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Pharmacotherapeutic Evaluation of Paribhadra Patra *(Erythrina variegata* LINN.) and Amalaki Phala (*Emblica officinalis* GAERTN.) Kwatha in the Management of Amlapitta (Hyperacidity)

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Abstract: ***Background: Amlapitta is a commonly encountered gastrointestinal disorder described in Ayurveda in association with disturbed Agni, Vidagdha Ahara and Pitta predominance. Its clinical manifestations overlap with symptoms commonly described in hyperacidity and related upper gastrointestinal complaints. The present study evaluated Paribhadra Patra and Amalaki Phala Kwatha as a combined Ayurvedic intervention.***
Aim: To evaluate the efficacy and safety of Paribhadra Patra (Erythrina variegata Linn.) and Amalaki Phala (Emblica officinalis Gaertn.) Kwatha in the management of Amlapitta.
Materials and Methods: A single-arm, open-label, prospective exploratory clinical study was conducted in clinically diagnosed patients of Amlapitta. Thirty-two patients were registered and 30 completed the study. The formulation was administered as 50 mL twice daily after meals for 30 days, with clinical assessment at baseline, day 15 and day 30 and follow-up. Pharmacognostical, physicochemical, preliminary phytochemical and TLC studies were also performed. Subjective outcomes were analyzed using the Wilcoxon signed-rank test and objective parametric variables by paired t-test.
Results: All six assessed subjective parameters showed statistically highly significant improvement ($p < 0.001$). Improvement was 74.09% in Tiktamlaudgara, 67.00% in Utklesha, 53.14% in Avipaka, 50.92% in Guruta, 40.71% in Klama and 32.37% in Aruchi. The overall mean symptom score decreased from 11.07 ± 3.42 to 5.03 ± 1.90, giving 54.58% overall improvement ($p < 0.001$). Fourteen patients showed significant improvement and 16 showed moderate improvement. No significant adverse effects were reported.
Conclusion: Paribhadra Patra–Amalaki Phala Kwatha demonstrated significant improvement in the clinical manifestations of Amlapitta and was well tolerated during the study period. Its probable action can be interpreted through Deepana, Pachana, Pittashamana, Kaphahara, Amapachana and Rasayana effects, together with reported antioxidant, anti-inflammatory and gastroprotective activities. Larger controlled studies are required for confirmation.
Keywords: Amlapitta; Hyperacidity; Paribhadra; Erythrina variegata; Amalaki; Emblica officinalis; Kwatha; Agni; Pitta; Dravyaguna; gastroprotection.

I. INTRODUCTION

Ayurveda places Agni at the centre of normal digestion, metabolism and maintenance of health. Disturbance of Agni may result in improper digestion, formation of Ama and subsequent Dosha-Dushya interaction. Gastrointestinal complaints are particularly influenced by irregular food habits, inappropriate dietary combinations, excessive intake of Pitta-provoking foods, disturbed sleep, sedentary behaviour and psychological stress.

Amlapitta is described in the Ayurvedic literature in association with Vidagdha Ahara and Pitta aggravation. The present study discusses Amlapitta as a condition in which impaired digestion and Pitta predominance produce manifestations such as Avipaka, Utklesha, Tiktamlaudgara, Aruchi, Guruta and Daha-related complaints. The disease therefore provides a useful clinical setting for studying the relationship between Agni, Pitta and Annavaha Srotas.

In contemporary clinical practice, symptoms of Amlapitta may overlap with hyperacidity, dyspepsia, gastritis and reflux-related complaints. Such overlap is useful for clinical communication, but Amlapitta should not be regarded as a direct one-to-one equivalent of a single modern disease entity. The present study therefore retains the Ayurvedic construct while using hyperacidity as a descriptive clinical correlate.

Management in Ayurveda emphasizes Nidana Parivarjana and restoration of Agni and Dosha equilibrium. Depending on the clinical presentation, Deepana-Pachana, Pittashamana and other suitable measures are employed. A formulation combining Paribhadra and Amalaki was selected because the two drugs provide complementary pharmacodynamic attributes: Paribhadra is considered useful for Deepana-Pachana and Kapha-related manifestations, while Amalaki is classically valued for Pittashamana and Rasayana effects.

