



A Comprehensive Review of *Physalis Peruviana* : Nutritional, Pharmacological, Horticulture, & Cultivation Aspects.

¹Akshada Pawar, ²Pradnya Patil, ³Jayesh Sabale, ⁴Vinaya Suryarao

Research Scholar , Assistant Professor

Siddhi's Institute of Pharmacy Nandgoan

Abstract : For centuries *Physalis Peruviana* fruits have been an essential part of human consumption for medicinal and nutritive purposes . Fresh fruits can help to nourish our body, acts as good and natural cleansers and protects our body from toxic metal. The Powder microscopical studies was carried and showed the presence of Abundant oil globules on the surface of epidermal cells and in the mesocarp region, (Parenchymatous Cells) and group of elongated stone cells. Simple, oval to rounded starch grains with conspicuous hilum in the centre of the starch grains, reddish content of tannin in the parenchymatous tissue, reticulate type of Xylem vessel, group of elongated stone cells.

IndexTerms - *Physalis peruviana* fruits, Nutritive, Parenchymatous Cells .

INTRODUCTION

Physalis is a genus belongs to family solanaceae. (1) It is a part of nightshade family and it refers to wide category that includes several species and resemblance characteristics. *Physalis* well known for producing fleshy, rounds and small fruits. These fruits wrapped with papery husk and adds to their rare appearance. (2) *Physalis Peruviana* usually known as Goldenberry or cape gooseberries. Broadly grown in south Africa, New zealand, Australia , Zimbabwe, Great Britain. Colombia is largest producers of [p.p] plant India" (in Maharashtra tropical & subtropical region) in India it called al "Rasbhari". *Physalis Peruviana* contain therapeutically active constituents multiple disease in treatment of multiple disease. (3)



Figure 1:Physalis Peruviana Plant



Figure 2 :PP. fruits

Taxonomical classification (4) (5)

- Common name: Cape gooseberry , Goldenberry .
- Synonym : The Peruvian groundcherry , Goldenberry, cape gooseberry .
- Biological source : The B. S. of this herb is the plant itself belongs to the Family solanaceae.
- Kingdom Phylum - Plantae
- Phylum : Streptophyta
- Order- Solanales
- Class : Equisetopsida
- Sub class- Magnolidae
- Genus : Physalis
- Species – Physalis Peruviana
- ❖ Parts of plant used : Fruits leaves whole plant , roots,aerial parts, & seeds aerial parts and seeds are also used .
 - Each part of plant have distinct medicinal properties.
 - Each part of plant include chemical properties which are effective.
 - Often depends on preparation and administration.
 - Physalis genus contain key medicinal elements .
 - In inflammatory conditions the stem , fruits and fruiting calyx is used from physalis genus .

A) FRUITS (6) :

Fruits are oval shaped ,smooth berry, nutritious, cherry sized yellowed-oranged in colour, consumed it raw, cooked or in jellies, jams. When vermicompost is added.

- No. of fruits per plant (29.94)
- Fruits yield (757.49g/plant)
- Avg fruit length (26.32 mm)
- Fruit width (25.78 mm)
- Fruit length (25.10 g)
- Fruit volume (24.47 ml)

Some Withanolides, flavonoids, Tannins, Alkaloids, Saponins, Carotenoids, Vitamins, Minerals, Physterols this are primary phytochemicals found in *Physalis peruviana* fruits. It has unique feature a papery calyx is

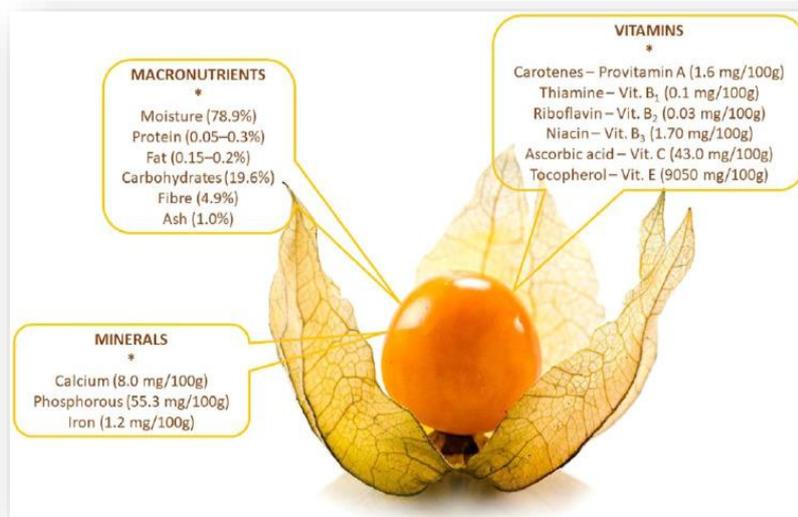


Figure 3: Biological and Phytochemicals

enclosing each berry.

B) LEAVES (7):

The leaves are extensively used part of *Physalis p.* plant.

- Leaves contain heart shaped and have a slightly serrated margin
- The leaves are placed in an alternating manner on the stem and can grow up to 6-15 cm in length.
- CC-Alkaloids, Flavonoids, polyphenols, Saponins, Tannins and Withanolides.

