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A Comprehensive Review on Turmeric: Herbal Dosage Forms, Therapeutic Potential and Market Price Comparisons

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Authors' Contributions

1,2Data Collection & Processing, Data Analysis and/or Interpretation, Drafting of Manuscript 2,,3 Drafting of Manuscript, Critical Review

Article info.

Received: June 5, 2025

Accepted: Nov 6, 2025

Published:Nov 23 , 2025

Funding Source: *Nil*

Conflict of Interest: *Nil*

Cite this article: *Sawera A, Fatima Q, Aymen O.* A Comprehensive Review on Turmeric: Herbal Dosage Forms, Therapeutic Potential and Market Price Comparisons *r. International Journal of Trends in Business Management and Economics 2025;1:12-21.*

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ABSTRACT

Turmeric, which is well-known for its medical benefits, is widely utilized as a spice and in religious ceremonies throughout Southeast Asia. Its rich yellow color earned it the nickname "Indian Saffron," and its rhizomes (*Curcuma longa* L.) are used as culinary additions, coloring agents, and herbal treatments. Turmeric is well known in traditional Chinese and Ayurvedic medicine for its anti-inflammatory effects, which help to treat a variety of conditions such as digestive problems and skin infections. Curcumin, the main molecule, has a variety of pharmacological benefits, including antibacterial, antioxidant and anti-inflammatory properties, making it useful for illnesses such as lupus nephritis and diabetes. Different species, such as *Curcuma amada* (Mango Ginger) and *Curcuma caesia* (Black Turmeric), provide distinct therapeutic benefits such as wound healing and anti-inflammatory properties. The plant itself has lance-shaped leaves, thick rhizomes utilized for medicinal extraction and thrives in tropical environments. Turmeric cultivation provides economic benefits to farmers, however obstacles such as yield stagnation and market price swings persists. The review underlines the significance of traditional herbal formulations, establishing their medicinal efficacy through careful literature analysis in credible databases. Turmeric's abundant bioactive components make it a popular choice among people looking for natural skin care products. Its ability to bridge old wisdom with current formulation processes is critical in increasing its market presence.

Keywords: Turmeric, *Curcuma amada, Curcuma caesia*, *Curcuma longa*, herbal formulations, Mango Ginger, Black Turmeric

INTRODUCTION

Turmeric is a plant that has a very long history of medicinal uses. In Southeast Asia, turmeric is used not only as a principal spice but also as a component in religious ceremonies. Because of its brilliant yellow color turmeric is also known as “Indian Saffron” which is also used to color cheese and in mustard. Turmeric is traditionally used as an anti-inflammatory in Chinese and Ayurvedic medicine to treat digestive and liver issues, skin disease and wounds. Four thousands of peoples all over the world, especially in Asian nations, have utilized the rhizome of turmeric (*Curcuma longa L.)* as a spice culinary additive, coloring agent and herbal remedy. Turmeric has also available in different Botanical names and pharmacological activities also: *Curcuma longa L*. (widely cultivated) belongs to the Zingiberaceae/ Scitaminaceae family. It contains essential compounds like Curcumin. Curcumin possesses to the antibacterial, antioxidant, Deobstruent alterative anti-inflammatory and antiseptic, preventive in several internal and external disorders of catarrhal or bleeding type as well as against accidental shocks wounds and bruises expectorant and hypoglycemic properties, along with the capacity to enhance wound healing and diminish sensitivity to chemotherapy and radiation therapy. Lupus nephritis, Fibrosis, diabetes, acne and all skin disease are only a few the human diseases that have been tested in clinics. *Curcuma amada Roxb.* (Mango Ginger) is an important species of mango ginger, known for its characteristic unripe mango aroma, because its rhizome has a raw mango flavor which is Bitter Aromatic, Excellent Resolvent, Carminative, Stomachic, also used as Blood Purifier and Febrifuge. Resolvent (of inflammation and swellings) particularly external (contusions) bruises and accidental shocks, injuries or inflammations. *Curcuma caesia Roxb.* (Black Turmeric): Its pharmacological actions are similar to Zingiber zerumbet Smith (Zarnabad), which is Aromatic, Stimulant, Carminative, Rubefacient, Detersive, Expectorant and Tonic for Liver Heart and Liver, Deobstruent, Vulnery. Specific Action of Black Turmeric has Carminative, Liver Tonic, Rubefacient and Deobstruent. Zedoary is externally used for sprains and bruises and in cosmetics household preparations[1-5]. As a domestic remedy the paste is externally applied in suitable combinations for such purposes and for rheumatic pains. Included in electuaries and cardiac refrigerant preparation which are meant to impart functional strength to heart and liver. Externally applied it relieves local inflammations and pains. It contains the generic properties of being antioedemic, anti-inflammatory, because Bactericide, Cholagogue (a drug or other susbstance that promotes the flow of bile from the gall bladder into the duodenum) and fungicide and antitumor (due to curcumin). *Curcuma zedoaria Rosc.* (White Turmeric). Root reduced to powder is regarded as useful nutrient for the infants.

