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Review - Phytomedicine (Turmeric)

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Abstract: ***The skin work for body as a first line protection against Mechanical Chemical and Thermal damage to the internal organs. They include the extremely developed immune response that work as a barrier against pathogenic infections. The skin integrity is required by a physiological process for repairing the damage tissue. Healing process is proceeds by four phases- HEMOSTASIS, INFLAMMATION, PROLIFERATION AND REMODELING The natural Phyto-medicine are hold extensive pharmacological property that use in the treatment of wound and infection prevention. It is most popular in the general population and all over the world. The Phyto medicine are high used for the wound healing Sach as - MIMOSA, ALOE VERA, GINSENG, JOJOBA, GREEN TEA, GARLIC, GINKGO, LEMON, OLIVE OIL, SOYBEA, OCIMUM. The article provides a review of the common beneficial medicinal plant for the management of skin wounds.***
Keywords: Phytomedicine, Turmeric, Mechanism of action of turmeric.

I. INTRODUCTION

Phytomedicine is the use of plants, plant parts, or substances derived from plants, such as essential oils and extracts, for the purpose of preventing and treating diseases and promoting overall health. It encompasses a wide range of applications, including herbal teas, topical applications like salves and creams, and inhalation therapies. The practice is rooted in ancient traditions, continues to be explored with modern scientific methods to understand the efficacy, quality, and safety of these plant-based remedies.

A. Key Aspects of Phytomedicine

1) Herbal Products

These are plant-based products used internally or externally to maintain health or treat conditions, according to Johns Hopkins Medicine.

2) Standardization

For their use as medicines, these plant-derived products are often standardized to ensure consistent quality and therapeutic effectiveness.

3) Forms of Application

Phytomedicines can be administered in various forms:

1) Ingestion: As herbal teas or oral supplements.
2) Topical Application: As oils, salves, creams, and lotions for skin conditions or wounds.
3) Inhalation: Using aromatic oils or steam for therapeutic effects.

Examples of Phytomedicines and Their Uses:

a) Beta-sitosterol: May help with skin conditions, wound healing, and heart health.
b) Ginger: May help alleviate nausea and vomiting.
c) Green Tea: Research suggests it might help fight cancerous tumors' or improve certain diabetes-related conditions.

It involves the analysis and characterization of plant extracts and their components to ensure quality, safety, and effectiveness. Phytomedicines are also known as herbal medicines or botanicals and are available in various forms, such as pills, teas, or topical preparations.

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II. TURMERIC



Curcuma longa is a flowering plant in the ginger family Zingiberaceae. It is a perennial, rhizomatous, herbaceous plant native to the Indian subcontinent and Southeast Asia that requires temperatures between 20 and 30 °C (68 and 86 °F) and high annual rainfall to thrive. Plants are gathered each year for their rhizomes, some for propagation in the following season and some for consumption or dyeing.[6] The rhizomes can be used fresh, but they are often boiled in water and dried, after which they are ground into a deep orange-yellow shelf-stable spice powder commonly used as a colouring and flavouring agent in many Asian cuisines, especially for curries (curry powder). Turmeric powder has a warm, bitter, black pepper-like flavour and earthy, mustard-like aroma.[7] Although long used in Ayurvedic medicine, there is no high-quality clinical evidence that consuming turmeric or the principal turmeric constituent, curcumin, is effective for treating any disease.[8][9] Curcumin, a bright yellow chemical produced by the turmeric plant, is approved as a food additive by the World Health Organization, European Parliament, and United States Food and Drug Administration.[6] Turmeric and its extract curcumin are generally safe but have recently been linked, especially in high-bioavailability forms, to rare cases of immune-mediated acute liver injury that typically resolve after stopping use, though severe outcomes can occur if use continues.

