World Journal of Biology Pharmacy and Health Sciences
eISSN: 2582-5542
Cross Ref DOI: 10.30574/wjbphs
Journal homepage: https://wjbphs.com/

(RESEARCH ARTICLE)

Check for updates

Pharmacognostical evaluation and herbal standardization of *Prunus Persica* pulp extract

Hema Arya and Minakshi Pandey *

School of Pharmacy, Sharda University, Knowledge Park III, Greater Noida, Uttar Pradesh, India, 201310.

World Journal of Biology Pharmacy and Health Sciences, 2025, 22(01), 164-171

Publication history: Received on 05 February 2025; revised on 06 April 2025; accepted on 08 April 2025

Article DOI: https://doi.org/10.30574/wjbphs.2025.22.1.0290

Abstract

The current study sets out to elucidate the morphological, physiochemical, phytochemical properties, and the analytical profile of *Prunus persica* (peach). *Prunus persica* with well-established nutritional and therapeutic values, has undergone a thorough pharmacognostic examination to elucidate its macroscopic and microscopic characters and quality identification, and purity of the raw material. The phytochemical investigation pointed to the presence of some significant bioactive compounds such as flavonoids, phenolics, and carotenoids that could be responsible for their antioxidant, anti-inflammatory, and anticancer activities. Physicochemical parameters of the extract, such as pH, viscosity, and solubility, were evaluated with the intent of developing standardization protocols. Such a complete study provides a platform for the therapeutic use of *Prunus persica* pulp extract in pharmaceutical formulations. The results suggest that standardization is indispensable for herbal drug preparation, ensuring uniformity and effectiveness in a clinical setting.

Keywords: *Prunus persica*; Physicochemical; Phenolic; Pharmacognostic; PPPE

1. Introduction

Humans have relied on nature to meet fundamental needs like food, clothes, shelter, transportation, fertilizers, and medicines. For thousands of years, plants have been the foundation of complex traditional medical systems that are still being developed today, offering new treatments to humanity(1). Through years of careful study, experience, and trial and error, early humans learned how to use plants for therapeutic purposes. Traditional medicines are age-old practices and long-time companions of mankind in fighting diseases and leading a healthy life. Indigenous communities have relied on their unique medicinal traditions for centuries, with the Indian, Chinese, and African systems being remarkably renowned(2). According to Rigveda, humans have learned to differentiate between edible and poisonous plants by observing animals. Traditional medicines are widely available, culturally accepted, affordable, and easily accessible(3).

Nature is the greatest library for pharmaceutical leads and a large variety of chemicals(4). One of the Indian-origin herbs is Peach or *Prunus Persica L.* The peach tree is a deciduous fruit tree that typically reaches a height of 10 to 13 feet under cultivation. Peach trees have rounded crowns with upward-extending branches covered in three to six-inch-long, dark green, deciduous leaves(5). Peach trees are known for their exquisite flowers that bloom in April before the new leaves emerge. These flowers come in solitary, semi-double, and double varieties, and they exhibit a wide range of colors, from bright yellow to deep crimson and even bi-colors(1). The beauty and variety of peach blossoms make them a striking feature of the tree, often heralding the arrival of spring with their vibrant display. Frosts in the late spring or an extremely cold winter can harm the blossoms(6). One of the most significant stone fruit crops in the Rosaceae family, the peach (*Prunus persica L.* Batsch.), is widely cultivated across temperate regions of the world. Peaches come in various sizes, from small to large, and are typically round with a slightly flattened shape. The skin can range in color

* Corresponding author: Minakshi Pandey.

from light yellow to vibrant red, and the flesh inside can be yellow or white, depending on the variety. The fruit is known for its velvety skin and juicy, sweet flesh(7). Peaches are a rich source of vitamins and minerals, including vitamin C, vitamin A, potassium, and dietary fiber, and offer a variety of health benefits. They contain antioxidants that help protect the body from harmful free radicals and are believed to have anti-inflammatory properties(5). Additionally, the fiber in peaches can aid in digestion and promote gut health. Peaches are a valuable addition to a healthy diet, offering a wide range of nutrients and potential health benefits(8).

There is no systematic pharmacognostic standardization for peach fruit. We have used peach fruit for the study and our work The following article contains the pharmacognostic data of *Prunus Persica* fruit as per World Health Organization guidelines for the standardization of herbal drugs(9).

