WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 14, 1201-1208. Research Article ISSN 2277–

COMPARATIVE PHARMACOGNOSTICAL STUDY OF *NAVIN* AND *PURAN PIPPALI* (*PIPER LONGUM*)

Gurjar Hemwati[1*] and Singh Chandan[2]

[1]Ph.D. Scholar, Department of Dravya Guna Vigyana, Dr.Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur, Rajasthan.

[2]Professor & Head of the Department of Dravya Guna Vigyana, Dr. Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur, Rajasthan.

Article Received on
05 June 2025,

Revised on 25 June 2025,
Accepted on 13 July 2025,

DOI: 10.20959/wjpr202514-37637

***Corresponding Author**
Gurjar Hemwati
Ph.D. Scholar, Department of Dravya Guna Vigyana, Dr.Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur, Rajasthan.

ABSTRACT

Pippali (Piper longum Linn) is a significant Ayurvedic drug used in various therapeutic applications and as a key component in classical formulations such as Trikatu choornm, Panchakola choornm, and Pippalyasavam. According to the Ayurvedic Pharmacopoeia of India (API), Piper longum Linn is recognized as its source plant. Despite its limited cultivation in Rajasthan, Pippali continues to be widely utilized in the preparation of numerous formulations. Raw drug samples of Navin and Puran Pippali were collected from Udaipur, systematically labelled, and analyzed using standard pharmacognostic and phytochemical procedures. Morphological assessment revealed slight differences in size, shape, and appearance between the samples. Phytochemical analysis indicated variations in the intensity of steroids, alkaloids, and flavonoids across the specimens. Further qualitative evaluation using Thin-Layer Chromatography (TLC) with a Stationary Phase: Silica gelG60F254 and Mobile solution Toluene: Ethyl Acetate (6:4) Visualization: UV 366 nm was performed. The presence of the chemical composition of the samples, confirming variability among them.

KEYWORDS: Pippali, Piper longum Linn, Navin and Puran Pippali, Phytochemical analysis.

INTRODUCTION

Pippali (Piper longum Linn) is well-known for its efficacy on the Rasvaha and Pranvaha Srotas, playing a crucial role in managing Swasa, Kasa, and Jvara—three significant disorders associated with Pranavaha Srotas imbalance. The Urahsthana is Kapha-dominant, while Swasa primarily arises due to the vaigunya of Vata, particularly affecting Prana and Udana Vayu. Given Pippali's Kapha-Vata shamaka properties, it is extensively used for therapeutic purposes.

Pippali is utilized both as a single drug and as a key ingredient in approximately 320 classical Ayurvedic formulations, including Trikatu choornm, Panchakola choornm, Pippalyasavam, Ayaskriti, Amritarishtam, and Chyavanprasam. Ayurvedic scholars have long emphasized the concept of Kala Prakarsha in their texts. Acharyas Sharangdhara and Bhavamishra have elaborated on this principle at various instances in their respective Samhitas.

Most Dravyas are employed in their fresh form (Navin Dravya) for single drug usage or formulations, except for six specific substances—Vidanga, Krushna, Guda, Dhanya, Aajya, and Makshika. Acharya Charaka underscores the importance of evaluating a drug based on its nature, quality, and specific pharmacological actions, ensuring maximum therapeutic efficacy. This highlights the necessity of revalidating Ayurvedic concepts through scientific methodologies, particularly by assessing the qualities of Nava Pippali (fresh form) and Purana Pippali (aged form).

Systematic evaluation is essential to establish the identity, purity, and quality of Pippali. While it is widely used in practice, the period of collection and time of usage significantly influence its classification as Nava or Purana. The absence of specific phytoconstituents may impact its therapeutic effectiveness. Quantitative phytochemical analysis is crucial to determine the concentration of key bioactive compounds responsible for its medicinal properties. Through this study, the presence, absence, and concentration of phytoconstituents in Nava and Purana Pippali can be established, ensuring their therapeutic relevance. Additionally, the research can aid in determining the antipyretic activity of both forms, thereby validating their safety, quality, and efficacy.

MATERIALS AND METHODS

Sample collection

The genuine samples of Pippali (Piper longum Linn) were collected from Udaipur. They were shade dried and packed in zip lock polythene bag and labelled as Navin(N) and Puran(P) sample.

