NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 10, ISSUE 6, June - 2024

PHYSALIS ANGULATE PHYTOCHEMICAL BIOACTIVE COMPOSITION (Review)

Professor Bobayev Isomiddin
Tashkent Institute of Chemical Technology

Hamzayeva Nargiza
PhD Student of Tashkent Institute of Chemical Technology
Email: galorisbk@mail.ru

Abstract
Physalis angulata Linn. (P. angulata L.), a medicinal and food plant in a number of tropical and subtropical countries, is widely studied for its beneficial properties. P. angulata L. has antibacterial, anti-cancer, anti-parasitic, anti-inflammatory, anti-fibrotic and anti-diabetic properties. Various chemical studies using these in vivo and in vitro models are described.

Keywords: Physalis angulata Linn., phytochemical analysis, polyphenols, in vivo, in vitro.

Introduction

Physalis angulata belongs to the Solanaceae family and includes more than 120 species. This plant forms a shrub up to 50 cm tall with glabrous or sparsely hairy stems. It has bell-shaped flowers and drooping spherical fruits. The fruits of Physalis angulata are very tasty and suitable for consumption. This plant is widespread in tropical and subtropical regions. A literature review revealed that Physalis angulata can be used as a herbal medicine for many ailments. It is known as an immune system booster and can be used in food, mainly in sauces (Ariyani Novitasari, 2024). In several regions of the world, extracts or infusions of this plant are used against malaria, asthma, and dermatitis. Chemical compounds isolated from Physalis angulata have shown antitumor activity against many cancer cells in vitro studies. In particular, in Japan, it was traditionally used for antipyretic purposes. This plant is used for intestinal and digestive problems and many other ailments such as wounds, cuts, etc. Its leaves are also used in salads. Studies have shown that Physalis angulata exhibits many therapeutic activities such as antiallergic, antiasthmatic, antileishmanial, antimalarial and immunomodulatory activity based on its chemical compounds. Phytochemical investigation of Physalis angulata revealed many primary and secondary metabolites such as carbohydrates, minerals, vitamins, lipids and phytosterols.

Polyphenols

The class of polyphenols is found in many plants and includes flavonoids, lignans, stilbenes. 8000 of them are known. Resveratrol is found most in green tea, long and wine. Including physalis angulate is among plants rich in polyphenols.

Basically, polyphenols are antioxidants for the body and protect against ultraviolet light and poisoning. At the same time, it is also useful for cancer and heart diseases. The stomach is also good for the intestines. Polyphenols are abundant prooxidants and sometimes exhibit anti-metabolic activity. They may also work against apoptosis. They can increase the amount, reduce the enzymes lypoxygenase and telomerase. Hydroxycinnamic and hydroxybenzene acids are 2 classes of phenolic acids. Hydroxybenzoic acid may not play a role in the human body. Some phenolic acids are found free in

vegetables and some are bound. And bound phenolic acids appear without acid, enzyme, hydrolysis. 270mg/kg is found in the fruit of red berries. The fruit of Physalis angulate is also a berry (Jayachithra Ramakrishna Pillai, 2022).

Polyphenols, including flavonoids (rutin, mangiferin, and kaempferol) and phenolic acids (gallic, caffeine, and ellagic acid), have been identified in Physalis angulata using several methods (Naira Carniel, 2017).

The structure of flavanoids consists of 2 benzene rings connected to a ring with 3 carbon chains. 4000 types of flavanones are found in plants. They are joined to C3 and C2 by a double bond and to C3 by an H bond. The bark of plants is very rich in flavanols. Because they will be enriched with sunlight. Flavanols can be in mono and poly molecular form. The combination of flavones is held by C4 and O2 molecules. They are saturated with 3 carbons.

Bioactivity of phytochemical compounds

The intestinal absorption of polyphenols depends mainly on their chemical structure. As an example, catechin is a phenolic compound with high bioactivity and has been detected in plasma and urine. Polyphenols pass through the small intestine unabsorbed. Because intestinal microbiome will be there. Tannins: Complex compounds are also classified as phenolic compounds. They have a larger molecular mass than protein, cellulose, starch. Soluble in water. They contain gelatin, alkaloids, protein precipitation. Tannins are secondary metabolites. Tannin is used in diarrhea and skin burns. Food products containing tannin are low in calories. Some tannin compounds are active against mutagens. Physalis angulata also contains tannin. Their slightly bitter taste indicates the presence of tannin. Tannins have antioxidant activity and protect cells from lipid peroxidase and oxidative stress. Fungus, yeast, bacteria, viruses stop their activity due to tannins. Propyl gallate cleans food and water bacteria. Tannins lower blood pressure and slow down the formation of blood clots. Lowers plasma fat level, reduces liver damage.