Scientific classification	
Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Monocots
Clade:	Commelinids
Order:	Zingiberales
Family:	Zingiberaceae
Genus:	*Curcuma*
Species:	***C. longa***
Binomial name	
Curcuma longa	

III. MORPHOLOGY OF TURMERIC

Turmeric is a perennial herbaceous plant that reaches up to 1 m (3 ft 3 in) tall.[1] It has highly branched, yellow to orange, cylindrical, aromatic rhizomes.[1]

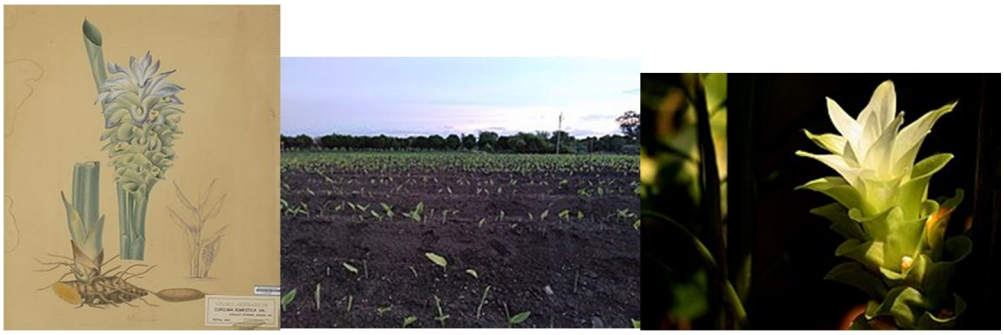
The leaves are alternate and arranged in two rows. They are divided into leaf sheath, petiole, and leaf blade.[1] From the leaf sheaths, a false stem is formed. The petiole is 50 to 115 cm (20–45 in) long. The simple leaf blades are usually 76 to 115 cm (30–45 in) long and rarely up to 230 cm (7 ft 7 in). They have a width of 38 to 45 cm (15 to 17+½ in) and are oblong to elliptical, narrowing at the tip.[1]

A. Inflorescence, Flower, and Fruit

At the top of the inflorescence, stem bracts are present on which no flowers occur; these are white to green and sometimes tinged reddish-purple, and the upper ends are tapered.[21]

The hermaphrodite flowers are zygomorphic and threefold. The three sepals are 0.8 to 1.2 cm (⅜ to ½ in) long, fused, and white, and have fluffy hairs; the three calyx teeth are unequal. The three bright-yellow petals are fused into a corolla tube up to 3 cm (1+¼ in) long. The three corolla lobes have a length of 1.0 to 1.5 cm (⅜–⅝ in) and are triangular with soft-spiny upper ends. While the average corolla lobe is larger than the two lateral, only the median stamen of the inner circle is fertile. The dust bag is spurred at its base. All other stamens are converted to staminodes. The outer staminodes are shorter than the labellum. The labellum is yellowish, with a yellow ribbon in its centre and it is obovate, with a length from 1.2 to 2.0 cm (½ to ¾ in). Three carpels are under a constant, trilobed ovary adherent, which is sparsely hairy. The fruit capsule opens with three compartments.[22][23]

In East Asia, the flowering time is usually in August. Terminally on the false stem is an inflorescence stem, 12 to 20 cm (4+½ to 8 in) long, containing many flowers. The bracts are light green and ovate to oblong with a blunt upper end with a length of 3 to 5 cm (1 to 2 in).[21]



- Curcuma domestica Valeton, a drawing by A. Bernecker around 1860
- Turmeric farm on Deccan Plateau
- Turmeric flower