Withanoloids a group of steroidal lactones, are particularly significant as they exhibit various biological activities .

- Antioxidants
- Antimicrobial
- Anticancer

Leaves of PP. are often used to treat various ailments such as skin disorder, malaria, Asthma. It is typically prepared by Decoction, Infusion, poultices. Some chemical compounds like *Solanine* & *Solanidine* alkaloids are found out in stem which can be poisonous if it is ingested by humans, cattle or horses. Extract of *Physalis* leaves used in application for medicine and cosmetic.

C) STEM (8):

Each node gives rise to two buds out of which one is flowering and one is vegetative.

CC : flavonoids, Alkaloids, withanoloids .

Roots contain *cuscohygrine* .

Stem are rich in functional phytonutrients .

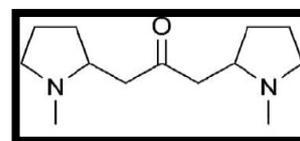


Figure 4: Cuscohygrine

3.1 System of medicine used – Ayurveda, Siddha, & traditional Chinese Medicine

3.2 Preparation of PP fruit juice and seeds : (9)

1. Fresh fleshy fruits of PPE are washed and mixed in speed blender for 15 minutes to eliminate the skin and seeds .
2. The fruit juice is filtered by the cheesecloth.
3. Fruit seeds are separated from skin and then freeze dried decrease the moisture to 15%.
4. That dried seeds are grinded and kept for 4°C for further process.

3.3 Preparation of extract : Ethanol extract (10)

1. Physalis Peruviana fruits were grinded by mortar and pestle.
2. The grinded materials soaked in ethanol at room temperature for one week.
3. Ethanol extract were filtered through cotton wool.
4. By decreasing the pressure the extract was dried on Rotary vacuum.
5. Evaporator at 40°C So it will obtain gummy paste.

3.1 Horticultrual Aspect : (11)

1. Physalis as a genus was first depict by ‘Linnaeus’ in 1753 .
2. Physalis P. within solanceace family under the genus physalis & species peruviana categorize by USDA – The United States Department of Agriculture.
3. The name ‘Physalis’ derived from Greek “ Physa” means bulb or bladder due to wrapped with papery husky give a unique appearance fruit.
4. The flower of these plant are hermaphroditic displaying yellow tubular corolla, making them appropriate for pollination via wind and insect.

3.2 Cultivation and Collection : (12) (13)

1. Traditionally PP. is undefined growth habit that means vegetative and reproduction meristem stay active whole time of plants life cycle. Simultaneously floral as well as fruits growth take place .
2. Accordingly, the plant synchronously undergoes blooming and fruit production.
3. The PP. fruit has special characteristics that it improves the weight and development and ripening the fruit while attach to PP plant.
4. After maturation of fruits, its colour swap from green to orange due to presence of cartenoids and breakdown of chlorophyll . during this phase the fruits get soften simultaneously, and ratio of soluble solid to titrable acidity rate increases.

In Arid region, well drained soil, sunny regions the PP. propogate in those region . A study demonstrated that the out come of colored shade nets on physicochemical properties of PP. in sub tropical zone .The study delibrate the titratable Acidity T.A/soluble solid S.S relation , Ph, Vit.C, and Anti-oxidant activity to figure out the quality fruits when it grows under white , black or blue shade nets .Through fertile soils it achieve the more growth of leaves and increase the fruit production .The tolerance rate if plants in wide soil pH range , from 4.5 to 8.2. Some cultivar’s maintain the temperature as low as -10C .



3.3 Chemicals Constitutents : (14)

Vit. B1,B2,B3,C,B6,Iron,Phosphorus,B-carotene, calcium, sodium, flavonoids, tannins, Alkaloids 3.37g, phenols 125.4mg, Anthocyanins 6.68ug/100g, cartenoids 1.53mg/100g.

Phytochemicals are :

- A. B-carotene ,Vit.C, phenolic acid, flavonoids, and total phenolic compounds .
- B. Bioactive compounds:
Include physallins, polysaccharides, alkaloids,flavonoids,
The most important and characteristics compound is *physicolins*.
- C. Other compounds include tannins, anthocyanins and cartenoids.

3.4 Analytical standards : (15)**1. Powder Microscopy** – In Powder Microscopy the different fragment of tissue were observed .

Following fragments of tissue were observed :

- Single elongated fibres.
- Epidermal cells in surface view.
- Elongated stone cells with narrow lumen .
- Groups of fibres

2. Physicochemical Analyzers : (16)

NAME OF PARAMETERS	VALUES (%)w/w
Description	Fruit powder brown in colour
Foreign Matter	Less than 1.0%
PH 1% w/v aq.solution	10.0
Total Ash	5.87
Acid insoluble Ash	0.88
Water soluble extraction	0.88
Alcohol extraction	22.5

3. Phytochemicals Analysis : (17)

Various solvent are used to crude drugs for extraction purpose. The phytochemical Activity of PP plant shows those chemicals by standard procedure .