II. RATIONALE OF THE STUDY

The present study identified Viruddha Ahara as the most frequently reported dietary etiological factor (36.6%), followed by Vidahi Ahara (30%), Ruksha Ahara (20%) and Ajirnashana (13.3%). Behavioural factors included Diwaswapna, Vegadharana, Ratri Jagarana and Atapa Sevana. Psychological factors such as stress, anxiety, anger and fear were also documented. These observations reinforce the multifactorial nature of Amlapitta and the need for treatment that addresses impaired digestion as well as Pitta-related manifestations.

III. AIM AND OBJECTIVES

1) To evaluate the clinical efficacy of Paribhadra Patra and Amalaki Phala Kwatha in Amlapitta.
2) To study the pharmacognostical characteristics of the selected drugs.
3) To evaluate physicochemical parameters and preliminary phytochemical constituents.
4) To assess the effect of the formulation on major clinical manifestations of Amlapitta.
5) To evaluate the safety and tolerability of the formulation.

IV. MATERIALS AND METHODS

A. Study Design and Setting

The study was an intervention-based, single-arm, open-label, prospective exploratory clinical study conducted at the Postgraduate Institute of Ayurveda, Dr Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur. The study protocol included clinical evaluation together with pharmacognostical and analytical assessment of the trial drugs.

B. Ethical Approval and Trial Registration

Ethical clearance was obtained from the Institutional Ethics Committee of Dr Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur (DSRRAU/PGIA/IEC/23-24/801; dated 03 January 2025). The clinical study was registered in the Clinical Trials Registry–India under CTRI/2025/04/084669, registered on 13 April 2025.

C. Study Population

Thirty-two clinically diagnosed patients were registered. Thirty patients completed the treatment protocol and two discontinued participation. Thus, the completion rate was 93.75%.

D. Inclusion Criteria

- Patients aged 16–50 years.
- Clinically and pathologically diagnosed Amlapitta.
- Disease duration of less than three months.
- Patients willing to participate and provide consent.

E. Exclusion Criteria

- Age below 16 or above 50 years.
- Major associated disorders/complications such as cardiac disease, emphysema or carcinoma.
- Pregnancy or lactation.
- Gastric malignancy.
- Recent gastrointestinal surgery.

F. Intervention

Paribhadra Patra (Erythrina variegata Linn.) and Amalaki Phala (Emblica officinalis Gaertn.) were administered in Kwatha form. The dose used in the study was 50 mL twice daily after meals. Treatment was given for 30 days, with clinical assessment at baseline, day 15 and day 30 and subsequent follow-up.

G. Outcome Assessment

Subjective assessment included Avipaka, Klama, Utklesha, Tiktamlaudgara, Guruta and Aruchi. Each symptom was graded from 0 to 3 according to severity.

H. Statistical Analysis

Descriptive statistics included mean, standard deviation and standard error. The Wilcoxon signed-rank test was used for subjective non-parametric. A p-value below 0.05 was considered statistically significant.

V. PHARMACOGNOSTICAL AND ANALYTICAL EVALUATION

Authentication and standardization of the raw drugs formed an important component of the study. The study reports macroscopic and microscopic examination, powder microscopy, physicochemical evaluation, preliminary phytochemical screening and TLC profiling.

A. Paribhadra (Erythrina variegata Linn.)

Paribhadra is described as a medium-to-large deciduous tree with trifoliate leaves. The pharmacognostical study recorded characteristic epidermal, mesophyll, vascular and crystal features. The transverse section of the leaf showed a single-layered epidermis, paracytic stomata, palisade and spongy mesophyll, collateral vascular bundle, sclerenchymatous bundle sheath and calcium oxalate crystals.