Assessment of Organoleptic Characters

Organoleptic characters of samples such as kind, shape of spike, size of spike, colour, texture, broken surface, odour and taste were recorded and compared as with API 2,3 standards.

Assessment of Microscopic Characters

Microscopic evaluations Powder Microscopy of fruit *Churna* samples were done.

Physico-chemical Screening

Physico-chemical values of loss on drying, total ash, acid insoluble ash, alcohol soluble extractive and water soluble extractive were calculated as per API2. The samples were detected for the presence of Phytoconstituents like steroids, flavonoids, alkaloids etc.

TLC

Thin Layer Chromatography (TLC) was performed to assess the phytochemical composition of Navin and Puran Pippali, helping to establish differences in their bioactive constituents. The TLC technique involved

- **Stationary Phase:** Silica gel G60F254
- **Mobile Solution:** Toluene: Ethyl Acetate (6:4)
- **Visualization:** UV at 366 nm

RESULTS

Macroscopic evaluation Result of macroscopic characters of all the Pippali fruit samples observed are shown in table 1 and figure1

Table 1. Macroscopic Characters of Pippali Samples.

	Characters as API							
Sample	**Kind**	**Shape of spike**	**Size of Spike**	**Colour**	**Texture**	**Broken Surface**	**Odour**	**Taste Length**
	Berry	Cylindrical	Length 2.5 to 5cm Breadth: 0.4 to 1cm	Greenish black to black	Woody	6 to 12 fruitlets arranged around a central axis	Aromatic	Pungent
Navin	+	+	+	Greenish Black	+	+	+	+
Puran	+	+	+	Dark Greenish Black	+	+	+	++

+ Indicates similar feature

Microscopic Evaluation

Powder Microscopic evaluation was done for *Navin* and *Puran Pippali* fruit.

Powder Microscopy

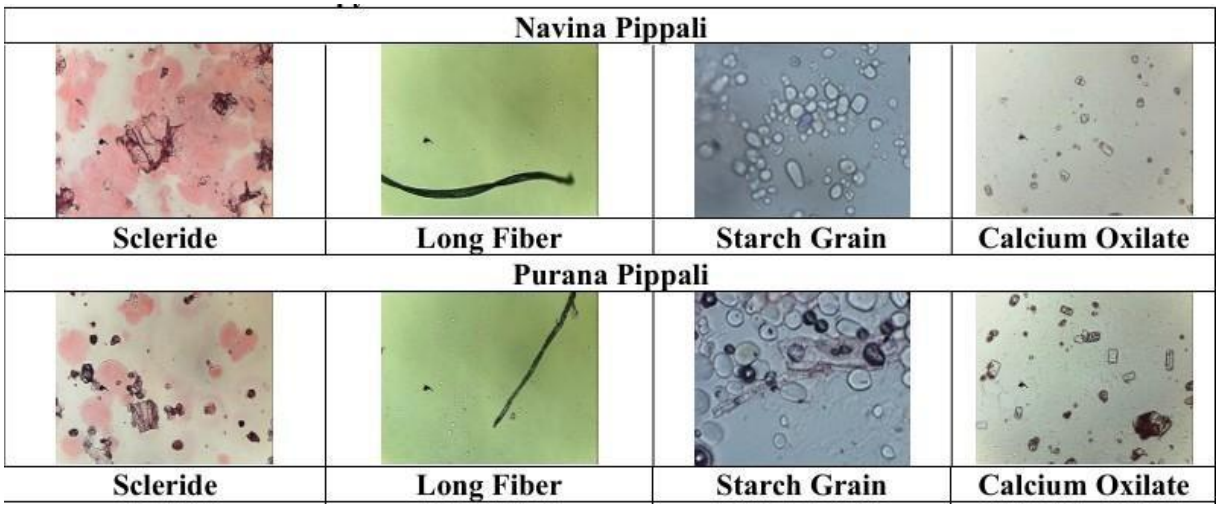


Fig. 1: Powder Macroscopic Characters of *Navin* and *Puran Pippali.*

Results of Qualitative Test Done in *Navin* and *Puran Pippali* Samples

The methanolic extract of market samples showing following chemical constituents are shown in table 2

Table 2: Qualitative Analysis.