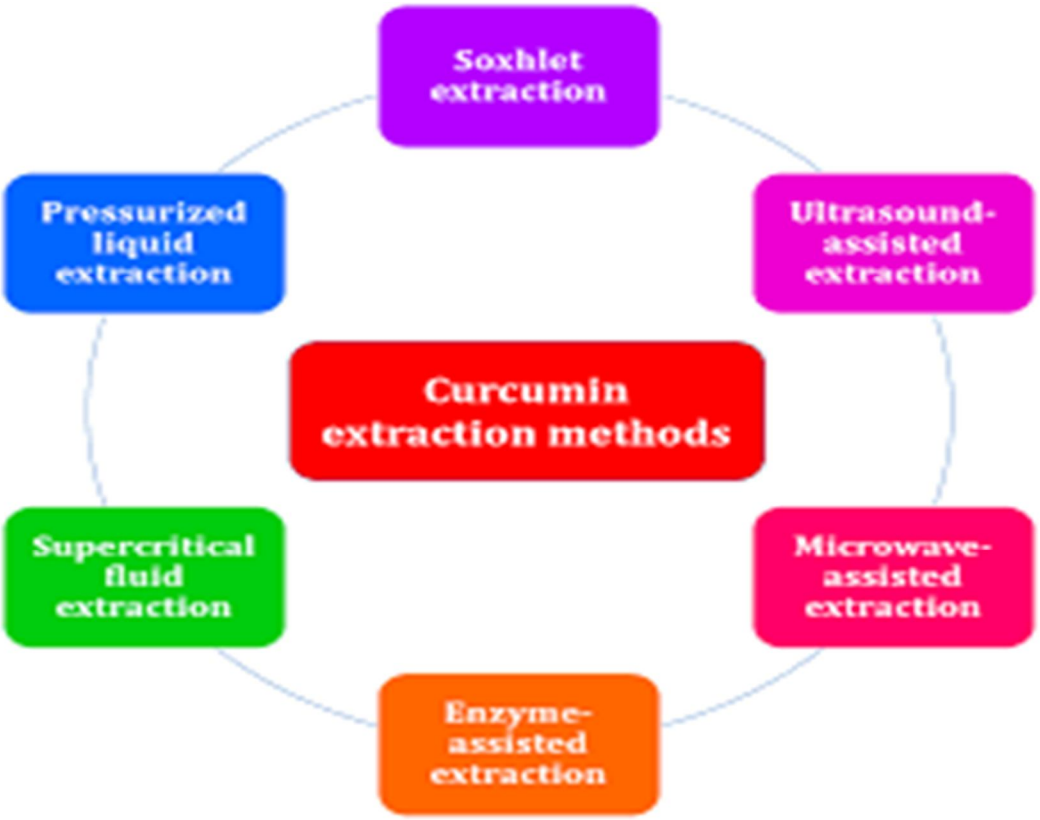
B. Extraction of Turmeric extract

Curcumin can be extracted from turmeric using conventional solvent extraction with organic solvents like ethanol, acetone, or ethyl acetate, often using a Soxhlet apparatus. Modern methods like ultrasound-assisted, microwave-assisted, and enzyme-assisted extraction are also used, offering faster and more efficient alternatives. After extraction, the solvent is removed by evaporation, often with a rotary evaporator, and purification techniques like column chromatography or crystallization can be used to obtain pure curcumin.