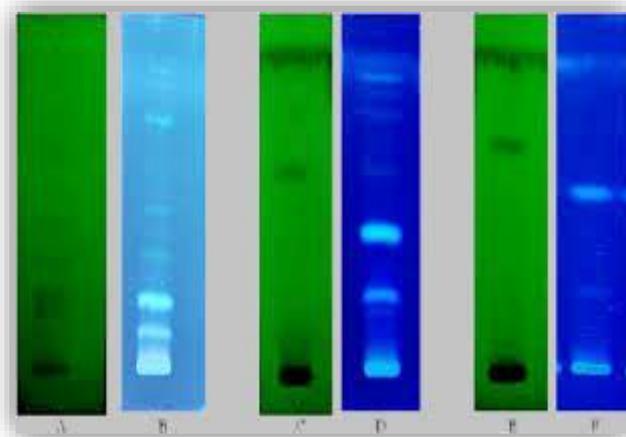
CONSTITUENTS	RESULT
Total phenolics contents(mg gallic acid /100g)	525
Total flavonoids content (mg quercetin /100g)	16
Saponins	3.1
Total antioxidant capacity (mg AAE/ 100g)	395

3.4.1 TLC (THIN LAYER CHROMATOGRAPHY) : (18)

Dried fruit Powder were extracted with Petroleum ether (60-80 OC), Chloroform and Ethanol is used by using Soxhlet extraction Apparatus. TLC studies of these extracts were carried out by using, available precoated plates with Standardized adsorption layers, i.e. Silica gel 60 F254, (Merck, Germany) at room temperature according the standard procedures.

- The TLC was carried out for the different extracts i.e. Hexane: Ethyl acetate (9:1) for Petroleum ether extract (PE); Hexane: Ethyl acetate (8:2) for Chloroform extract and Hexane: Ethyl acetate (2:8) for Ethanol extract of fruit powder. After developing the plates were dried under room temperature for 5-10 minutes and observed under UV-254 & UV-366.

Figure 6: a and b - Petrolleum ether extract uv-254 nm , uv - 366nm : **c and d**- chloroform extract, uv-254 nm, uv- 366nm : **e and f** -ethanol extract,uv-254nm,uv-366nm.



3.4.2 Preliminary Phytochemical tests for fruit of *Physalis peruviana* L.

Natural product group	Test for natural products	Extract used for the test	Presence (+)/ Absence (-)
Alkaloids	(a) Dragendorff's test .	Alcohol	+
	(b) Hager's test	Aqueous	-
	(c) Mayers's test	Alcohol	+
	(d) Wagner's test.	Alcohol	+
	(e) Benedict's test.	Alcoholic	+
	(f) Fehlings test	Aqueous	+
	(g) Molisch's test	Alcoholic	+
Carbohydrates	(a) Anthrone test	Aqueous	+
	(b) Benedict's test	Aqueous	-

3.4.2.1 Therapeutics uses : (19)

A. Immunity Booster :

Fruits contain Vit.C which acts against the infection .

Fruits are very beneficial for strengthening your immune system Vit.C protect body and prevent free radical damage and boost Immune system.

B. Skin healthy :

Physalis fruit contain Vit. C which acts as antioxidant property . Its protect from free radical damage .

ANTIOXIDANT :

Help to build collagen .

These fruits prevents acne, and skin problems like dermatitis .

C. Wound Healing :

- The one cup of physalis contain more than 50% of Vitamin C .
- Vitamin C play a major role of anti oxidant to form a collagen which contributes to wound

- It heals cut, wound , graze etc .

D. Anti inflammatory and cancer fighting properties :

- Physalis is rich in *withanolides* .
- Withanolides also called as steroids .
- Withanolides can fight against inflammatory conditions such as Arthritis lupus and inflammatory bowel disease . (IBD).

E. Cancer : (Anti cancer)

Withanolide is chemical constituent which can lower in the risk of cancer in body .

- Cancer cells are targeted by withanolide and cause a death .
- These chemical constituent plays a major rolr in prevention treatment of cancer .

F. Bone Health :

Calcium play vital role to building and maintaining bone mass .

- Mucus contraction .
 - Regulating Heart Rhythm .
 - Hormone production .
- Calcium helps to secrete the hormones. Which is important for body growth which include metabolism and growth .
- Support of healthy blood vessels .

G. **Jaundice** (20):

The main function of liver is to clear the bilirubin from the body. Bilirubin is an orange yellow pigment which are the part of RBC. Increase in bilirubin leads to jaundice which is yellowing of skin and eyes. Physalis peruviana has that potency to protect liver from damage (Hepatoprotective). PP contain such antioxidant properties like Vit. C and E , carotenoids . Those compounds cancel out the harmful free radicals, reducing oxidative stress level in liver. PP can heal and controlled out many liver functions by enhancing the regeneration of liver cells and improving the detoxification process.

3.4.2.2 Conclusion :

Physalis Peruviana l. have multiple pharmacological activities, nutritional properties and health effects were described in this paper. Technology development have allowed to establish various preliminary test to forecast the physicochemical composition in goldenberry. PP shows highest hepatoprotective and improved antioxidant status of liver by reducing oxidative stress level.

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