2. Materials and Methods

2.1. Collection of fruit and authentication:

The *Prunus persica* fruits were assembled from Pithoragarh, Uttarakhand, India. The herbarium of *Prunus persica* fruits was sent to NISCAIR, New Delhi for authentication.

2.2. Phytochemical, pharmacognostic, and physiochemical evaluation

Prunus persica (PP) fruits were washed with water to remove the dirt, foreign matter, and hairy portion. The PP fruits were peeled, and the pulp was removed from the seed. The pulp was subjected to cold maceration using a hydroalcoholic solvent. About 200 grams of *Prunus persica* pulp was weighed and transferred into a conical flask with the help of a funnel. To the above conical flask, 70% methanol was added, and the flask was covered with foil and kept at room temperature for 96 hrs with intermittent shaking with the help of a glass rod(10). The PPP extract was filtered, and the filtrate was evaporated with the help of a rotary evaporator under reduced pressure. After the completion of evaporation, the percentage yield of the PPP extract was determined. Rate yield = Extract value/powdered value *100 the extracted drug is treated with petroleum ether to remove excess fat from the drug. Then it is used for further investigation.

2.3. Qualitative phytochemical screening

Phytochemical screening helps check the presence or absence of different phytoconstituents present in the herbal drug as reported by(11). Various tests for their specific categories were performed for alkaloids, glycosides, test for flavonoids, test for tannins, test for saponins, test for phenolics, test for carbohydrates, etc. Table 6 depicts the phytoconstituents present in the PPPE.

2.4. Infra-red Spectroscopy of Methanolic Extract

Infrared Spectroscopy is a most powerful tool for identifying the types of chemical bonds (functional groups) present in compounds(12). The wavelength of light absorbed is characteristic of the chemical bond as can be seen in the annotated spectrum. By interpreting the infrared absorption spectrum, the chemical bonds in a molecule can be determined. Dried powder of solvent extracts of fruit materials were subjected for FTIR analysis(13). 10 mg of the dried extract powder was encapsulated in 100 mg of KBr pellet, to prepare translucent ample discs. The powdered sample of each plant specimen was loaded in an FTIR spectroscope (Shimadzu, IR Affinity 1, Japan), with a Scan range from 400 to 4000 cm-1.

2.5. Pharmacognostic evaluation

Pharmacognostic evaluations were carried out for the *Prunus persica* fruit. The following parameters have been discussed from the pharmacognosy part.

2.6. Morphological Characters

The *Prunus Persica* fruit was observed for color, odour, taste, size, shape, touch, and fracture(14). These are the characteristics that can be measured using direct visualization. The observations and the outcome for the morphological characters are recorded in Table 1.

2.7. Foreign matter content

Herbal materials must be completely free from noticeable matter, stones, mouldy substances, or other moieties. Specific features or the smell were analyzed. Plant materials are completely liberated from some harmless foreign matter(15). Weighed the amount of herbal material was spread in a far layer and sorted the foreign matter into bunches by visual examination, utilizing an amplifying focal point (6× or 10×), and with the assistance of an appropriate sieve, as per the requirements for the herbal material. Filter the rest of the sample through a No. 250 sieve; dust is viewed as a mineral admixture. Gauge the bits of this arranged foreign matter inside the 0.05 g limit.

2.8. Determination of loss on drying

Loss on drying value reflects the information which can help to yield the volatile content of the aqueous content of the drug(13). Weighed 2.0 g of the PPPE in a tared small crucible and dried with the heat at 105 °C until constant weight. Each sample was performed in triplicate to ensure that it has reached its constant weight (Table 2).

2.9. Determination of ash value

Ash means inorganic matter. This ash value indicates the total concentration of inorganic components present in the PPPE. For its determination, the silica crucibles were previously weighed, and then 2 g of the powdered pulp was kept in it. It was ensured that the drug was evenly distributed within the crucible. The PPPE was placed within the silica crucible and heated up to 500-600º C temperature until a constant weight was observed. After maintaining the normal room temperature, the crucible was kept in a desiccator and determine the total ash content(16).

