



A Comprehensive Review of Patranga (Caesalpinia sappan Linn.)

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DOI:10.21760/jaims.11.4.67

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Patranga (*Caesalpinia sappan* Linn.), a member of the Fabaceae family, is an important medicinal plant widely described in classical Ayurvedic texts such as Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya. It is attributed with properties like Raktastambhana, Vranaropana, Pittashamana, and Kushthaghna, indicating its significance in Rakta and Pitta disorders. Its Rasapanchaka, predominantly Kashaya–Madhura Rasa, Ruksha Guna, and Sheeta Virya, supports its therapeutic applications. The Phytochemical studies reveal the presence of bioactive compounds such as brazilin, tannins, and flavonoids, contributing to antioxidant, anti-inflammatory, antimicrobial, and antidiabetic activities. Clinically, it is widely used in gynecological disorders, gastrointestinal conditions, bleeding disorders, and wound healing. This review integrates classical Ayurvedic concepts with modern scientific findings, highlighting the therapeutic potential of Patranga and emphasizing the need for further research to validate its clinical efficacy.

Keywords: Patranga, *Caesalpinia sappan*, phytochemical, Raktastambhana, Vranaropana

Corresponding Author	How to Cite this Article	To Browse
Aditi Sharma, Post Graduate Scholar, Department of Dravyaguna, Post Graduate Training and Research Institute, Government Ayurvedic College, Patiala, Punjab, India. Email: aditivashisht399@gmail.com	Sharma A, Kaundal M, A Comprehensive Review of Patranga (<i>Caesalpinia sappan</i> Linn.). J Ayu Int Med Sci. 2026;11(4):466-473. Available From https://jaims.in/jaims/article/view/6424/	

Manuscript Received 2026-01-02	Review Round 1 2026-01-30	Review Round 2 2026-02-18	Review Round 3 2026-03-05	Accepted 2026-03-20
Conflict of Interest None	Funding Nil	Ethical Approval Not required	Plagiarism X-checker 10.59	Note

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Introduction

Ayurveda, the ancient holistic system of medicine, emphasizes the use of plant-based drugs for health promotion and disease management. *Patranga* (*Caesalpinia sappan* Linn.), a member of the Fabaceae family, is an important medicinal plant widely described in classical Ayurvedic texts as well as in Unani and Chinese systems of medicine.

Commonly known as Sappan wood, its heartwood is the chief medicinal part, valued for both therapeutic and industrial applications.

Classical texts such as the *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya* mention *Patranga* under synonyms like *Patanga* and *Kuchandana*, and classify it under various *Ganas* including *Salsaradi* and *Priyangvadi*.

It is attributed with significant pharmacological actions such as *Raktastambhana*, *Vranaropana*, *Pittashamana*, and *Kushthaghna*, indicating its utility in *Rakta* and *Pitta* disorders.

According to *Rasapanchaka*, *Patranga* possesses *Kashaya* and *Madhura Rasa*, *Ruksha Guna*, and *Sheeta Virya*, contributing to its haemostatic, cooling, and absorbent properties.

These attributes support its classical indications in conditions like *Raktapradara*, *Atisara*, *Prameha*, and *Vrana*. Its inclusion in formulations such as *Patrangasava* highlights its importance in gynecological disorders.

Modern studies have identified bioactive constituents like brazilin, tannins, and flavonoids, demonstrating antioxidant, anti-inflammatory, antimicrobial, and antidiabetic activities. Despite its classical significance and scientific validation, a comprehensive review integrating traditional and modern perspectives remains essential. Hence, the present study aims to systematically review *Patranga* with respect to its classical references, pharmacological properties, and therapeutic potential.