Include in electuaries and exhilarant preparations prescription . *Curcuma aromatica* Salisb (Wild Turmeric), Therapeutically it has a strong antimicrobial effect which has been utilized since antiquity as a treatment for many microbiological illnesses[6, 7].

LITERATURE REVIEW: Leave are widely lanceolate or oblong and have a deep ferruginous purple color. Herb without a stem that has roots. Spike showing up before the leaves. The sheath and petiole are the same length as the blade. Bract green flowers with a hint of ferruginosity and blossom pale yellow, reddish at outside boarder. Turmeric is a perennial herbaceous plant that belongs to the Zingiberaceae family, which also includes ginger. The following traits are parts of its botanical description[7].

LEAVES: The plants leaves re long lance-shaped, with a smooth texture and a central rib. The leaves grow in a tight spiral from the bottom of the plant**.**

RHIZOMES: People mostly grow turmeric for its thick, tuberous, yellowish-orange underground stems, or rhizomes. Curcumin, a spice and medicine, comes from these rhizomes.

FLOWERS: Turmeric has spikes of yellow to pink flowers that have a central cylindrical spike called an inflorescence. The flowers are sterile, and rhizomes are usually used to make new plants[8].

HABITAT: Turmeric, which is indigenous to South-east Asia, grows well in tropical and subtropical regions. For best growth, it needs warm weather and well-drained soil[7].

HEIGHT: When fully grown, turmeric plants can grow to a height of 3 to 5 (1 to 1.5 metres).

HEALTH ADVANTAGES OF TURMERIC:

CULTIVATION: It is thought that turmeric originated in South Asia, and some species have spread to Java and the northeast parts of India. The current globalization and linearization era. Farmers can profit from it by cultivating premium turmeric and exporting it to other nations in order to generate foreign exchange. Farmers and the nation's economy will both benefit from this export. It is possible to store turmeric well after five to ten months of processing and noted when the costs are fair[9].

Turmeric is available in two seasons i.e, February to May and August to October. The various varieties of turmeric that are traded in South-east Asia Countries are Allepey Finger, Erode Turmeric, Salem Turmeric and Nizamabad Bulb etc. The major problems faced by farmers is yield stagnation. Inadequate market price is also one of the

major problems faced by the farmers. Leaf blotch disease is a major problem which reduces the rhizome yield in Turmeric.

METHODOLOGY:

The main goal of this review is to look into the rich history of classical Herbal formulations, especially Ointments, Gels, capsules, tablets creams, serums and majun and to see how useful they might be today. This was accomplished through a thorough review of authentic Herbal classical texts to find information about the formulation description, formulations, indications, preparation method, and therapeutic uses. Only authentic, traditional Herbal textbooks, acknowledged as reliable resources in the field of herbal medicine, were incorporated to guarantee the validity of the data. The authors personally conducted the literature review in the Ayurvedic and Unani Tibbia College and Hospital's UG and PG Libraries. Furthermore, significant scientific databases ResearchGate, PubMed, and Google Scholar were searched for all years of publication to find accessible literature on Herbal Formulations and associated concepts. The emphasis was on choosing references that shed light on the different kinds of formulations, their modes of action, preparation techniques, and therapeutic outcomes. Additionally, research on making formulations with herbal ingredients and commercially available formulations for various medical conditions were reviewed[10-14].