Samples	Navin Pippali		Puran Pippali	
	Aqueous Extract	Ethanol Extract	Aqueous Extract	Ethanol Extract
Carbohydrate	+++	++	+++	++
Alkaloids	+++	++	+++	++
Amino acids	+	-	+	-
Protein	++	+	++	+
Saponin	+	-	+	-
Glycosides	+	-	+	-
Phenolic compound	+	+	+	+
Steroids	+	-	+	-
Tannins	++	+	++	+

Physico-Chemical Evaluation of Navin and Puran Characters observed are mentioned in table 3,4,5,6.

Table 3: Physico Chemical Evaluation.

Name of sample	Loss on drying (%)	Total ash (%)	Acid insoluble ash (%)	Water soluble ash (%)	Water soluble extractive (%)	Alcohol soluble extractive (%)
API		Not >7	Not>0.5		Not>7	Not>5
Navin	8.65	6.25	2.68	4.58	16.65	11.41
Puran	6.91	6.89	2.74	4.81	17.65	11.89

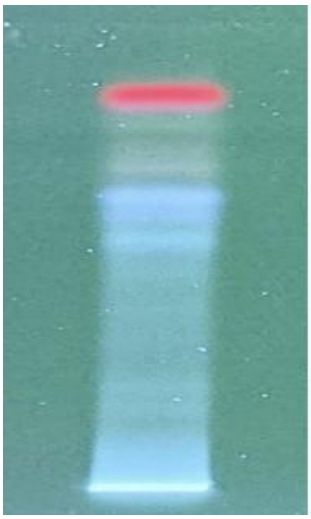
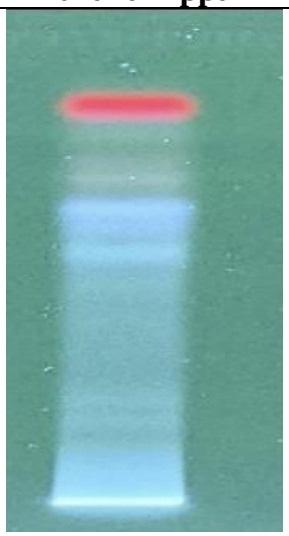
Table 4: Microbial contamination.

S.No	Microbial contamination	Value		Reference Value	Test method
		Navina Pippali	Purana Pippali		
1	Total bacterial count	10^4/g	10^3/g	10^5/g	A.P.I, Part II, Vol-I, Appendices- 2.4
2	Total fungal count	10^2/g	10^1/g	10^3/g	

Table 5: Heavy metals.

S.No	Test for heavy metals	Value		Reference Value	Test method
		Navina Pippali	Purana Pippali		
1	Lead	2.658 PPM	2.685 PPM	NMT 10 PPM	A.P.I, Part II, Vol-I, Appendices- 2.3.7
2	Cadmium	0.158 PPM	0.175 PPM	NMT 0.3 PPM	
3	Arsenic	1.236 PPM	1.267 PPM	NMT 3 PPM	
4	Mercury	0.128 PPM	0.147 PPM	NMT 1 PPM	

Table 6: Thin Layer Chromatography.

Rf Value		Test method
Navina Pippali	**Purana Pippali**	
 **0.004, 0.175, 0.233, 0.442, 0.625, 0.686, 0.784, 0.860, 0.955**	 **0.008, 0.176, 0.237, 0.446, 0.624, 0.684, 0.784, 0.858, 0.954**	**Stationary Phase: Silica gelG60F254 Mobile solution Toluene: Ethyl Acetate (6:4) Visualization: UV 366 nm**

DISCUSSION

Macroscopic and Microscopic Evaluation

Navin and Puran Pippali exhibited slight variations in macroscopic characteristics such as color and texture, with Navin Pippali appearing **greenish-black**, while Puran Pippali was **dark greenish-black**. The texture, odor, and taste were consistent with Ayurvedic Pharmacopoeia standards. Microscopic analysis of powder samples showed similarities, confirming structural integrity across both forms.