Reference of *Patranga* in classical Ayurvedic texts

Charaka Samhita[1]

SN	Ref. Ch/Sh	Synonyms	Form	Action and uses
1.	27/9	Patanga	Shukadhanya Varga	Badha Alpa Varchasa, Shukramutrala,

Sushruta Samhita - Sutrasthana[2]

SN	Ref. Ch/Sh	Synonyms	Form	Action and uses
1.	38/12	Kuchandan Salsaraadi Gana		Kaphamedovishoshana, Kushtha, Prameha, Pandu
2.	38/34	Kuchandan Patoladi Gana		Pittakaphanashak, Arochaka, Jwara, Vrana, Chardi, Kandu
3.	38/39	Kuchandan Sarivadi Gana		Raktapittahara, Pipasa, Pittaja Jwara, Daha
4.	38/45	Kuchandan Priyangvadi Gana		Vranaropana
5.	40/8	Kuchandan Pittashaman Varga		Pittashaman

Chikitsa Sathana

SN	Ref. Ch/Sh	Synonyms	Form	Action and uses
1.	22/ 61	Patanga	Churna	Vranaropana

Ashtanga Sangraha - Sutrasthana[3]

SN	Ref. Ch/Sh	Synonyms	Form	Action and uses
1.	23/ 10	Patanga	Churna	Raktastambhaka

Ashtanga Hridaya - Sutrasthana[4]

SN	Ref. Ch/Sh	Synonyms	Form	Action and uses
1.	27/ 48	Patanga	Churna	Raktastambhaka

Reference from *Bhavprakash Samhita Chikitsa Sathana*[5]

SN	Ref Ch/Sh	Synonyms	Form	Action and uses
1.	67/89	Patanga	Lepa	Lootanashaka

References of *Patranga* in *Bhaishajya Ratnavali*[6]

SN	Ref Ch/Sh	Synonyms	Form	Action and uses
1.	118/122	Patranga	Asava	Striroga

Synonyms of *Patranga* in various *Nighantus*

SN	Synonyms	S.N.	P.R.	D.N.	S.C.	N.S.	M.P.N.	K.N.	R.N.	B.P.	AK.
1.	Patranga	+	+	+	+	+		-	+	-	+
2.	Patanga	+	+	+	+	+	+	+	+	+	-
3.	Kuchandhan	+	+	+	+	+	+	+	+	+	+
4.	Raktakashtha	-	-	+	-	+	+	+	-	-	-
5.	Surangak	-	-	+	-	+	+	-	+	+	-
6.	Patragam	-	-	+	-	-	+	+	-	-	-
7.	Pattranjanam	-	-	+	-	+	+	+	+	+	-
8.	Jaghanayak	-	-	-	-	-	-	+	-	-	-
9.	Pattura	-	-	-	-	+	+	+	-	+	-
10.	Raktam	-	+	-	+	-	-	-	-	-	-
11.	Raktak	-	-	-	-	-	-	-	+	-	-
12.	Bharyavriksha	-	-	-	-	-	-	-	+	-	-
13.	Ragkashtha	-	-	-	-	-	-	-	+	-	-
14.	Lohita	-	-	-	-	-	-	-	+	-	-
15.	Raktasara	+	-	-	-	-	-	-	-	+	-
16.	Ranjan	+	+	-	+	-	-	-	-	+	+
17.	Rangkashtha	-	-	-	-	-	-	-	+	-	-
18.	Raktachandan	+	-	-	+	-	-	-	-	-	+
19.	Tilparni	+	-	-	-	+	-	-	-	-	+
20.	Kanyavaham	-	-	-	-	-	+	-	-	-	-

Important synonyms of *Patranga* with their etymology (*Nirukti*) and interpretation[7]

SN	Name	Nirukti	Character
1.	कुचन्दनम्	कुत्सितं चन्दनं, चन्दनाभास इति । Heart wood looking like sandal.	Morphological feature of heartwood
2.	पतङ्गं	पतति वर्धते इति, पल्लुगतौ; अथवा पतङ्गं उदयास्तकालीनः सूर्यः स इव पीतलोहितः सारोऽस्या । It is fast growing tree.	Habit of the plant
3.	पत्राङ्गम्	पत्रमङ्गमस्य, प्रभूतपत्रमिति । The plant is covered with rich foliage.	Morphological feature of leaves
4.	पत्राढ्यम्	पत्रबहुलम्। The plant is covered with rich foliage.	Morphological feature of leaves
5.	पट्टरंजकम्	पट्टं वस्त्रं रञ्जयतीति । Used for dyeing cloth.	Industrial use
6.	रक्तसारम्	रक्तः सारोऽस्य । Yields a red dye.	Industrial use
7.	रञ्जनम्	रक्तः सारोऽस्य । Used for dyeing cloth.	Industrial use
8.	सुरङ्गम्	शोभनो रंगोऽस्य । Yields a red dye.	Industrial use

