a clear version and a fruit pulp version, began to lose their medieval seasoning of spices in the 16th century. In the 17th century La Varenne provided recipes for both thick and clear cotignac .

The extension of "marmalade" in the English language to refer to citrus fruits was made in the 17th century, when citrus first began to be plentiful enough in England for the usage to become common.

In some continental Europe languages ' a word sharing a root with "marmalade" refers to all gelled fruit conserves, and those derived from citrus fruits merit no special word of their own. Due to British influence, however, only citrus products may be sold as "marmalade" in the European Union (with certain exceptions , which has led to considerable complaints from those countries '

In Portugal, where the modern use of the word originated, "marmelada" refers only to a solid gel - like substance made of quinces . Any other other use of the word is considered improper both linguistically and technically.

### 3 - Etymology :

According to the Oxford English Dictionary, "marmalade" appeared in English language in 1480, borrowed from French marmelade which, in turn, came from the Portuguese marmelada. According to José Pedro Machado's Dicionário Etimológico da Língua Portuguesa , the oldest known document where this Portuguese word is to be found is Gil Vicente's play Comédia de Rubena, written in 1521 :

Temos tanta marmelada  
Que minha mãe vai me dar um pouco<sup>[6]</sup>

In Portuguese, according to the root of the word, which is marmelo, "quince", marmelada is a preserve made from quinces, quince cheese . Marmelo in turn derives from Latin melimelum , " honey apple " , which in turn comes from the earlier Greek ( melímēlon ) , from ( meli ) , " honey " + ( mēlon ) , "apple" .

There is no truth to a folk etymology that claims the word derives from " Marie malade " (French for "ill Mary"), referring to Mary, Queen of Scots, because she used it as a medicine for a headache or upset stomach—or that during a bout of seasickness when sailing from France to Scotland, she turned to the sugary substance made of quinces by her French chef to ease her queasiness. A similar folk etymology is based on Marie Antoinette.

In 1524, Henry VIII received a "box of marmalade" from Mr. Hull of Exeter . As it was in a box, this was likely to have been marmelada, a quince paste from Portugal , still made and sold in southern Europe. Its Portuguese origins from marmalado can be detected in the remarks in letters to Lord Lisle, from William Grett, 12 May 1534, "I have sent to your lordship a box of marmaladoo , and another unto my good lady your wife" and from Richard Lee, 14



December 1536 " , He most heartily thanketh her Ladyship for her marmalade " .

#### **4 - Dundee Marmalade :**

The Scottish city of Dundee has a long association with marmalade . In 1797 , James Keiller and his mother Janet ran a small sweet and preserves shop in the Seagate section of Dundee; they opened a factory to produce "Dundee Marmalade", that is marmalade containing thick chunks of Seville orange rind . Some claim this preparation as a new twist by Keiller on the already well-known fruit preserve of quince marmalade . Others see the Keiller claims as canny commercial promotion, backed up by such references as "My wife has made marmalade of oranges for you" in James Boswell's letter to Dr. Johnson of April 24, 1777.

# Pectin

## Contents :

- 1 introduction
- 2 Biology
- 3 Chemistry
- 4 Sources and production
- 5 Uses
- 6 Legal status
- 7 History

### 1 – Pectin :

**Pectin** (from Greek - pektikos , " congealed, curdled " ) is a structural hetero poly saccharide contained in the primary cell walls of terrestrial plants. It was first isolated and described in 1825 by Henri Braconnot . It is produced commercially as a white to light brown powder, mainly extracted from citrus fruits, and is used in food as a gelling agent particularly in jams and jellies. It is also used in fillings, sweets, as a stabilizer in fruit juices and milk drinks and as a source of dietary fiber .

### 2 – Biology :

In plant cells, pectin consists of a complex set of polysaccharides that are present in most primary cell walls and particularly abundant in the non - woody parts of terrestrial plants. Pectin is present not only throughout primary cell walls but also in the middle lamella between plant cells where it helps to bind cells together . The amount , structure and chemical composition of pectin differs between plants, within a plant over time and in different parts of a plant. During ripening , pectin is broken down by the enzymes pectinase and pectinesterase ; in this process the fruit becomes softer as the middle lamella breaks down and cells become separated from each other. A similar process of cell separation caused by pectin breakdown occurs in the abscission zone of the petioles of deciduous plants at leaf fall.

Pectin is a natural part of human diet, but does not contribute significantly to nutrition. The daily intake of pectin from fruits and vegetables can be estimated to be around 5 g ( assuming consumption of approximately 500 g fruits and vegetables per day ) .