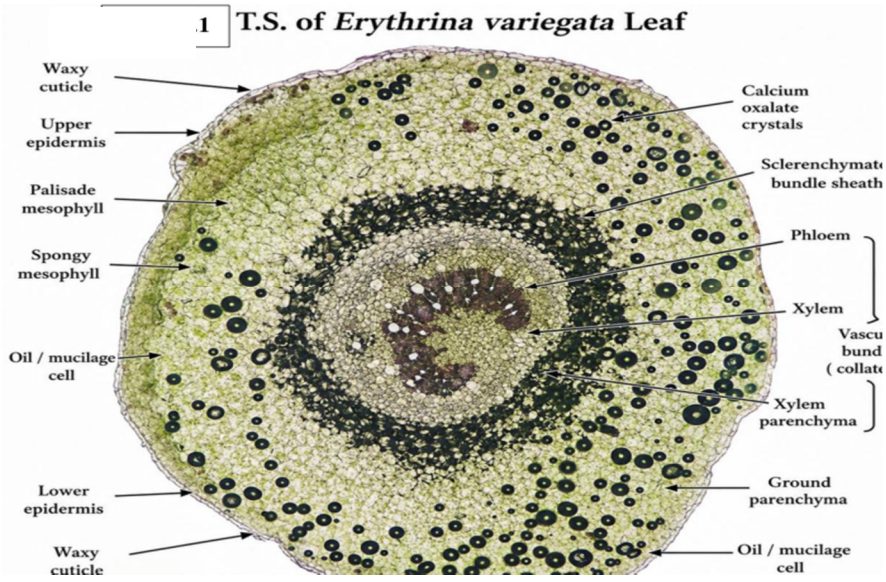


Figure 1. T.S. of Erythrina variegata leaf.

B. Amalaki (Emblica officinalis Gaertn.)

The fruit is globose, smooth and characteristically six-lobed. Microscopic examination showed a single-layered epidermis, parenchymatous mesocarp, sclereids, vascular bundles, tannin-containing cells and calcium oxalate crystals.

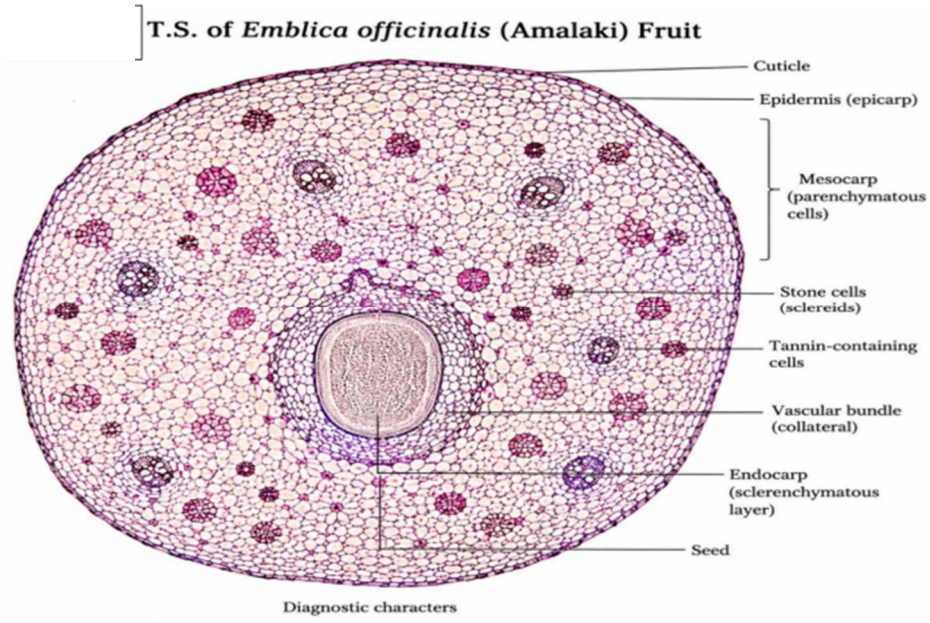


Figure 2. T.S. of Emblica officinalis (Amalaki) fruit.

C. Powder Microscopy

Powder microscopy was performed using organoleptic, microscopic and microchemical observations. The Paribhadra powder showed diagnostic fragments including sclerenchyma, stone cells, pitted vessels, parenchyma, epidermal fragments, trichome and calcium oxalate crystals.

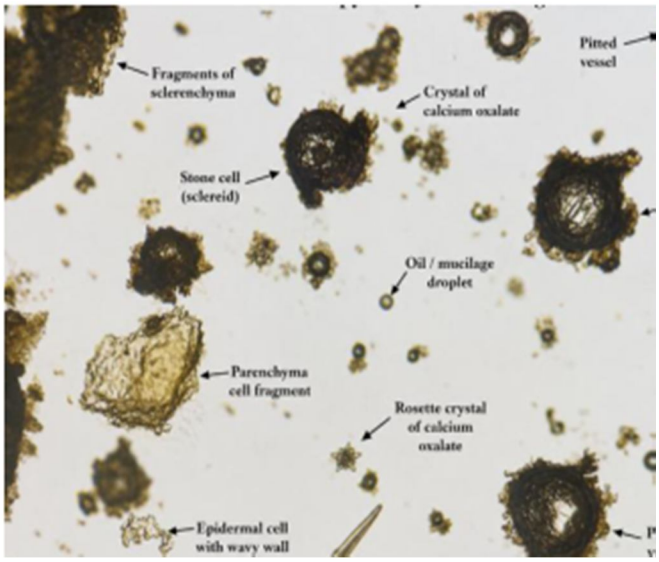


Figure 3. Powder microscopy of Erythrina variegata leaf .

