

# Bake Apple: Cloudberry

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**Available online at**  
[www.sunshineagriculture.vitalbiotech.org](http://www.sunshineagriculture.vitalbiotech.org)

## Article History

Received: 5.08.2022

Revised: 16.08.2022

Accepted: 19.08.2022

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## INTRODUCTION

Cloudberry is an herbaceous, perennial plant species, often called as “pioneer plant” on accounts of its rapid growth, prior to other species, following soil disturbance on native peat land. Cloud berry is a flowering plant which belongs to family Rosaceae, it is native to cool temperate regions, alpine and arctic tundra and boreal forest. It produces amber coloured edible fruits and it is called by different names in different parts of the country like Cloudeberry, Nordic berry and Bake apple in Newfoundland and Labrador, Knotberry and Knoutberry in England and aqpiq or low bush salmonberry in Alaska and averin or evron in Scotland.

The cloudberry appears on the Finnish version of the 2 euro coin. The name of the hill *Beinn nan Oighreag* in Breadalbane in the Scottish Highlands means "Hill of the Cloudberreries" in Scottish Gaelic. Transactions of Camden's Britain (1637 edition) indicates the etymological origins of 'cloud-berry', the plant's name in old Lancashire dialect: 'Pendelhill [in Lancashire] advenceth itselpe up the skie and in the very top thereof bringeth forth a peculiar plant which, as though it came out of the clowdes, they tearme clowdes-berry'. In Norrland cloudberreries are known as Norrland's gold.

## Botany and Description

Cloudberry, botanically it is called as a *Rubus chamaemorus* belongs to the *Rubus* genus and is closely related to raspberry (*R. idaeus*), blackberry (*R. fruticosus*), black raspberry (common name for *R. leucodermis*, *R. occidentalis* and *R. coreanus*), and arctic bramble (*R. arcticus*). As a member of the *Rosaceae* family it is also related to strawberry (*Fragaria x ananassa*). Cloudberry (*R. chamaemorus* L.) is an octoploid species ( $2n = 56$ ).

This is the only species in group 3, *Chamaemorus*, under the genus *Rubus*. Cloudberry has been crossed with raspberry (*R. idaeus* L.,  $2n = 14$ ) both spontaneously and artificially, and crossed artificially with the bramble *R. fruticosus* L. ( $2n = 28$ ). However, all crossing offspring have been sterile. [Raspberry is in group 1 (*Idaeobatus*) and the bramble is in group 4 (*Eubatus*) under the genus *Rubus*.].

The plant grows up to a height of 10 to 25 cm, the leaves are alternate between having 5 and 7 soft, handlike lobes on straight, branchless stalk. Flowers are white in colour sometimes reddish tipped after pollination the flowers form a raspberry sized aggregate fruits consisting of 5 to 25 drupelets, each fruit is initially pale red and on ripening turns into amber colour in early autumn. Unlike most *Rubus* species, the cloudberry is dioecious, and fruit production by a female plant requires pollination from a male plant.

### Distribution and cultivation

Cloudberrys are a circumpolar boreal plant that grows naturally from 78° N to around 55° N in the Northern Hemisphere. They are found mostly in hilly terrain and moorlands south of 44° N. They thrive in the Nordic nations, but are uncommon in the Baltic States (Estonia, Latvia and Lithuania). They may be found all the way from northern Russia to the Pacific Ocean, as far south as Japan. Cloudberrys grow wild in Greenland, most of northern Canada, Alaska, northern Minnesota, New Hampshire, Maine, and New York in North America.

The indigestible seeds are excreted by birds and animals, resulting in widespread dissemination. Its rhizomes, which may grow up to 10 m (33 ft) long and grow around 10–15 cm (4–6 in) below the soil surface, spread farther, forming huge and dense berry patches. Cuttings taken in May or August provide a genetic clone of the parent plant. In Norway, the cloudberry grows in bogs, marshes, wet meadows, tundra, and at heights of 1,400

metres (4,600 feet) above sea level (between 3.5 and 5 pH). After selection and breeding at the Holt Research Centre in Tromsø, two female cloudberry varieties, Fjellgull and Fjordgull, and one male cloudberry variety, Apolto, have been produced for northern Norway.

### Content and uses

Cloudberrys are rich in polyphenols called ellagitannins and polyphenols that belong to the group of hydrolysable tannins (Landete, 2011). The content of ellagitannins in fresh cloudberrys is more than 300 mg/100 g (Koponen *et al.* 2007) and they are rich in vitamins C. The antioxidative and/or potential human health beneficial effects of cloudberry are mainly due to the ellagitannins, which have been shown to exhibit antiproliferative effects on certain human cancer cell types (Coates *et al.*, 2007, Battino *et al.*, 2009, ).

In addition, cloudberry contains some free ellagic acid, hydroxycinnamic acids, hydroxybenzoic acids, flavan-3-ols, flavonols (quercetin), and proanthocyanidins (cyanidin) (Mattila *et al.* 2006). Lignans and small amounts of carotenoids, mainly  $\beta$ -carotene, also exist in cloudberrys (Smeds *et al.* 2012, Lashmanova *et al.* 2012). Cloudberry contains large seeds, which make up 12 % of its fresh weight (Johansson *et al.* 1997) and 47 % of dry weight (Päiväranta *et al.* 2006). Cloudberry seeds contain large amounts of lignans, mainly medioresinol, lariciresinol, and syringaresinol (Smeds *et al.* 2012). The oil content of seed is 12 % of dry weight, whereas that of the fresh berries is 1.4 % (Johansson *et al.* 1997). The dominating fatty acids are linoleic acid (41 %),  $\alpha$ -linolenic acid (36 %), and oleic acid (14 %) (Johansson *et al.* 1997).

Cloudberrys are known to possess many beneficial and health promoting properties, such as strong antimicrobial activity against many harmful and pathogenic human bacteria, anti-adhesion activity against uro-pathogenic *E. coli*, anti-inflammatory activity in activated macrophages and antifungal activity. Cloudberry fruit is of

economic importance in Nordic countries, and it is a desired raw material for the food, beverage, and cosmetic industries. The juice is used by the food and beverage industry for liqueurs, jams, and jellies. After juice pressing the remaining press cake, cloudberry pomace, which largely contains seeds, is mainly used for seed oil extraction for the cosmetic industry

### CONCLUSION

Cloudberry (*Rubus chamaemorus*) is a perennial herb with boreal distribution and it is a desired raw material for the food, beverage and cosmetic industries. The juice is used by the food and beverage industries. Cloudberry are rich in polyphenols called ellagitannins, which are known to possess many beneficial and health-promoting properties, such as strong antimicrobial activity against many harmful and pathogenic human bacteria. And cloud berry is called as pioneer plant for its rapid growth and it has high economic importance in Finland.

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