In human digestion, pectin goes through the small intestine more or less intact. Pectin is thus a soluble dietary fiber.

Consumption of pectin has been shown to reduce blood cholesterol levels. The mechanism appears to be an increase of viscosity in the intestinal tract, leading to a reduced absorption of cholesterol from bile or food . In the large intestine and colon, microorganisms degrade pectin and liberate short-chain fatty acids that have positive influence on health ( pre biotic effect ) .

### **3 – Chemistry :**

Pectins are a family of complex poly saccharides that contain 1,4 - linked  $\alpha$  – D - galactosyluronic acid residues . Three pectic poly saccharides have been isolated from plant primary cell walls and structurally characterized. These are :

- Homogalacturonans
- Substituted galacturonans
- Rhamnogalacturonans

Homogalacturonans are linear chains of  $\alpha$ - (1- 4) - linked D - galacturonic acid .

Substituted galacturonans are characterized by the presence of saccharide appendant residues ( such as D - xylose or D - apiose in the respective cases of xylogalacturonan and apiogalacturonan ) branching from a backbone of D- galacturonic acid residues.<sup>[4][5]</sup>

Rhamnogalacturonan I pectins (RG-I) contain a backbone of the repeating disaccharide : 4) - $\alpha$ -D-galacturonic acid-(1,2)- $\alpha$ -L-rhamnose - (1. From many of the rhamnose residues, sidechains of various neutral sugars branch off. The neutral sugars are mainly D - galactose , L - arabinose and D - xylose , the types and proportions of neutral sugars varying with the origin of pectin .

Another structural type of pectin is rhamnogalacturonan II ( RG – II ) , which is a less frequent complex, highly branched polysaccharide . Rhamnogalacturonan II is classified by some authors within the group of substituted galacturonans since the rhamnogalacturonan II backbone is made exclusively of D - galacturonic acid units .

Isolated pectin has a molecular weight of typically 60 – 130,000 g / mol , varying with origin and extraction conditions.

In nature, around 80 % of carboxyl groups of galacturonic acid are esterified with methanol . This proportion is decreased more or less during pectin extraction. The ratio of esterified to non - esterified galacturonic acid determines the behavior of pectin in food applications. This is why pectins are classified as high – vs . low - ester pectins – or in short HM vs. LM – pectins , with more or less than half of all the galacturonic acid esterified .

The non - esterified galacturonic acid units can be either free acids ( carboxyl groups ) or salts with sodium, potassium or calcium. The salts of partially esterified pectins are called pectinates , if the degree of esterification is below 5 % the salts are called pectates , the insoluble acid form, pectic acid.

Some plants like sugar beet, potatoes and pears contain pectins with acetylated galacturonic acid in addition to methyl esters. Acetylation prevents gel - formation but increases the stabilizing and emulsifying effects of pectin.

Amidated pectin is a modified form of pectin. Here, some of the galacturonic acid is converted with ammonia to carboxylic acid amide. These pectins are more tolerant of varying calcium concentrations that occur in use .

To prepare a pectin – gel , the ingredients are heated, dissolving the pectin. Upon cooling below gelling temperature, a gel starts to form. If gel formation is too strong, syneresis or a granular texture are the result, whilst weak gelling leads to excessively soft gels. In high-ester pectins at soluble solids content above 60 % and a pH-value

between 2.8 and 3.6, hydrogen bonds and hydrophobic interactions bind the individual pectin chains together. These bonds form as water is bound by sugar and forces pectin strands to stick together. These form a 3- dimensional molecular net that creates the macromolecular gel. The gelling-mechanism is called a low – water - activity gel or sugar - acid - pectin gel.

In low- ester pectins, ionic bridges are formed between calcium ions and the ionized carboxyl groups of the galacturonic acid. This is idealised in the so - called “egg box - model”. Low - ester pectins need calcium to form a gel, but can do so at lower soluble solids and higher pH - values than high - ester pectins .

Amidated pectins behave like low-ester pectins but need less calcium and are more tolerant of excess calcium. Also, gels from amidated pectin are thermo - reversible – they can be heated and after cooling solidify again , whereas conventional pectin-gels will afterwards remain liquid . High ester pectins set at higher temperatures than low-ester pectins. However, gelling reactions with calcium increase as the degree of esterification falls. Similarly, lower pH - values or higher soluble solids ( normally sugars ) increase gelling speed. Suitable pectins can therefore be selected for jams and for jellies, or for higher sugar confectionery jellies.