VI. PHYSICOCHEMICAL, PHYTOCHEMICAL AND TLC FINDINGS

Physicochemical evaluation included determination of foreign matter, loss on drying, pH, total ash, acid-insoluble ash, water-soluble ash, extractive values in different mediums. The study revealed that the observed values were within the relevant permissible limits and were considered supportive of the quality of the raw materials.

Physical Evaluation

Sr. No.	Tests	Values for *Erythrina variegata*	Values for *Emblica officinalis*
1	Foreign Matter (%)	1.67 %	0.98 %
2	Loss on drying (%)	4 %	2.3 %

Physiochemical Evaluation

Sr. No.	Tests		Values for Erythrina variegata	Values for Emblica officinalis
1	pH of sample		6.4	3.5
2	Total ash (%)		13.3 %	3.5 %
3	Acid insoluble ash (%)		1.52 %	1.93 %
4	Water soluble ash (%)		0.87 %	2.3 %
5	Extractive values (%)	Distilled water	6.4 %	28 %
		Methanol	2.3 %	13.5 %
		Glacial Acetic acid	4.8 %	3.1 %
		Chloroform	3.8 %	2.3 %

A. Preliminary Phytochemical Screening

Paribhadra showed the presence of alkaloids, tannins, saponins, glycosides, proteins and carbohydrates. Amalaki showed tannins, proteins, alkaloids, saponins, glycosides, carbohydrates and ascorbic acid. These broad phytochemical classes provide a basis for further pharmacological investigation, although preliminary screening does not establish quantitative concentrations or identify a single active constituent.

Results of Physiochemical Analysis of *Erythrina variegata*

SR. NO.	TESTS	EXTRACT FOR TEST	OBSERVATION	RESULT
A.	Carbohydrate			
1.	Molisch test	Aqueous extract	Violet ring	+
2.	Benedict test	Aqueous extract	Brick- red ppt	+
B.	Alkaloids			
1.	Wagner's test	Ethanolic extract	Reddish brown ppt	+
C.	Amino Acid			
1.	Ninhydrin test	Aqueous extract	Blue purple colour	+
D.	Protein			
1.	Millon's test	Ethanolic extract	Red ppt	+
E.	Saponins			
1.	Foam test	Aqueous extract	Foam	+
F.	Glycosides			
1.	Keller-Killiani test	Acetic Acid Extract	Reddish brown ring	+
G.	Tannins			
1.	Ferric Chloride test	Ethanolic extract	Greenish black colour	+
2.	Vanillin test	Aqueous extract	Pink and red colour	+
H.	Reducing sugar			
1.	Benedict's test	Aqueous extract	Green or yellow colour	+

Results of Physiochemical Analysis of *Emblica officinalis*

SR. NO.	TESTS	EXTRACT FOR TEST	OBSERVATION	RESULT
A.	Carbohydrate			
1.	Molisch test	Aqueous extract	Violet ring	+
2.	Benedict test	Aqueous extract	Brick- red ppt	+
B.	Alkaloids			
1.	Wagner's test	Ethanolic extract	Reddish brown ppt	+
C.	Amino Acid			
1.	Ninhydrin test	Aqueous extract	Blue purple colour	+
D.	Protein			
1.	Millon's test	Ethanolic extract	Red ppt	+
E.	Saponins			
1.	Foam test	Aqueous extract	Foam	+
F.	Glycosides			
1.	Keller-Killiani test	Acetic Acid Extract	Reddish brown ring	+
G.	Tannins			
1.	Ferric Chloride test	Ethanolic extract	Greenish black colour	+
2.	Vanillin test	Aqueous extract	Pink and red colour	+
H.	Reducing sugar			
1.	Benedict's test	Aqueous extract	Green or yellow colour	+

B. Thin-Layer Chromatography

TLC was performed as a chromatographic fingerprinting procedure. For the Paribhadra sample, a silica gel 60 F254 plate was used. The study shows activation at 105°C for 1.5 hours, a toluene:methanol mobile phase in a 9:1 ratio and UV visualization at 366 nm. Five spots were recorded at distances of 1.8, 3.5, 5.6, 7.4 and 8.7 cm, corresponding to Rf values of 0.18, 0.35, 0.56, 0.74 and 0.87.