RESULT:

The comparative cost of turmeric in different dosage form is displayed in Table. Daily retail costs were standardized to increase uniformity, and any differences between formulas were then assessed. Data from various retail locations was also combined to determine the average retail value of each dosage form (Table.4). However, because herbal remedies can result in negative interactions, it is important to consult a healthcare professional before using them, especially for those who have underlying medical conditions or are taking medication at the same time.[15]

The various forms of turmeric, such as Creams, Ointments, Tinctures, Capsules, Tablets, Balm, Oils & Majun and other topical applications, are shown in the Table. Documentation of the corresponding minimum and maximum retail costs will be included with these formulas. The average cost of each formulation will also be calculated and presented as a percentage in order to provide a consistent comparison study.

DISCUSSION:

Herbal cosmetics are products that use one or more plant-based ingredients to care for your skin, hair and body. Compared to purely synthetic cosmetics, they are becoming more popular because people think they are safer, culturally acceptable, and have health benefits. Haldi or Turmeric (*C. longa*) is one of the most popular herbs used in TMS like Ayurveda, Unani, Siddha and TCM. Numerous bioactive substances, including curcuminoids, essential oils, and volatile constituents, are present in the golden-yellow rhizome. It has antimicrobial, anti-inflammatory, antioxidant, and wound-healing qualities because of these. Turmeric's wide pharmacological range has led to its incorporation into herbal formulations as a natural cosmetic ingredient for tropical applications as well as a therapeutic agent for internal use[16]. It is a versatile ingredient in face masks, lotions, creams and other skincare products because of its various therapeutic actions. Although the value of traditional knowledge has already been established, its potential is being further enhanced by contemporary research and formulation technologies[17, 18]. By creating standardized, safe and efficient formulations that can compete in the global cosmetic market, turmeric-based cosmetics have the potential to bridge the gap between pharmaceutical innovation and natural heritage.

Formulation, extraction, evaluation of antimicrobial cream from turmeric:

Extraction: Curcuminoids and volatile oils are the primary sources of turmeric pharmacological effects. They are extracted using a variety of techniques[19].

Formulation: To increase its bioavailability and patient compliance, turmeric (Curcuma longa, primarily curcumin) is transformed into various dosage forms.

Evaluation of Pharmacological Effect: Testing the formulations safety and effectiveness is crucial after they have been prepared[20].

Turmeric, renowned for its therapeutic properties, has sparked interest in formulations, extraction and evaluation processes. Formulating turmeric involves creating diverse products to harness its medicinal benefits, such as anti-inflammatory and antioxidant effects[21, 22]. Extraction methods play a pivotal role in isolating the bioactive compounds, with techniques like solvent extraction and supercritical fluid extraction being prominent. The evaluation of turmeric formulations focuses on assessing their potency, stability and bioavailability,

ensuring optimal therapeutic outcomes. This multidimensional approach contributes to unlocking the full potential of turmeric in various application, from traditional medicine to modern pharmaceuticals[23-25].

CONCLUSION

In Pakistan, the cost of turmeric formulations varies greatly depending on the brand and dosage form. Since locally made herbal creams, ointments, tablets and teas are the most reasonably priced which is typically falling between 60 and 500 in rupees and the majority of customers can easily afford them. However, because of the influence of packaging, certification, and brand value, imported and branded goods are typically much more expensive.

While oral formulations like tinctures, teas and capsules exhibit wider price fluctuations, topical preparations like ointments and creams continue to be the most cost-effective. This suggests that processing complexity and formulation type have a significant impact on retail costs.

Overall, the results indicate that Pakistani Consumers have access to both high quality imported alternatives and reasonably priced local herbal remedies. This dual availability is a reflection of both growing exposure to global herbal and nutraceuticals markets and cultural reliance on traditional medicine. To prevent potential interactions or adverse effects, cautions use under medical supervision is advised.



