

## Studies on Cape Gooseberry (*Physalis peruviana*)

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*Physalis peruviana* var. *latifolia* (*P. peruviana*) known as cape gooseberry or golden berry, belongs to Solanaceae family and is grown in Egypt, Colombia, South Africa, India, New Zealand, Australia, Zimbabwe, Kenya and Great Britain. Colombia is one of its largest producers, consumer and exporter<sup>1</sup>. The genus *Physalis* includes around 100 species characterized via fruits bearing an inflated calyx<sup>2</sup>. It is a tropical plant with hairy, fuzzy, heart-shaped, slender-pointed leaves bearing yellow flowers and orange edible fruits. They bear a thin defensive covering which resembles a Chinese lantern to guard them from birds and bugs<sup>3</sup>.

Present review deals in detail with cultivational, therapeutic and nutraceutical aspects of *P. peruviana* fruit. It also briefly discusses its culinary advantages and few nutraceutical formulations that have been tried either through extract or juice. Cape gooseberry, (*Physalis peruviana*), also called goldenberry, species of ground cherry in the nightshade family (Solanaceae) and its edible fruit. The plant is native to Colombia, Ecuador, and Peru and was widely grown in South Africa beginning in the 19th century, which is likely the source of its common name. It is unrelated to true gooseberries of the genus *Ribes* (family Grossulariaceae). Cape gooseberries are bittersweet, slightly tart, and quite juicy. They have some of the acidity of a cherry tomato and notes of citrus fruits, pineapple, peaches, and cherries.

**Cultivation:** It has been widely introduced into cultivation in tropical, subtropical, and temperate areas such as Australia, China, India, Malaysia, and the Philippines. *P. peruviana* thrives at an annual average temperature from 13 to 18 °C (55 to 64 °F), tolerating temperatures as high as 30 °C (86 °F). It grows well in Mediterranean climates and is hardy to USDA hardiness zone 8, meaning it can be damaged by frost. It grows well in rainfall amounts of 800–4,300 mm (31–169 in) if the soil is well drained, and prefers full sun or partial shade in well-drained soil, and grows vigorously in sandy loam. The plant is readily grown from seeds, which are abundant (100 to 300 in each fruit), but with low germination rates, requiring thousands of seeds to sow a hectare.[2] Plants grown from year-old stem cuttings will flower early and yield well, but are less vigorous than those grown from seed.

**Nutrition:** According to nutrient analyses by the USDA, a 100 g serving of Cape gooseberries is low in food energy (222 kilojoules or 53 kilocalories) and contains moderate levels of vitamin C, thiamin and niacin, while other nutrients are negligible (see table). Analyses of oil from different berry components, primarily its seeds, showed that linoleic acid and oleic acid were the main fatty acids,



beta-sitosterol and campesterol were principal phytosterols and the oil contained vitamin K and beta-carotene.

**Pests and Disease:** Several diseases infest *P. peruviana* including powdery mildew and *Alternaria*. When grown on poorly drained soil, the plants become prone to the attack of viruses and root rots. A host of bugs also infest the plants, namely cut worm, *Heliothis virescens* (Stem borer), *Epiplatys* species (Leaf borer), *Phthorimaea* (Fruit moth), *Phyllotreta vittula* (Flea beetle), *Leptinotarsa decemlineata* (Colorado potato beetle), and *Acalymma vittata* (Striped cucumber beetle). Plants grown in the greenhouse are usually attacked by aphids and white fly. The stored fruit is adversely infested by *Penicillium* and *Botrytis* molds.

**Harvesting, Yield and Production Season:** In several parts of India, the fruit ripening season is of February and in the Southern region, crop season is from January to May. In southern as well as the central part of Africa, the crop season ranged from the early April to late June. In England, plants are sown from seeds in spring, begin to bear fruit from August and it continued till strong frosting. *P. peruviana* fruits are harvested when the calyx turns to a pale tan colour and the berry is bright orange or gold. Green fruits should not be harvested as these often fail to ripen properly with good sweetness and may be toxic. At full ripeness, the fruit falls from the plant. Fruit for processing can be shaken from the plant or picked from the ground, but fruit for fresh sale should be harvested from the plant. The fruits are either twisted off gently or cut with secateurs. Whatever technique is applied calyx is critical and should remain intact/ undamaged. The fruits should be harvested in dry weather when the plants are quite dry and morning dew has evaporated.

**Packaging:** Fruits with open or burst calyx should be discarded together with under-ripe fruits and those damaged through handling or disease. Calyx should be dried completely before packing. The fruits should be dried gently undercover on sheets of card or slatted wood; fans can be used if required. Once the fruits are dry, they may be given a final grading and sorting for size before packing into lidded punnets. It is mandatory to mention the name, address or mark of dispatcher, nature and origin of produce and specifications related to size, class and quantity. Package specifications also include the net weight of the product, storage temperature and handling instructions.

**Culinary Preparations:** In most centuries, *P. peruviana* used to be cultivated for direct consumption. Moreover, the fruits possess a good reputation in several international markets, such as Europe, where premium prices are paid for it. They have a distinct flavour and besides having great potential as fresh fruit. It can be consumed as fresh fruit, juices, salads, fruit cocktails, dipped in chocolate and other glazes, pricked and rolled in sugar or in cooked dishes, jams, natural snacks and fruit preserves. For desserts, it can be cooked with apples or ginger and stewed with honey. It has high pectin content, therefore can be canned as whole fruit, made into sauce and chutneys, ice-creams, pies and puddings. It can also be dried into flavoured raisins or used as a garnish.

**Jellies:** As compared to other species of *P. peruviana*, jellies obtained from Peruvian species was found to be more suitable for processing. Also, it was found to be sensory accepted jelly<sup>103</sup>. Influence of different sugars have also been checked out but it was found that though it may affect the physico-chemical and rheological properties (white refined, white crystal and demerara sugars being most suitable), it had no significant influence on sensory acceptability of jellies on consumers.

**Wine:** People use the fruit to make wine and the foremost factors which affect the sensory quality and alcohol content of wine are a level of saccharifying liquid and fermentation temperature.

## References

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