2.10. Quantitative Estimation of Total Ash

2.10.1. Acid Insoluble ash

Weighed ash was added to the 25ml of dilute hydrochloric acid and boiled for five minutes. Then the immiscible solution was filtered using the special ashless filter paper and hot water was used to remove the acidic impurities. Now the ashless paper was ignited at 450º C temperature till constant weight(17). Then the amount of AIA was calculated and depicted in Table 4.

2.10.2. Water soluble ash

Weighed total ash was dissolved in distilled water and then the filtration was performed using ashless filter paper. Then using the calculation, the water-soluble part of the ash was calculated and shown in Table 4.

2.10.3. Extractive Value

The extraction process includes the extracting of chemical constituents from the crude drug Solvent selection was done according to their polarity(18). The extraction was done using the Soxhlet apparatus. About 4 g of the *Prunus persica* pulp was taken and mixed with the methanol(19). The extraction process was followed for 6 hours and then the rest sample was taken. The solvent is evaporated, and the extractive value of the sample was calculated in Table 5.

2.10.4. Volatile oil determination

Volatile oils are sometimes called aromatic oils due to the specific aroma in the volatile oils. Volatile oils can be characterized by their odour, oily appearance, and their ability to be volatile at higher or room temperature. Volatile oil determination can be carried out by the steam distillation method. The distillate is collected in a pre-graduated tube and the aqueous phase is allowed to recirculation in the distillation assembly (12). In this study, the volatile oil was extracted using the Clevenger apparatus. In the first step, 25 gm of the drug was boiled in 220 ml of water and 30 ml of glycerol with the addition of porshulin chips. It was boiled for 3.5 hours with regular inspections. The temperature of the outgoing water was maintained. It should not be more than 25ºC After 3.5 hours assembly was settled off and then oil was collected.

2.10.5. Qualitative phytochemical screening

Phytochemical screening helps check the presence or absence of different phytoconstituents present in the herbal drug as reported by(11). Various tests for their specific categories were performed for alkaloids, glycosides, test for flavonoids, test for tannins, test for saponins, test for phenolics, test for carbohydrates, etc. Table 6 depicts the phytoconstituents present in the PPPE.

2.10.6. Infra-red Spectroscopy of Methanolic Extract

Infrared Spectroscopy is a most powerful tool for identifying the types of chemical bonds (functional groups) present in compounds(12). The wavelength of light absorbed is characteristic of the chemical bond as can be seen in the annotated spectrum. By interpreting the infrared absorption spectrum, the chemical bonds in a molecule can be determined. Dried powder of solvent extracts of fruit materials were subjected for FTIR analysis(3). 10 mg of the dried extract powder was encapsulated in 100 mg of KBr pellet, to prepare translucent ample discs(20). The powdered sample of each plant specimen was loaded in the FT-IR spectroscope (Shimadzu, IR Affinity 1, Japan), with a Scan range from 400 to 4000 cm^{-1}(21,22) The interpretation of the infrared spectroscopy of PPPE is shown in Table 7.

3. Results and Discussion

3.1. Morphological Characteristics

Table 1 Morphological Characteristics of *Prunus Persica* Linn. have been recorded in the Following

Sr. No.	Characteristic	Outcome
1	Colour	Golden orange
2	Odour	Pleasant
3	Taste	Sweet
4	Touch	Soft
5	Fracture	Uneven
6	Size	6.3cm
7	Shape	Rounded edges

3.2. Foreign matter determination

About 1.2% of the *Prunus Persica* fruit was contaminated with foreign matter.

3.3. Loss on drying

The results of the pharmacognostical parameter have been summarized in the following table 2.

Table 2 The Outcomes of Loss on Drying of PPPE

Sample No.	Empty weight of crucible	Initial weight of crucible with fruit (slices)	Final constant weight of crucible with fruit (Slices)	LOD	LOD (mean)
Crucible No. 1	27.48	49.48 gm	32.82 gm	75.7 %	76.6%
Crucible No. 2	28.50	48.50 gm	32.62 gm	79.4 %	
Crucible No. 3	27.50	47.50 gm	32.56 gm	74.7 %	

3.4. Ash Value Determination

Ash value was determined in 3 folds. The outcomes for all 3 types of ash have been recorded in the following Table 3.

The estimation of the total ash of PPPE was recorded in the following Table 4.