Figure 1. Turmeric: From Cultivation to Final Product

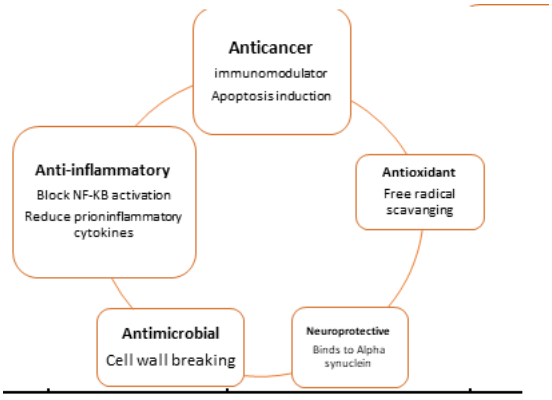


Figure 2. Multifunctional therapeutic properties of Bioactive Compounds

Table.1: Botanical Description of Turmeric with different genera.

Genus	Family	Arabic Name	English Name	Urdu Name	Temperament	Parts Used
Curcuma longa L.	Zingiberaceae/ Scitaminaceae	Aruq us Suff	Turmeric	Haldi, Zard-Choll	Warm & dry (Third order)	Rhizome
Curcuma amada Roxb.	Zingiberaceae	Qame ul Samoom	Mango ginger, Mango turmeric	Aanba Haldi, Kapur Haldi.	Warm & dry (Second order)	Rhizome
Curcuma caesia Roxb.	Zingiberaceae	Jadwar ul Aswad	Zedoary (Black)	Kali Haldi, Kachur, Narkachur	Warm & dry (Second order)	Root
Curcuma zedoaria Rosc.	Zingiberaceae/ Scitaminaceae	Rehan Turanjani, Rijl uljarad	Zedoary (round)	Zarnabad, Zaramabad Kachur	Warm (Second order) & dry (Third order)	Rhizomes/ tubers.
Curcuma aromatica Salisb	Zingiberaceae	Kukum	Wild Turmeric	Jangli Haldi	Warm (Second and Third order)	Rhizome

Table. 2: Inclusion and Exclusion Criteria of Turmeric (Herbal) Formulations:

S.NO	Criteria for Exclusion	Criteria for Inclusion
1	Formulations that contained out of date medications or medications whose identities could not be verified.	Texts that discuss formulation, its preparation or its use in detail or in part.
2	Herbal medicine from secondary or non-classical sources.	Herbal medicine acknowledges original Herbal classical textbooks as reliable sources.
3	Articles that have nothing to do with pharmacological effects.	Original research studies, review papers, or peer-reviewed articles that concentrate exclusively on formulations.
4	Publications in languages other than English that could not be translated.	Research on the creation and assessment of herbal formulation.
5	Literature with insufficient data, lacking peer review, or not available in full text.	English-Language literature that can be found in reliable databases like PubMed, Google Scholar and Research Gate.

Table. 3: This table summarizes the key stages in the development and study of turmeric formulations.

Formulations:	Extraction	Modern Dosage Forms
Standardization.	Solvent extraction: using ethanol, methanol, acetone and water.	(Analgesic, wound healing and hepatoprotective and neuroprotective)
Stability testing.	Hydro-distillation: For volatile oil	(Antioxidant, Anti-inflammatory and Anti-microbial activity)
Selection of excipients(stabilizers, base material and preservatives)	Soxhlet extraction: Lab scale extraction for curcumin	Clinical Evaluation: (checking Safety, therapeutic effect and dosage optimization.)