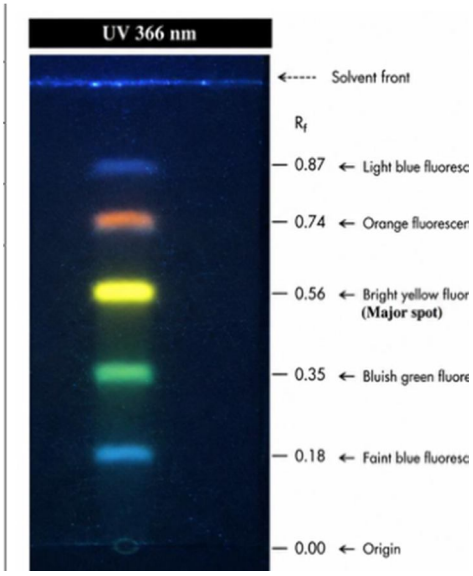


Figure 4. TLC profile of Erythrina variegata sample under UV 366 nm.

C. Pharmaceutical Preparation

The prepared medicine was packed under the proper pharmaceutical protocol. Standardization of raw material identity and analytical profile is important because variation in botanical material can influence the reproducibility of herbal clinical outcomes.

VII. CLINICAL ASSESSMENT

The six principal subjective parameters were Avipaka, Klama, Utklesha, Tiktamlaudgara, Guruta and Aruchi. These parameters were selected to capture digestion-related, Pitta-related and Kapha/Ama-associated manifestations described in the clinical protocol.

VIII. CLINICAL RESULTS

A. Patient Completion

Status	Number	Percentage
Registered	32	100%
Completed	30	93.75%
Dropout	2	6.25%

B. Age Distribution

Age group	Patients	Percentage
16–20 years	1	3.3%
21–30 years	7	23.3%
31–40 years	13	43.3%
41–50 years	9	30.0%

The largest proportion of participants belonged to the 31–40-year age group (43.3%), followed by 41–50 years (30.0%).

C. Gender Distribution

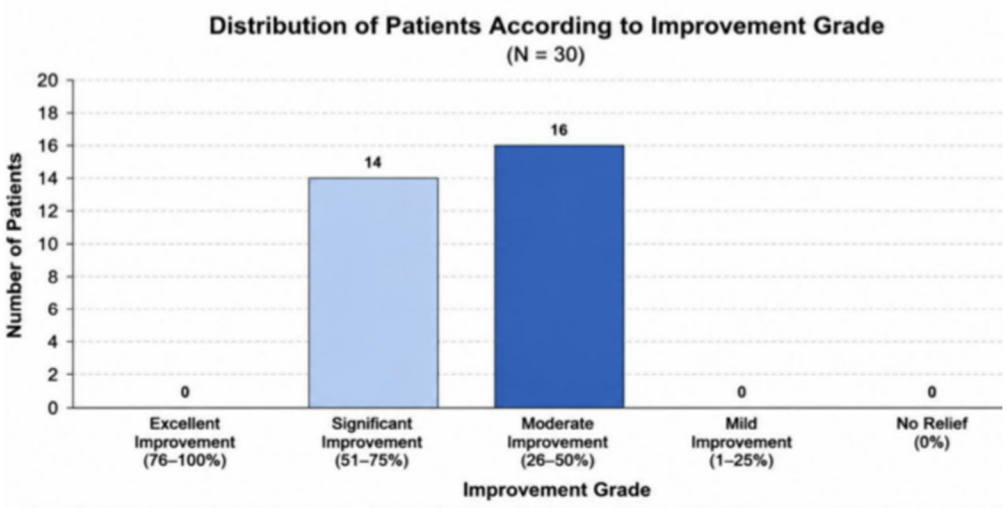
Gender	Patients	Percentage
Female	21	70.0%
Male	9	30.0%

D. Effect on Subjective Parameters

Parameter	BT Mean ± SD	AT Mean ± SD	Improvement	p-value
Avipaka	2.07 ± 0.83	0.97 ± 0.56	53.14%	<0.001
Klama	1.40 ± 0.93	0.83 ± 0.53	40.71%	<0.001
Utklesha	2.03 ± 0.96	0.67 ± 0.61	67.00%	<0.001
Tiktamlaudgara	2.20 ± 0.81	0.57 ± 0.50	74.09%	<0.001
Guruta	1.63 ± 1.03	0.80 ± 0.71	50.92%	<0.001
Aruchi	1.73 ± 0.98	1.17 ± 0.46	32.37%	<0.001

All six parameters showed statistically highly significant improvement. The greatest percentage reduction occurred in Tiktamlaudgara, while Aruchi showed the smallest percentage improvement, although the change remained statistically highly significant.