Table 3 Outcomes of Ash Value Determination of PPPE

S. No.	Wt. of Empty Crucible (g)	Wt. of Crucible + pulp powder (g)	Wt. of Ash + Wt. of crucible (g)	% Total Ash	Mean Ash
Crucible No. 1	28.81	31.61	28.90	3.2	3.26%
Crucible No. 2	28.93	31.78	29.03	3.5	
Crucible No. 3	28.64	31.56	28.73	3.08	

Table 4 Quantitative Estimation of Total Ash of PPPE

Ash type/ drug	Total Ash	Acid insoluble ash	Water soluble ash
Dried powdered drug	3.26 %	1.09 %	2.04%

3.5. Extractive value

The total extractive value was determined by using different solvents as per their polarity pattern. The outcomes for this parameter are given in the following Table 5.

Table 5 Determination of Extractive Value

Parameters	Me	EA	PE
Extractive value (gm)	22	16	12

3.6. Volatile oil Determination

VOD was carried out using the Clevenger apparatus. We have found 4.66 ml of volatile oil in PP fruits.

3.7. Qualitative Phytochemical screening

The outcomes of the Phytochemical screening have been given in Table 6. Phytochemical screening was performed for 5 different extracts. Figure 1 and 2 demonstrates the practical outcomes of phytochemical screening.

Figure 1 Phytochemical Screening of PPPE in different solvents

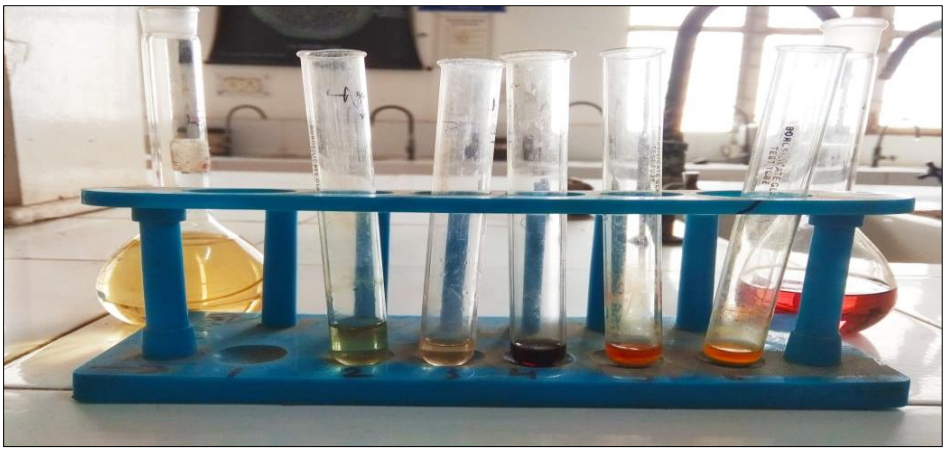

Figure 2 Phytochemical Screening of PPPE in different solvents

Table 6 Outcomes of Phytochemical Screening of PPPE in Different Solvents

S. No.	Phytoconstituents	Pet. ether Extract	Ethyl acetate Extract	Methanol Extract
1	Alkaloids	-	-	+
2	Glycosides	-	+	+
3	Tannins and Phenols	-	+	+
4	Flavonoids	-	+	+
5	Steroids/ Triterpenoids	-/-	-/-	+/-
6	Proteins and Amino acids	-	+	+
7	Carbohydrates	-	+	+
8	Fats and fixed oils	+	+	-

3.8. Infrared Spectroscopy

IR spectroscopy of methanolic extract of peach has been performed using BRUKER IR Spectrometer, and outcomes have been attached below