Table.4: Turmeric Formulations: Complete Products List With Minimum And Maximum Prices

Products	Quantity	Min. Prices	Max. Prices	Average Cost In %
CREAMS				
Ubtan Turmeric Cream – English	35-40g	80	295	268.75
Turmeric Skin Cream – Him Herbal	30g	60	100	66.66
Vicco Turmeric Skin Cream – Helen	30g	1,190	2,112	77.47
Extra Glow Lightening Cream – Vincecare	40ml	650	700	7.69
Dark Spot Turmeric Cream – Himalaya	50g	1,550	1,600	3.22
Ubtan Turmeric – Biocos	50g	506	675	33.39
Turmeric Face Cream – Dr. Rashel	50g	1,299	1,499	15.39
Mama Organic – Ubtan Day Cream –	50g	1,240	1,600	29.03
Ointments:				
Turmeric Ointment – Arapal	50g	100	120	20
Herbal Ointment – Hamdard	25g	102	120	17.64
Tinctures				
Turmeric Rhizome Tincture – herbal healing	50ml	130	630	384.61
Turmeric $ Ginger Herbal Tincture – prairie Doctor	50ml	550	637	15.81
Tendinitis Care Tincture—Turmeric Root + Other Herbs – Hawa Pharm	32fl.oz	45,000	50,139	11.42
Capsules:				
Turmeric Curcumin – Goldtree	500mg, 72 capsules	450	500	11.11
Turmeric Capsules – Nutrifactor	500mg, 30 Capsules.	1,050	1,250	19.04
Turmeric With Black Pepper & Ginger Oil Capsule – WB By Hemani	50 Capsules	1,000	1,500	50
Turmeric Powder/Oil Capsules – Dr. Herbalist	250-500mg, 60 Capsules	1,351	1,790	32.49
Turmeric Capsule – Nb	450mg, 60 Capsules	5,000	5,875	17.5
Extra Strength Turmeric Curcumin – Herbal Roots	1300mg	14,720	16,000	8.69
Tablets				
Curcumin Total Turmeric Therapy – Restore	30 tablet	1,000	1,175	17.5
Fusion Turmeric – fusion Health	30 tablets	6,000	7,500	25
Turmeric Tablet – Youtheory	60 tablet	7,000	8,350	19.28
Balm				
Turmeric Ginger Herbal Mint Balm – Luyan	15g	125	155	24
Herbal Balm – Herbactive	20g	185	195	5.4
After-Bite Turmeric Balm – Mother sparsh	15g	1,000	1,500	50
Vicco Turmeric Skin Cream (Used As Balm Type) – Helen	30ml	1,190	1,499	25.96
Oils:				
Turmeric Oil – Chiltanpure	200ml	500	1,199	139.8

Turmeric Essential Oil – west and month	10ml	800	899	12.37
Turmeric Face Oil – west and month	10ml	284	599	110.9
Turmeric Haldi Oil-Haque Planters –	30ml	100	168	68
Turmeric Pure & Natural Oil – Sauvasine	30ml	2,000	2,500	25
Advanced Clinicals Turmeric Facial Oil (With Rose & Jojoba) – Advanced Clinical	53ml	8,000	8,384	4.8
Majun				
Majun Falasfa – Ajmal	100g	200	1,800	800
Majun Arad Khurma – Hamdard	100g jar	200	500	150
Majun Zanjabeel – Ajmal	100g	150	2,200	1366.6
Hamdard Majun E Azqarqi – Qarshi	15g	110	180	63.63
Majun Muqavi Wa Mumsik Khas Ul Khas – Ajmal	100g	700	3,150	350
Themra Macun – Turkish Imported Majun	500g	3,300	5,499	66.63
Majun Mughalaz Jawahar – Qarshi	500g	550	1,680	205.45
Pastes				
Turkish Curcumin Macun Creamy Paste – Aksu vital	190g	5,000	5,500	10
Macun Honey Herbal Paste – Aksu vital	240g	8,450	9,500	12.42
Herbal Teas				
Turmeric Herbal Tea – Herboganic	25 bags	300	380	26.66
Premium Turmeric/Haldi – Organic Way	20 bags	400	429	7.25
Turmeric Ginger Herbal Tea – Az organic oils	20 bags	450	1,480	228.8
Super Blends turmeric tea bags – twinings (UK)	20 bags	500	2,225	345
Turmeric Tea – Som Herbal Specialities	20 sachets	200	225	11.11

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