IX. OVERALL CLINICAL IMPROVEMENT



Improvement Grade	Percentage Range	Number of Patients	Percentage (%)
Excellent Improvement	76-100%	0	0.00%
Significant Improvement	51-75%	14	46.67%
Moderate Improvement	26-50%	16	53.33%
Mild Improvement	1-25%	0	0.00%

Figure 5. Overall improvement grading and overall clinical assessment.

A. Overall Clinical Score

Parameter	Value
Mean Total Score (BT)	11.07 ± 3.42
Mean Total Score (AT)	5.03 ± 1.90
Mean Reduction	6.04 ± 2.60
Mean Improvement	54.58%
Standard Deviation	2.60
p-value	<0.001 (Highly Significant)

B. Overall Improvement Grade

Improvement category	Percentage range	Patients	Percentage
Excellent improvement	76–100%	0	0.00%
Significant improvement	51–75%	14	46.67%
Moderate improvement	26–50%	16	53.33%
Mild improvement	1–25%	0	0.00%
No relief	0%	0	0.00%

Overall, 14 patients (46.67%) demonstrated significant improvement and 16 patients (53.33%) demonstrated moderate improvement. No participant was categorized as having excellent improvement, mild improvement or no relief.

C. Safety

No significant adverse effects were reported during the study period. The formulation was documented as well tolerated. Because the study was small and of limited duration, this finding should be interpreted as preliminary rather than definitive evidence of long-term safety.

X. DISCUSSION

A. Ayurvedic Interpretation

The clinical response can be interpreted in the context of Amlapitta Samprapti. Persistent Nidana Sevan leads to Dosha disturbance, particularly Pitta predominance, followed by impairment of Agni and formation of Ama/Vidagdha Ahara. Progression through the Annavaha Srotas produces the characteristic symptom complex. The formulation appears to act at several points of this sequence. Paribhadra is considered useful for Deepana and Pachana and may reduce Kapha and Ama-associated manifestations. Amalaki is classically recognized for Pittashamana and Rasayana effects and therefore complements the action of Paribhadra. The combination provides a plausible Samprapti-vighatana approach rather than merely masking individual symptoms.

B. Symptom-wise Interpretation

Tiktamlaudgara showed the greatest improvement (74.09%). This symptom is closely related to the central clinical expression of Amlapitta and may reflect reduction of the Vidagdha/Pitta component. Utklesha improved by 67%, suggesting a favorable effect on nausea and the associated Pitta-Kapha disturbance.

Avipaka improved by 53.14%, consistent with the Deepana-Pachana rationale of Paribhadra and the supportive digestive role attributed to the combination. Guruta improved by 50.92%, which may be interpreted in relation to reduction of Kapha/Ama-associated heaviness.

Klama improved by 40.71%. Fatigue may be multifactorial and can be influenced by digestion, sleep, diet and mental factors; therefore a moderate response is plausible. Aruchi showed the lowest improvement (32.37%), although the statistical significance remained high. Restoration of appetite may require longer correction of Agni and dietary behaviour.

C. Interpretation of the Overall Result

The overall 54.58% improvement indicates a clinically meaningful reduction in the aggregate symptom score. The result was statistically highly significant ($p < 0.001$). The finding is supportive of therapeutic potential, while the exploratory design requires cautious interpretation because there was no parallel control group.

XI. PROBABLE MODE OF ACTION

Amlapitta Samprapti	Paribhadra–Amalaki Kwath Karma
Nidana Sevana (Aharaja, Viharaja, Manasika)	Nidana Parivarjana Support, Agni Deepana
↓	↓
Pitta Pradhana Tridosha Dushti	Pitta-Kapha Shamana
↓	↓
Mandagni → Ama Utpatti	Deepana, Pachana, Ama Pachana
↓	↓
Vidagdha Ahara & Amla-Drava Guna Vriddhi	Amla-Pitta Shamana, Pachaka Pitta Regulation
↓	↓
Annavaha Srotodushti	Srotoshodhana, Grahi, Ropana
↓	↓
Urdhvaga Amlapitta (Avipaka, Utklesha, Tikta-Amla Udgara, Hrit-Kantha Daha)	Shoolahara, Dahahara, Chhardi Nigrahana, Pittashamana
↓	↓
Amlapitta Lakshanas	Restoration of Agni, Dosha Balance & Gastric Mucosal Protection
↓	↓
Disease Manifestation	Reduction of Amlapitta Symptoms

Figure 6. Samprapti-based correlation and probable action of Paribhadra–Amalaki Kwatha .