Saponins: Triterpene glucosides produce a foam when mixed with bitter-tasting, poisonous water. They are widely used in soap making, medicine, fire extinguishing, production of feed additives, production of carbonated water. They are soluble in both water and fat. For example: glycyrrhizin. They are glycosides that form 1 or more molecules attached to a sugar.

Primary phytochemical analysis

Alkaloids, carbohydrates, glucosides, saponins, tannins, phenol compounds in the liquid extract of Physalis angulata are determined by a standard protocol.

Determination of alkaloids

To identify them, a few drops of Mayer's reagent are added to the solvent-free extract. Alkaloid solution forms a cream-colored precipitate with Mayer's reagent. 50 mg of the solvent-free extract was mixed with slightly diluted HCl and a few ml of the filtrate was added, followed by 1 or 2 ml of Hager's reagent. He showed that the plant contains yellow alkaloids (Filibus Dogara, 2023).

Determination of phenol compounds

Put 1 ml of extract and 2 ml of distilled water in a test tube and drop a few drops of $FeCl_3$ on it. The appearance of a blue or green color indicates the presence of phenol. At the same time, 50 mg of extract is dissolved in distilled water and 3 ml of 10% acetate solution is added to it. A large white precipitate indicates the presence of phenolic compounds (Filibus Dogara, 2023).

Carbohydrates can be determined in 2 different ways.

1) Add 1ml of ethanol extract to a test tube along with 1ml of distilled water and 20 drops of boiling "Fahlin" solution. A red precipitate that sinks to the bottom of the test tube indicates the presence of sugar.

2) A red precipitate can also be seen with 2 ml of aqueous solution and 5-8 drops of boiling "Fahlin" solution.

Next method 100mg extract was dissolved in 5ml distilled water and filtered. 0.5 ml of filtrate and 0.5 ml of Benedict's reagent were added. This mixture was heated in a water bath for 2 minutes. Colored precipitates indicate the presence of sugar (Filibus Dogara, 2023).

Determination of glycosides

5 ml of physalis extract was placed in a test tube, 2 ml of glacial acetic acid was added to it, a few drops of FeCl3 solution were added, and 1 ml of concentrated H2SO4 was added to it. The appearance of the malla ring indicated the presence of a "deoxy cortelanide" with a sugar character. Next, 50 ml of extract was hydrolyzed for 2 hours using concentrated hydrochloric acid. Filtered in 2ml of filtrate, added 3ml of chloroform and shaken. The chloroform layer was separated, 10% ammonia was added, and a pink color indicated the presence of glycosides.

Determination of tannins:

1ml of 5% FeCl3 is added and solvent-free extract is added. A dark blue or greenish black derivative indicates the presence of tannins.

Analysis of saponins:

Different extracts of Physalis angulata were dissolved in 20ml of distilled water. It is stirred in the cylinder for 15 minutes, and if bubbles are formed, it indicates the presence of saponin. These analyzes show that Physalis angulata extract has different phytochemical compounds.

Conclusion

In conclusion, the antioxidant properties of P. angulata confirm the therapeutic potential of this plant. The current research may support future breeding programs and biotechnological approaches to optimize the beneficial compound present in P. angulata.

References:

1. Ariyani Novitasari, 1. E. (2024). Physalis angulata Linn. as a medicinal plant (Review). Biomed Rep.
2. Filibus Dogara, D. B. (2023). Phytochemical analysys and antimicrobial satudies of leaves and roots of P angulata. Merit research journal .
3. Jayachithra Ramakrishna Pillai, F. (2022). Chemical Composition Analysis, Cytotoxic, Antimicrobial and Antioxidant Activities of Physalis angulata L.: A Comparative Study of Leaves and Fruit. Molecules.
4. Naira Carniel, R. M. (2017). The effects of ultrasound-assisted extraction on polyphenolics compounds obtained from Physalis angulata using response surface approach. Ciência, Tecnologia de Alimentos e Engenharia de Alimentos.