Rasa Panchak of *Patranga*

SN	Nighantu	Rasa	Guna	Virya
1.	Dhanwantri Nighantu	Madhura Tikta		Sheeta
2.	Madanpala Nighantu	Madhura		Sheeta
3.	Kaideva Nighantu	Madhura		Sheeta
4.	Raj Nighantu	Katu Amla Madhura	Ruksha	Sheeta
5.	Bhavaprakash Nighantu	Madhura		Sheeta
6.	Nighantu Ratnakar	Kashaya Madhura Amla	Ruksha	Sheeta
7.	Nighantu Adarsha	Madhura Tikta		
8.	P.V. Sharma	Kashaya Madhura Tikta	Ruksha	Sheeta

Panchmahabhuta composition

In Ayurveda, the concept of *Panchmahabhuta* - the five great elements: *Prithvi* (Earth), *Jala* (Water), *Tejas* (Fire), *Vayu* (Air), and *Akasha* (Space) - forms the very foundation of how substances (*Dravya*) are understood, classified, and used in healing.

SN	Raspanchaka	Akasha	Vayu	Agni	Jala	Prithavi
1.	Rasa	Kashaya Madhura Tikta	- - +	+ - -	- + -	+ + -
2.	Guna	Ruksha	-	+	+	+
3.	Virya	Sheeta	-	-	-	+
4.	Vipaka	Katu	-	+	+	-
Total		1	4	2	2	4

Patranga is *Vayu* and *Prithvi* Pradhan *Dravya*.

Actions (*Karma*)

Karma	S.S	B.R.	S.N.	D.N.	S.C.	M.P.N.	R.N.	B.N.	P.N.
Vranaropana	+	-	+	+	-	+	-	+	+
Jawara	+	-	-	-	-	-	+	-	-
Visphota	-	-	-	-	-	-	+	-	-
Unmada	-	-	-	-	-	-	+	-	-
Dahanashaka	+	-	-	-	-	-	-	+	-
Kushtha	+	-	-	-	+	-	-	-	-
Prameha	+	-	-	-	-	-	-	-	-
Pandu	+	-	-	-	-	-	-	-	-
Striroga	-	+	-	-	-	-	-	-	-

Action on *Dhatu*[8]

- It is *Raktarodhaka*, *Varnya*, *Vranashodhana*, *Vranaropana* and *Vranalekhan*.
- Because of its *Raktarodhaka* property *Basti* of *Kwath* is used in *Raktapradar* & *Shavetapradar*.

Action on *Mala*

- It has *Sangrahaka* action on *Mala* and acts as anti-diuretic.
- Due to its *Sangrahi* nature it is used in *Atisara* and *Pravahika* and as *Sangrahi Uttarbasti* also.

Parts Used:

- Sara* (Heartwood)[9]
- Twak* (Stem bark) and *Taila* (Oil)[10]

Dose of *Patranga*:

- Powder: 5-10 gm[11]
- Kashtha Churna*: 1-2 gm[12]
- Taila*: 5-15 drops
- Decoction: 50-100 ml[13]

Formulations and Preparations of *Patranga*

- Arimedadi Taila*
- Karpuradyarka*
- Kunkumadi Taila* [14]
- Patrangasava*[15]

Vernacular names[16]

Sanskrit: *Patranga*, *Pattanga*
Assamese: *Baggam*, *Bakam*
Bengali: *Bokom*
English: *Sappan Wood*
Gujrati: *Patang*
Hindi: *Patang*, *Bakam*
Kannada : *Patang*

Marathi : Patang
 Tamil : Anaikuntrumani
 Telugu : Bukkapuchettu
 Urdu: Pattang

Taxonomical classification of *Caesalpinia sappan*[17]

- **Kingdom:** Plantae (comprising all living or extinct plants)
- **Subkingdom:** Tracheobionta (have lignified tissues or xylem for conducting water and minerals)
- **Superdivision:** Spermatophyta (produce seeds)
- **Division:** Magnoliophyta (flowering plants)
- **Class:** Magnoliopsida (flowering plant producing an embryo with paired cotyledons)
- **Subclass:** Rosidae
- **Order:** Fabales
- **Family:** Fabaceae or Leguminosae – Pea family
- **Genus:** *Caesalpinia* L.
- **Species:** *sappan* L.– sappanwood

Habitat[18]

Believed to be wild in the Shan Hills; Eastern and Western Peninsula, Pegu and Malaya.