A. *Paribhadra*

The Ayurvedic rationale for Paribhadra is based on its Tikta-Kashaya profile and Deepana-Pachana utility. In the present context, these properties may help correct Mandagni, support Amapachana and reduce Kapha-associated heaviness and Utklesha. Its role is therefore primarily directed toward the digestive and Ama-related components of the disease process.

B. *Amalaki*

Amalaki contributes Pittashamana and Rasayana effects. Its Sheeta Virya and Madhura Vipaka are relevant to Pitta-dominant symptoms, while its established antioxidant-rich phytochemical profile provides a contemporary rationale for mucosal protection. The combination may therefore reduce Daha-related irritation and support restoration of gastrointestinal homeostasis.

C. *Contemporary Pharmacological Correlation*

The study discusses antioxidant, anti-inflammatory and gastroprotective actions as possible contributors to the clinical response. Amalaki contains vitamin C, emblicanin A and B, gallic acid and ellagic acid, while Paribhadra contains flavonoids, alkaloids and phenolic constituents. These compound classes have been associated in the cited literature with antioxidant and protective activities. The modern interpretation should be regarded as a pharmacological correlation rather than proof of mechanism in the present clinical study. No mechanistic biomarker study was undertaken within this trial, so molecular pathways cannot be claimed as demonstrated outcomes.

XII. INTEGRATIVE DISCUSSION

A. *Pharmacognostical Relevance*

The characteristic microscopic features recorded for Paribhadra and Amalaki support botanical identity and provide useful quality-control markers. The T.S. of Paribhadra leaf demonstrated diagnostic tissue organization and calcium oxalate crystals, while the Amalaki fruit showed characteristic sclereids, vascular bundles and tannin-containing cells. Such observations are particularly relevant in herbal clinical research, where correct identification of the starting material is essential.

B. *Phytochemical Relevance*

Preliminary phytochemical screening revealed multiple classes of constituents in both drugs. The findings support a multi-component pharmacological model rather than a single-compound explanation. Nevertheless, preliminary tests are qualitative and should not be used to infer concentration or definitive therapeutic activity.

C. *Clinical Significance*

The strongest response was observed in symptoms most closely connected with the immediate digestive and Pitta-related presentation of Amlapitta. The improvement pattern is therefore compatible with the proposed Ayurvedic pharmacodynamics of the formulation. The absence of significant adverse effects during the treatment period further supports its short-term tolerability in the studied population.

XIII. LIMITATIONS

1) Small sample size and single-centre design.
2) Single-arm, open-label methodology without a control group.
3) Possibility of participant and observer bias.
4) Short treatment and follow-up duration for assessing recurrence and long-term safety.
5) Herbal phytochemical variability may influence reproducibility.
6) Comparative efficacy against standard therapy cannot be determined from this design.

XIV. FUTURE SCOPE

1) Randomized controlled trials with adequate sample size should be undertaken.
2) Comparative studies against standard Ayurvedic or conventional anti-hyperacidity therapy are warranted.
3) Multicentric trials may improve external validity and generalizability.
4) Long-term follow-up should assess recurrence, sustained benefit and safety.
5) Different dosage forms such as Kwatha, Ghana and Churna may be compared.

6) Mechanistic studies should evaluate gastric mucosal protection, oxidative stress, inflammatory mediators and acid-related parameters.
7) Standardization should include quantitative chromatographic markers wherever feasible.

XV. CONCLUSION

The present exploratory clinical study suggests that Paribhadra Patra–Amalaki Phala Kwatha is a promising Ayurvedic intervention for the management of Amlapitta. The formulation produced statistically highly significant improvement in all six assessed subjective parameters, with an overall improvement of 54.58%. The greatest response was observed in Tiktamlaudgara (74.09%), followed by Utklesha (67.00%), Avipaka (53.14%), Guruta (50.92%), Klama (40.71%) and Aruchi (32.37%).