Phytochemical and Physicochemical Variations

- **Phytochemical Analysis:** The intensity of key phytoconstituents varied. Steroids were detected in *Navin Pippali* but absent in its *Puran Pippali* counterpart. Alkaloids and flavonoids were present in both samples, though their concentrations fluctuated.
- **Physicochemical Parameters:** Notably, Navin Pippali exhibited a higher loss on drying (8.65%) compared to Puran Pippali (6.91%), which might indicate differences in moisture retention and stability. The total ash content in *Puran Pippali* was slightly higher, implying a greater concentration of inorganic components. Water and alcohol-soluble extractive values also varied slightly, affecting solubility and bioavailability.

Microbial and Heavy Metal Analysis

Both samples were evaluated for microbial contamination and heavy metal content, adhering to safety standards

- **Microbial Count:** *Navin Pippali* had slightly higher bacterial and fungal counts, indicating possible differences in storage conditions or aging effects.
- **Heavy Metal Presence:** The concentrations of lead, cadmium, arsenic, and mercury in both samples remained well within permissible limits.

Thin Layer Chromatography (TLC)

TLC analysis revealed distinct Rf values, confirming slight variations in the chemical composition between Navin and Puran Pippali. This underscores the impact of aging on phytoconstituent profiles.

1. **Overall Similarity in Composition:** Both samples display closely matching Rf values across the TLC profile, indicating the presence of common bioactive compounds. This suggests that the fundamental phytochemical composition remains intact despite aging.

2. **Minor Variations in Rf Values:** Some differences were observed in the Rf values, particularly at the lower range (0.004 vs. 0.008) and middle segments (0.175 vs. 0.176, 0.233 vs. 0.237). These variations may point to
   - Shifts in chemical concentration due to aging.
   - Potential formation or degradation of minor constituents over time.

3. **Consistency at Higher Rf Values:** The high Rf spots (0.784–0.955) were nearly identical across both samples, reaffirming that key phytoconstituents such as alkaloids, flavonoids, and steroids remain stable in both forms.

4. **Implications for Therapeutic Activity:** Despite slight modifications, *Puran Pippali* retains essential bioactive compounds, making it pharmaceutically viable. The loss or reduction of specific compounds may impact pharmacodynamics, necessitating further exploration.

CONCLUSION

The study confirms significant biochemical differences between *Navin* and *Puran Pippali*, influencing its therapeutic efficacy. While both forms meet Ayurvedic Pharmacopoeia standards, the altered presence of steroids and moisture content

highlights differences in potency. These variations suggest that selecting the appropriate form based on Ayurvedic principles can optimize medicinal benefits.

The TLC analysis highlights that *Navin* and *Puran Pippali* share a largely consistent chemical profile, with minor shifts in Rf values that could influence therapeutic efficacy. The differences may affect bioavailability, potency, or drug formulation preferences in Ayurvedic applications.

REFERNCES

1. Bhavaprakasha Nighantu, (2006), Reprint, Comment. Dr. K.C.Chunekar, ed. Dr. G.S. Pandey, Chaukhambha Bharati Academy, Varanasi, Pg 15.
2. Sharma P.C., Yellne M. B., Jeniss T.J.,Database on medicinal plants used in Ayurveda and Sidd Vol 3 (2007) Central Council for Research in Ayurveda & Siddha, New Delhi.
3. Ayurvedic Pharmacopoeia of India, Vol-IV, Ministry of Health and Family Welfare, SGovt of India, 1st Edition, Dept of Indian Science of Medicine and Homeopathy, New Delhi, Controller of Publication Civil Lines, Reprint, 2001; pg:397.
4. P.K.Warrier, C.Ramankutty, VPK Editor. Nambiar, Indian Medicinal Plants, A Compendium of 500 Species, Vol-4.4thedition. Kottakkal: Universities press (India) Private Limited, p190.
5. The Ayurvedic Pharmacopoeia of India; Ministry of Health and Family Welfare, Department of Health, Govt. of India, Vol 4: 1st edition.Delhi. p.91-93.
6. TE Wallis; Text book of pharmacognosy CBS publishers & distributers 4th edition pg 575.
7. C.K Kokate, A,P,Purohit, S.B. Gokhale . Pharmacognosy 50 th .Pune; Nirali prakashan, 2014; 1-15.