Plant description

Macroscopic features[19]

A tree 6-9 m. high;

Stem: prickly, 15-25 cm. diameter

Branches: rufous-pubescent, armed with a few small prickles.

Leaves: 20-38 cm. long; pinnae 8-12 pairs, 10-15 cm. long, subsessile, with small prickles at the base. Leaflets 10-18 pairs, 1.3-2 by 1 cm., subsessile, close, oblong, rounded at the apex, attached at the lowest corner, very inequilateral (the upper side much the largest), glabrous above, more or less puberulous beneath.

Flowers: in panicles, which are terminal and in the axils of the upper leaves, 30-40 cm. long; pedicels 1.3-1.5 cm. long; bracts lanceolate, 8 mm. long, caducous.

Calyx: 11 mm. long, leathery, glabrous.

Corolla: 2 cm, across; petals orbicular, subequal, yellow, the upper with a red spot at the base. **Stamens:** declinate, waxy-white; filaments densely woolly at the base. **Ovary:** grey-velvety. Pods 7.5-10 by 3.85 cm., woody, obliquely oblong, sub compressed, polished, indehiscent, with a hard recurved short beak at the upper angle of the obtuse apex.

Seeds: 3-4.

Microscopic features[20]

Shows vessels, tracheids, fibres and xylem parenchyma, traversed by numerous xylem rays; vessels numerous, barrel-shaped with bordered pits. scattered throughout xylem in single or in groups of 2 to 5, a few vessels filled with yellowish pigment; fibres spindle- shaped, pointed at both ends: xylem rays numerous uni to biseriate found more common. 3 to 30 cells high, ray cells round or oval; calcium oxalate crystals and starch grains absent.

Chemical constituents[21]

Red colouring matter-sappan red, gallic and tannic acids. Sappan-red resembles haematoxylin and is soluble in ether, alcohol and water; contains carbon 67.II.p.c., hydrogen 5.43-p.c. and oxygen 27.46 p. c.

Active principle resembles haematin and is said to be identical with brasilin. Resinous extract of Sappan contains a crystalline principle which, if distilled and fused with potash yields resorcin; essential oil.

Therapeutic Uses of *Patranga*

Patranga (*Caesalpinia sappan*) is a well-known drug in traditional systems of medicine including Ayurveda, Unani, and Chinese medicine, exhibiting diverse therapeutic applications owing to its astringent, haemostatic, and emmenagogue properties.

1. Gynecological Disorders[22]

Patranga is widely used in the management of female reproductive disorders. It acts as an *Artavasangrahaniya* (regulator of menstrual flow) and is particularly beneficial in conditions like *Rakta Pradara* (menorrhagia) and metrorrhagia. Decoction (*Kwatha*), *Arishta*, and *Asava* preparations such as *Patrangasava* are commonly prescribed in leucorrhoea (*Shveta Pradara*) & other vaginal disorders.

Additionally, *Uttarabasti* with *Patranga Kwatha* is administered in gynecological conditions to enhance therapeutic efficacy.

2. Skin Diseases and Wound Healing[23]

Internally, *Patranga* decoction is useful in skin disorders, especially lichen. Externally, its paste is applied in ulcers, wounds, haemorrhages, and cut injuries due to its *Vranaropana* (wound healing) property. *Patrangadi Lepa* is specifically indicated in facial skin disorders. It is also used in conditions like *Kshudra Roga* and leprosy.

3. ENT and Local Applications[24]

The powder prepared from *Patranga* is traditionally used in otorrhoea, where it is insufflated into the ear. Additionally, a mixture of *Patranga* with sugar and honey is applied locally in *Paittika Rohini*.

4. Other Traditional Uses[25]

- In Unani medicine, *Patranga* is used for wound healing, ulcers, rheumatism, and haemorrhages.
- In Chinese medicine, it is considered as astringent and sedative, used for wounds, menstrual disturbances, and haemorrhages.
- In Indo-China, it is recognized as a powerful emmenagogue.