Conventional Solvent Extraction

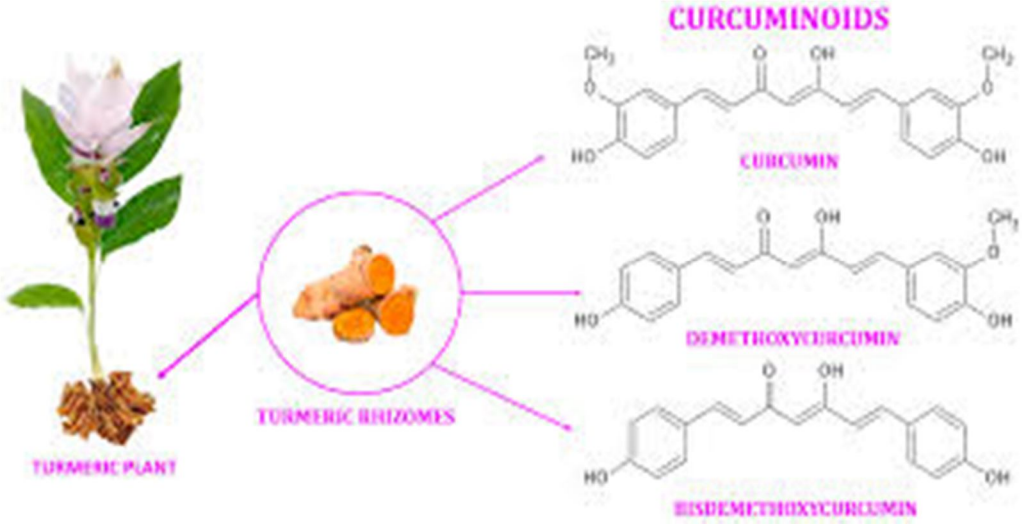
This is the most common method, utilizing the liposoluble nature of curcumin to dissolve it from the turmeric powder.

1) Preparation: Dry turmeric root is cleaned, ground into a fine powder, and placed in a thimble for the Soxhlet apparatus.
2) Extraction: An organic solvent, such as ethanol, acetone, or ethyl acetate, is added to the Soxhlet apparatus.
3) Process: The solvent is heated, evaporates, condenses, and drips onto the turmeric powder, extracting curcumin. The solvent containing the extracted compounds then drains into a flask.
4) Solvent Removal: The process is repeated until extraction is complete. The solvent is then removed from the collected extract using a rotary evaporator to yield a crude curcumin extract.