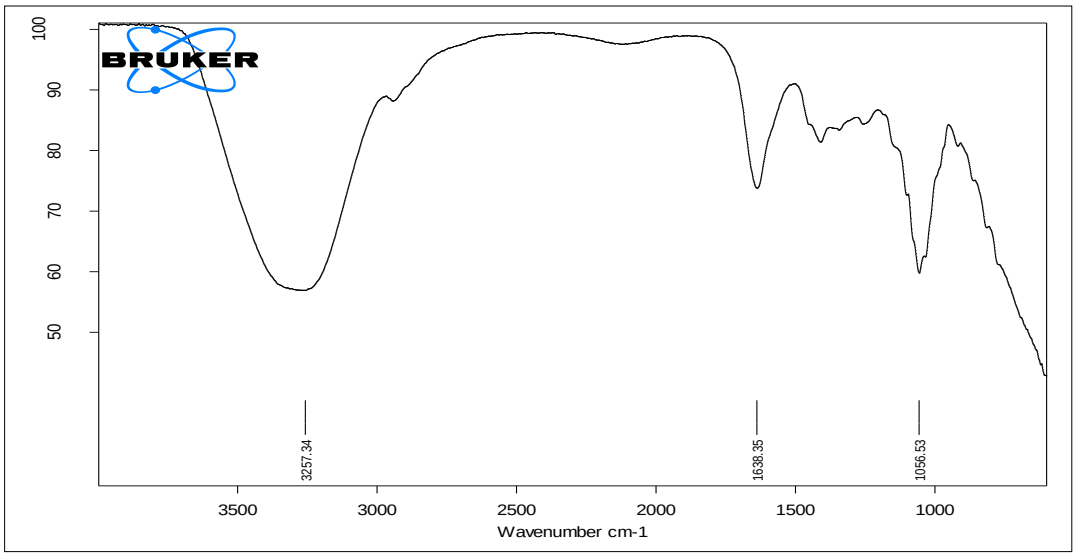

Figure 3 IR spectrum of PPPE

Table 7 Interpretation of IR Spectrum for PPPE

Wavenumber	Nature of Peak	Proposed Structure
3257 cm^{-1}	Broad medium	Alcoholic group
2935 cm^{-1}	Single peak with W shape	Methyl group
1638 cm^{-1}	Single, small intense	C=C stretching (Aromatics)
1056 cm^{-1}	Medium Intense	C-O stretching

4. Conclusion

Peaches are a common yet significant plant, they are consumed as a seasonal and nutritious fruit. This article presents a detailed pharmacogenetic and analytical evaluation of *Prunus Persica* pulp extract. The study includes the collection and authentication of the plant, the extraction process, and the pharmacogenetic evaluation of the extract. The pharmacogenetic evaluation includes the determination of morphological characteristics, foreign matter content, loss on drying, ash value, extractive value, volatile oil determination, and qualitative phytochemical screening. The study also presents the results of infrared spectroscopy of the methanolic extract of peach. Overall, this article provides valuable information on the pharmacogenetic and analytical perspectives of *Prunus Persica* pulp extract.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] (PDF) A Review on Peach (Prunus persica): An Asset of Medicinal Phytochemicals [Internet]. [cited 2024 Jul 5]. Available from: https://www.researchgate.net/publication/323258290_A_Review_on_Peach_Prunus_persica_An_Asset_of_Medicinal_Phytochemicals

[2] Kumar V, Sharma AK, Rajput SK, Pal M, Dhiman N. Pharmacognostic and pharmacological evaluation of Eulaliopsis binata plant extracts by measuring in vitro/in vivo safety profile and anti-microbial potential. Toxicology Research. 2018 May 8;7(3):454–64.

[3] Belhadj F, Somrani I, Aissaoui N, Messaoud C, Boussaid M, Marzouki MN. Bioactive compounds contents, antioxidant and antimicrobial activities during ripening of Prunus persica L. varieties from the North West of Tunisia. Food Chem. 2016 Aug 1;204:29–36.

[4] Bento C, Gonçalves AC, Silva B, Silva LR. Peach (Prunus Persica): Phytochemicals and Health Benefits. Food Reviews International. 2022 Nov 17;38(8):1703–34.

[5] Andreotti C, Ravaglia D, Ragaini A, Costa G. Phenolic compounds in peach (Prunus persica) cultivars at harvest and during fruit maturation. Annals of Applied Biology. 2008 Aug;153(1):11–23.

[6] Ukwubile CA, Malgwi TS, Ikpefan EO, Modu B, Umeano VA. Evaluation of physicochemical parameters, acute and subchronic toxicities, and anti-diabetic activity of Spondias venulosa (Engl.) Mart. ex Engl. leaf extract on alloxan-induced diabetic rats. Journal of Ethnopharmacology. 2023 Apr 24;306:116169.

[7] Shin TY, Park SB, Yoo JS, Kim IK, Lee HS, Kwon TK, et al. Anti-allergic inflammatory activity of the fruit of Prunus persica: Role of calcium and NF-κB. Food and Chemical Toxicology. 2010 Oct 1;48(10):2797–802.