Some studies supporting pharmacological actions of *Patranga*

Anti-bacterial action[26]

In vitro antibacterial activity of *C. sappan* leaf (methanolic and ethyl acetate extracts) was studied against two Gram +ve (*Staphylococcus aureus*, *Streptococcus pyogenes*) and two Gram -ve (*Escherichia coli* and *Pseudomonas aeruginosa*) strains by agar wells diffusion method ref. Nutrient agar was used as bacteriological medium. Both extracts were dissolved in sufficient volume of DMSO to get the different concentrations i.e., 100 mg, 200 mg and 300 mg/ml. Diameters of zones of inhibition produced by the extracts were compared with those produced by the standard antibiotic (Ofloxacin). Methanolic extract showed better antibacterial activity in vitro, and can be developed as antibacterial agent for curing infectious diseases.

Anti-Fungal activity[27]

Many groups of researchers are interested in the use of sappan heartwood extract (SHE) as an antimicrobial agent.

Antimicrobial capacity of SHE has been investigated, and it was discovered that SHE can be used to inhibit certain microorganisms including *Pseudomonas aeruginosa*, *Salmonella Typhi*, *Staphylococcus aureus*, *Enterobacter aerogenes*, *Candida albicans*, *Aspergillus niger*, *Klebsiella pneumoniae*, *Bacillus subtilis*, *Escherichia coli*, and *Salmonella Ebony*. Sireeratawong found that when 5,000 mg/kg of SHE was given to rats, it did not cause toxicity or changes to the rats' visceral organs. A sappan heartwood herbal beverage study and development was also carried out, and it was discovered that the formula that was most accepted by consumers and suitable for beverage production contained a 1.7% stevia sweetener, 9.83% *Caesalpinia sappan* extract, 29.49% water, and 58.97% tamarillo extract.

Anti-inflammatory activity[28]

CSE can effectively abrogate the IL-1 β -induced over-expression of inflammatory mediators at the transcriptional level in human chondrocytes and macrophages, most likely by inhibiting NF- κ B (p65/p50) signaling. Blockade of IL-1 β -induced NF- κ B signaling and its downstream pro-inflammatory targets by CSE may be beneficial for reducing cartilage breakdown in arthritis.

Antioxidant activity[29]

In this study it is concluded that the heartwood of *Caesalpinia sappan* possesses significant antioxidant activity, as demonstrated through both in vitro and in vivo experimental models. The ethyl acetate, methanol, and aqueous extracts showed strong free radical scavenging potential, with IC₅₀ values comparable to standard antioxidants such as ascorbic acid and rutin. In vivo administration of methanol and aqueous extracts effectively enhanced endogenous antioxidant enzymes, including superoxide dismutase and catalase, while reducing lipid peroxidation levels in liver and kidney tissues of carbon tetrachloride-induced oxidative stress models. The protective effects observed at a dose of 100 mg/kg were comparable to those of vitamin E, indicating the potent antioxidant and organ-protective nature of *Caesalpinia sappan* heartwood.

Anti diabetes potential[30]

The findings of the present study highlight the significant antidiabetic potential of the ethanolic extract of *Caesalpinia sappan* wood.

The observed activity, which was comparable to that of the standard antidiabetic drug glibenclamide, suggests that the extract exerts a substantial glucose-lowering effect. Phytochemical constituents such as alkaloids and flavonoids identified in the extract are likely to play a crucial role in mediating this activity, as these compounds are known to influence carbohydrate metabolism and improve glycemic control.

In vitro evaluation further supports this antidiabetic effect, as the ethanolic extract demonstrated significant inhibition of the α -glucosidase enzyme across a concentration range of 25 μ g/ml to 1000 μ g/ml. Inhibition of α -glucosidase delays carbohydrate digestion and glucose absorption, thereby reducing postprandial hyperglycemia. The dose-dependent enzyme inhibitory activity observed in this study indicates the effectiveness of *Caesalpinia sappan* in modulating key pathways involved in diabetes management. Overall, the results suggest that *Caesalpinia sappan* wood possesses promising antidiabetic properties and may serve as a potential natural alternative or adjunct in the management of diabetes mellitus.