#### **4 - Sources and production :**

Apples , guavas , quince , plums , gooseberries , oranges and other citrus fruits, contain large amounts of pectin, while soft fruits like cherries, grapes and strawberries contain small amounts of pectin.

Typical levels of pectin in plants are ( fresh weight ) :

|                |             |
|----------------|-------------|
| apples         | 1–1.5 %     |
| apricot        | 1 %         |
| cherries       | 0.4 %       |
| oranges        | 0.5 – 3.5 % |
| carrots approx | 1.4 %       |
| citrus peels   | 30 %        |

The main raw - materials for pectin production are dried citrus peel or apple pomace, both by - products of juice production. Pomace from sugar-beet is also used to a small extent.

From these materials, pectin is extracted by adding hot dilute acid at pH - values from 1.5 – 3.5 . During several hours of extraction, the proto pectin loses some of its branching and chain - length and goes into solution. After filtering , the extract is concentrated in vacuum and the pectin then precipitated by adding ethanol or iso propanol. An old technique of precipitating pectin with aluminium salts is no longer used ( apart from alcohols and poly valent cations; pectin also precipitates with proteins and detergents ) .

Alcohol - precipitated pectin is then separated, washed and dried. Treating the initial pectin with dilute acid leads to low-esterified pectins. When this process includes ammonium hydroxide, amidated pectins are obtained. After drying and milling pectin is usually standardized with sugar and sometimes calcium-salts or organic acids to have optimum performance in a particular application

World wide, approximately 40,000 metric tons of pectin are produced every year .

## **5 - Uses :**

The main use for pectin is as a gelling agent, thickening agent and stabilizer in food. The classical application is giving the jelly-like consistency to jams or marmalades, which would otherwise be sweet juices . For household use , pectin is an ingredient in gelling sugar ( also known as " Jam Sugar " ) where it is diluted to the right concentration with sugar and some citric acid to adjust pH . In some countries, pectin is also available as a solution or an extract, or as a blended powder, for home jam making. For conventional jams and marmalades that contain above 60 % sugar and soluble fruit solids, high-ester pectins are used. With low - ester pectins and amidated pectins less sugar is needed, so that diet products can be made. Pectin can also be used to stabilize acidic protein drinks, such as drinking yogurt, and as a fat substitute in baked goods. Typical levels of pectin

used as a food additive are between 0.5 – 1.0 % - this is about the same amount of pectin as in fresh fruit .

In medicine, pectin increases viscosity and volume of stool so that it is used against constipation and diarrhea. Until 2002, it was one of the main ingredients used in Kaopectate, along with kaolinite. Pectin is also used in throat lozenges as a demulcent. In cosmetic products, pectin acts as stabilizer. Pectin is also used in wound healing preparations and specialty medical adhesives, such as colostomy devices. Also, it is considered a natural remedy for nausea. Pectin rich foods are proven to help nausea .

In ruminant nutrition, depending on the extent of lignifications of the cell wall , pectin is up to 90 % digestible by bacterial enzymes. Ruminant nutritionists recommend that the digestibility and energy concentration in forages can be improved by increasing pectin concentration in the forage .

In the cigar industry, pectin is considered an excellent substitute for vegetable glue and many cigar smokers and collectors will use pectin for repairing damaged tobacco wrapper leaves on their cigars.

Pectin is also used in jelly beans .

## **6 - Legal status :**

At the FAO / WHO joint Expert Committee on Food Additives and in the EU, no numerical acceptable daily intake (ADI) has been set, as pectin is considered safe.<sup>[10]</sup>

In the US, pectin is GRAS – Generally recognized as safe. In most foods it can be used according to good manufacturing practices in the levels needed for its application, “quantum satis”.

In the International Numbering System (INS) pectin has the number 440 . In Europe pectins are differentiated into the E numbers E440 (i) for non - amidated pectins and E440 (ii) for amidated pectins There are specifications in all national and international legislation defining its quality and regulating its use.

## **7 – History :**

Pectin was first isolated and described in 1825 by Henri Braconnot, though the action of pectin to make jams and marmalades was known long before. To obtain well set jams from fruits that had little or only poor quality pectin, pectin - rich fruits or their extracts were mixed into the recipe.

During industrialization, the makers of fruit preserves soon turned to producers of apple juice to obtain dried apple pomace that was cooked to extract pectin.

Later, in the 1920s and 1930s, factories were built that commercially extracted pectin from dried apple pomace and later citrus - peel in regions that produced apple juice in both the USA and in Europe .

At first pectin was sold as a liquid extract, but nowadays pectin is often used as dried powder that is easier to store and handle than a liquid .