From the Ayurvedic perspective, the response can be understood through Deepana, Pachana, Amapachana, Pitta-Kapha Shamana and Rasayana actions. From a contemporary perspective, the documented phytochemical composition provides a plausible basis for antioxidant, anti-inflammatory and gastroprotective activity. These interpretations are supportive rather than definitive mechanistic proof.

The findings are encouraging, but the absence of a control group and the relatively small sample size restrict firm conclusions about comparative efficacy. Larger randomized, controlled and preferably multicentric studies with standardized pharmaceutical preparation and longer follow-up are recommended.

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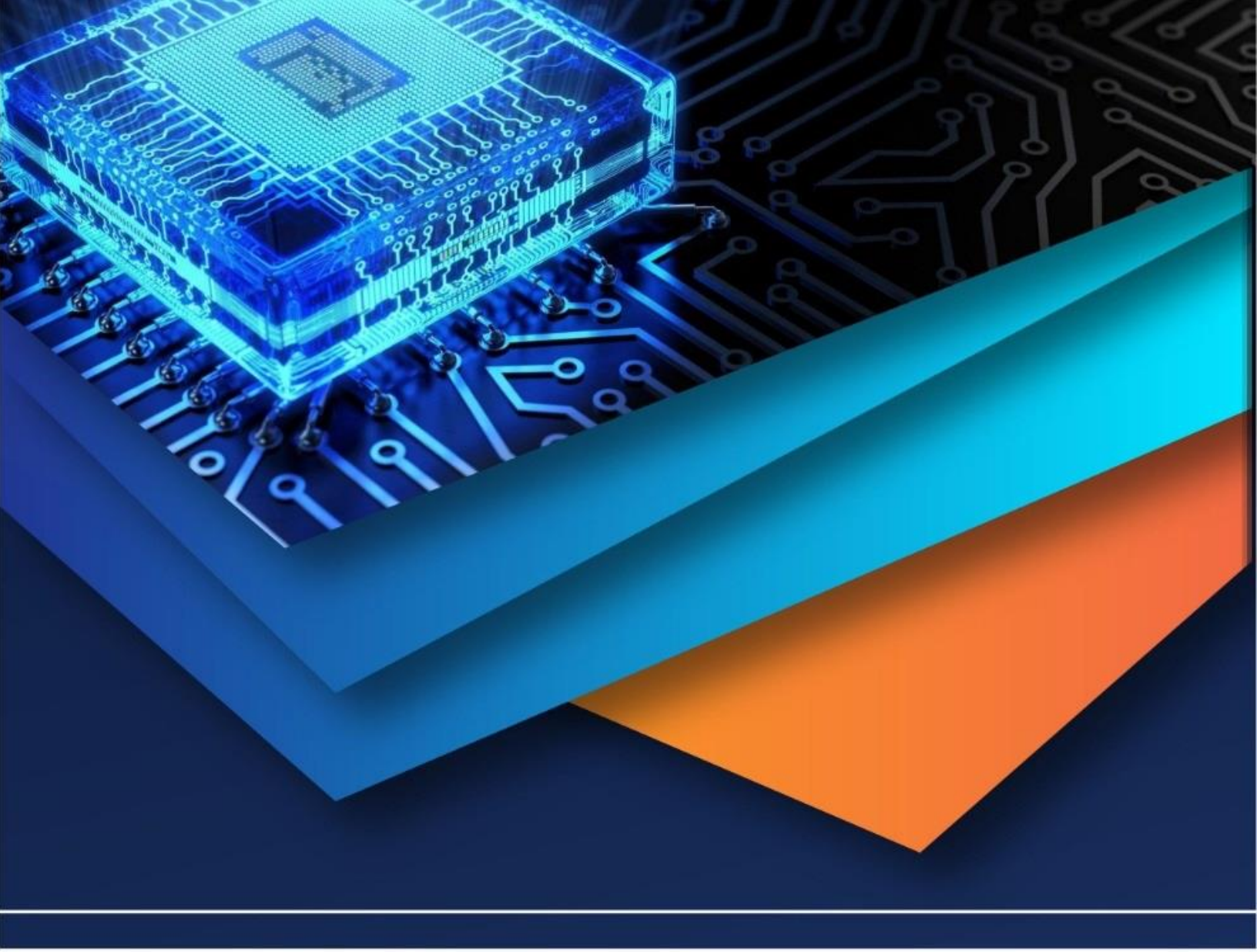

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