[8] Adedapo AA, Falayi OO, Oyagbemi AA. Evaluation of the analgesic, anti-inflammatory, anti-oxidant, phytochemical and toxicological properties of the methanolic leaf extract of commercially processed Moringa oleifera in some laboratory animals. Journal of Basic and Clinical Physiology and Pharmacology. 2015 Sep 1;26(5):491–9.

[9] Zakaria NH, Majid FAA, Helmi NANM, Fadhlina A, Sheikh HI. Medicinal Potentials of Strobilanthes crispus (L.) and Orthosiphon stamineus Benth. in the Management of Kidney Stones: A Review and Bibliometric Analysis. Journal of Herbal Medicine. 2023 Dec 1;42:100773.

[10] Jeevitha M, Ravi PV, Subramaniyam V, Pichumani M, Sripathi SK. Exploring the phyto- and physicochemical evaluation, fluorescence characteristics, and antioxidant activities of Acacia ferruginea Dc: an endangered medicinal plant. Futur J Pharm Sci. 2021 Nov 13;7(1):228.

[11] Krishna TPA, Krishna TPA, Kumuthakallavalli R, Raj VNS, Juliet S, Rani TS, et al. Physico-chemical evaluation and biochemical quantification of crude drug powder (stem) of Chassalia curviflora (Wall. ex Kurz.) Thwaites; A folk medicinal plant. J Pharmacogn Phytochem. 2014;3(4):121–4.

[12] Thakur AV, Ambwani S, Kumar T. Preliminary phytochemical screening and GC-MS analysis of leaf extract of Acacia catechu (L.f.) Willd. International Journal of Herbal Medicine.

[13] Shukla RK, Kant R. Assessment of phytochemical screening by Fourier Transform Infrared spectroscopic analysis of peach (Prunus persica) seed biomass from Uttarakhand region of India. Journal of Applied and Natural Science. 2020 Nov 24;12(4):519–24.

[14] Magbool FF, Elnima EI, Alhassan MS. Pharmacognostic, Physicochemical Standardization and Phytochemical Analysis of Quercus infecoria galls. 6.

[15] Apraj V, Thakur N, Bhagwat A, Mallya R, Sawant L, Pandita N. Pharmacognostic and Phytochemical Evaluation of Citrus aurantifolia (Christm) Swingle PEEL. Pharmacognosy Journal. 2011 Oct 1;3(26):70–6.

[16] de Escalada Pla MF, González P, Sette P, Portillo F, Rojas AM, Gerschenson LN. Effect of processing on physico-chemical characteristics of dietary fibre concentrates obtained from peach (Prunus persica L.) peel and pulp. Food Research International. 2012 Nov 1;49(1):184–92.

[17] Singh S, Semwal B, Neeli G, Neeli G. Microscopic and Physicochemical Evaluation of Leaves of Sphaeranthus indicus Linn. Pharmacognosy Journal. 2017;9(1):21–6.

[18] Gilani AH, Aziz N, Ali SM, Saeed M. Pharmacological basis for the use of peach leaves in constipation. Journal of Ethnopharmacology. 2000 Nov 1;73(1):87–93.

[19] Oswal M, Varghese R, Zagade T, Dhatrak C, Sharma R, Kumar D. Dietary supplements and medicinal plants in urolithiasis: diet, prevention, and cure. Journal of Pharmacy and Pharmacology. 2023 Jun 1;75(6):719–45.

[20] Kumar S, Kumar V, Prakash O. Microscopic evaluation and physiochemical analysis of Dillenia indica leaf. Asian Pacific Journal of Tropical Biomedicine. 2011 Oct 1;1(5):337–40

[21] Arya H, Kumar G, Hanker V, Pandey M. Fractionation and In vitro Evaluation of Prunus persica Pulp Extract against Urolithasis. Journal of Chemical Health Risks. 2024 Sep 1;14(3).

[22] Hema Arya V, Kumar G, Begum F, Famurewa AC, Pandey M. Pharmacological Evaluation Of Prunus Persica Pulp Extract In Urolithiasis Rat Model. Afr. J. Biomed. Res. Vol. 27(3s) (September2024); 1878 – 1888.