Anti-HIV activity[31]

This study concludes that *Caesalpinia sappan* possesses promising anti-HIV-1 integrase activity. Ethanolic extracts of the heartwood and roots led to the isolation of nine bioactive compounds, among which sappanchalcone exhibited the most potent inhibitory effect against HIV-1 integrase, followed by protosappanin A. Molecular docking studies revealed that the presence of vicinal hydroxyl groups plays a crucial role in the inhibitory activity, facilitating effective binding with key amino acid residues (Gln148 and Thr66) in the core domain of the HIV-1 integrase enzyme.

Discussion

Caesalpinia sappan Linn. (*Patranga*) holds a significant place in Ayurvedic therapeutics, primarily due to its multifaceted actions on *Rakta*, *Pitta*, and *Kapha Dosha*. Classical texts describe *Patranga* as possessing *Kashaya*, *Madhura*, *Tikta Rasa*, *Sheeta Virya*, and *Katu Vipaka*, which collectively contribute to its *Pitta-Kapha Shamaka*, *Rakta Shodhaka*, and *Krimighna* properties. These fundamental attributes form the basis for its wide range of therapeutic indications, particularly in disorders involving *Rakta Dushti*, inflammation, and metabolic imbalance.

From an Ayurvedic perspective, the antimicrobial activity observed in contemporary studies can be interpreted through its *Krimighna Karma*. The ability of *Patranga* to combat various microbial pathogens aligns with its classical indications in *Krimi Roga* and *Dushta Vrana*, where purification and healing of affected tissues are essential. Its *Kashaya Rasa* plays a crucial role in *Stambhana* and *Ropana*, aiding in wound healing and controlling excessive secretions.

The anti-inflammatory potential of *Patranga* can be understood through its *Pitta Shamaka* and *Rakta Prasadaka* actions. Its *Sheeta Virya* further contributes to alleviating *Daha* and inflammatory responses. The antioxidant activity demonstrated experimentally correlates well with the Ayurvedic concept of *Rasayana*. Its role in maintaining the integrity of *Rakta Dhatu* and preventing oxidative damage can be considered an extension of its *Rakta Shodhana* property.

In the context of metabolic disorders such as *Madhumeha*, *Patranga's Kashaya-Tikta Rasa* and *Katu Vipaka* contribute to *Kapha-Medahara* action, thereby correcting *Dhatvagnimandya* and improving metabolic functions. It aids in regulating *Kleda* and excessive *Meda Dhatu*, which are central to the pathogenesis of *Prameha*. Thus, its observed hypoglycemic activity can be interpreted through its effect on *Agni* and *Dosha-Dushya Sammurchana*.

Furthermore, its emerging antiviral potential may be conceptually correlated with *Krimighna* action indicating its broader applicability in systemic disorders involving pathogenic invasion and immune dysregulation. Although such actions are not explicitly described in classical texts, the underlying principles support its role in maintaining internal homeostasis.

Safety of *Patranga*, as evidenced in experimental studies, resonates with the Ayurvedic principle of *Yuktiyukta Sevana*, where proper administration ensures therapeutic efficacy without adverse effects.

Overall, *Patranga* exemplifies a classical Ayurvedic drug whose *Rasa-Panchaka* and *Guna* attributes rationalize its wide spectrum of therapeutic actions. The convergence of traditional knowledge with supporting scientific evidence highlights its potential as a valuable agent in integrative medicine, warranting further exploration within an Ayurvedic framework.

Conclusion

Caesalpinia sappan heartwood exhibits a wide spectrum of pharmacological activities, including antimicrobial, anti-inflammatory, antioxidant, antidiabetic, and anti-HIV effects. Its strong efficacy, coupled with a favorable safety profile, underscores its potential as a valuable natural therapeutic agent. The presence of diverse bioactive compounds contributes to its multi-mechanistic actions, making it a promising candidate for the development of novel herbal formulations and functional products.

However, despite encouraging experimental evidence, further clinical studies and standardization of extracts are essential to validate its efficacy and safety in humans. Future research focusing on isolation of active constituents, mechanism-based studies, and clinical trials will help in establishing *Caesalpinia sappan* as an evidence-based drug in modern therapeutics.

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