C. Phytochemistry of Turmeric

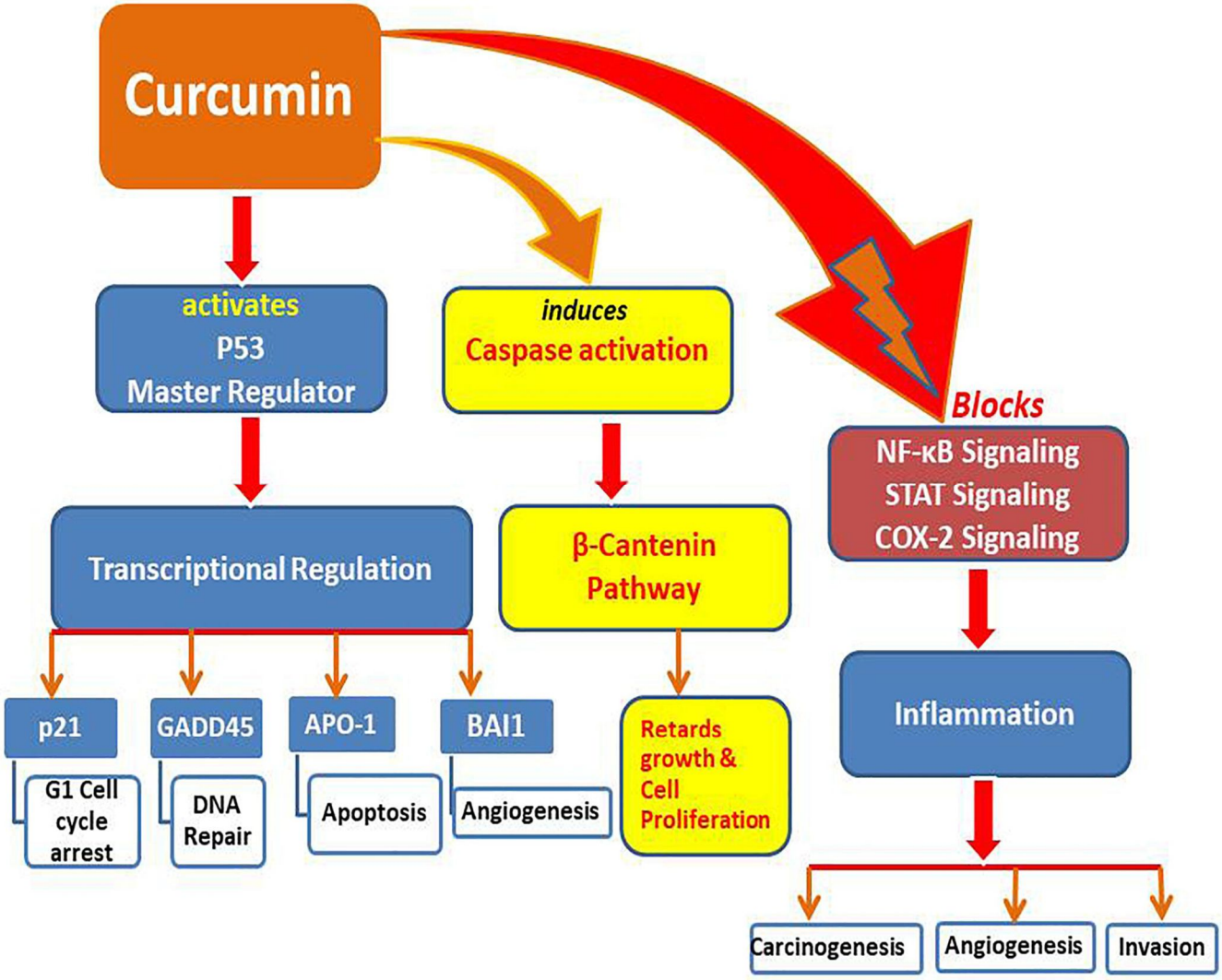
Turmeric powder is about 60–70% carbohydrates, 6–13% water, 6–8% protein, 5–10% fat, 3–7% dietary minerals, 3–7% essential oils, 2–7% dietary fibre, and 1–6% curcuminoids.[8] The golden yellow colour of turmeric is due to curcumin.[6] Phytochemical components of turmeric include diarylheptanoids, a class including numerous curcuminoids, such as curcumin, demethoxycurcumin, and bisdemethoxycurcumin.[8][6] Curcumin constitutes an average of 3.14% by weight of assayed commercial samples of turmeric powder; curry powder contains much less (an average of 0.29%).[24] Some 34 essential oils are present in turmeric, among which turmerone, germacrone, atlantone, and zingiberene are major constituents.



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D. Mechanism of action of Turmeric

Turmeric's mechanisms of action center on its primary active compound, curcumin, which exhibits potent antioxidant and anti-inflammatory properties by interacting with cellular signaling pathways like NF-κB and boosting protective systems such as Nrf2/HO-1. It also works by reducing histamine levels, improving insulin sensitivity, and influencing immune cells to promote tissue regeneration. These activities contribute to turmeric's potential benefits in managing a variety of conditions, including those involving oxidative stress and chronic inflammation.



E. Application of Turmeric

Turmeric is applied medicinally, in cosmetics and as a spice, and in religious and ceremonial contexts. As a medicine, it's used topically for skin conditions and wounds, and ingested for digestive and respiratory issues. In cosmetics, it's a traditional ingredient in face masks to improve complexion. As a spice, it adds flavor and its characteristic color to food. It also plays a role in various cultural traditions, including in marriage ceremonies and religious practices.

1) Medicinal Applications

- Skin and Wound Care: In Ayurvedic traditions, turmeric is an antiseptic applied to burns, cuts, and bruises. It's also used for various skin conditions like acne and inflammatory skin diseases, with its anti-inflammatory properties.
- Digestive Health: It's used as a digestive stimulant, carminative (relieves gas), and to alleviate symptoms of indigestion and bloating.
- Respiratory and Other Ailments: Traditional medicine uses turmeric for respiratory issues like asthma, coughs, and sinusitis. It's also used for conditions such as arthritis, diabetes, and liver disorders.

2) Cosmetic & Personal Care Uses

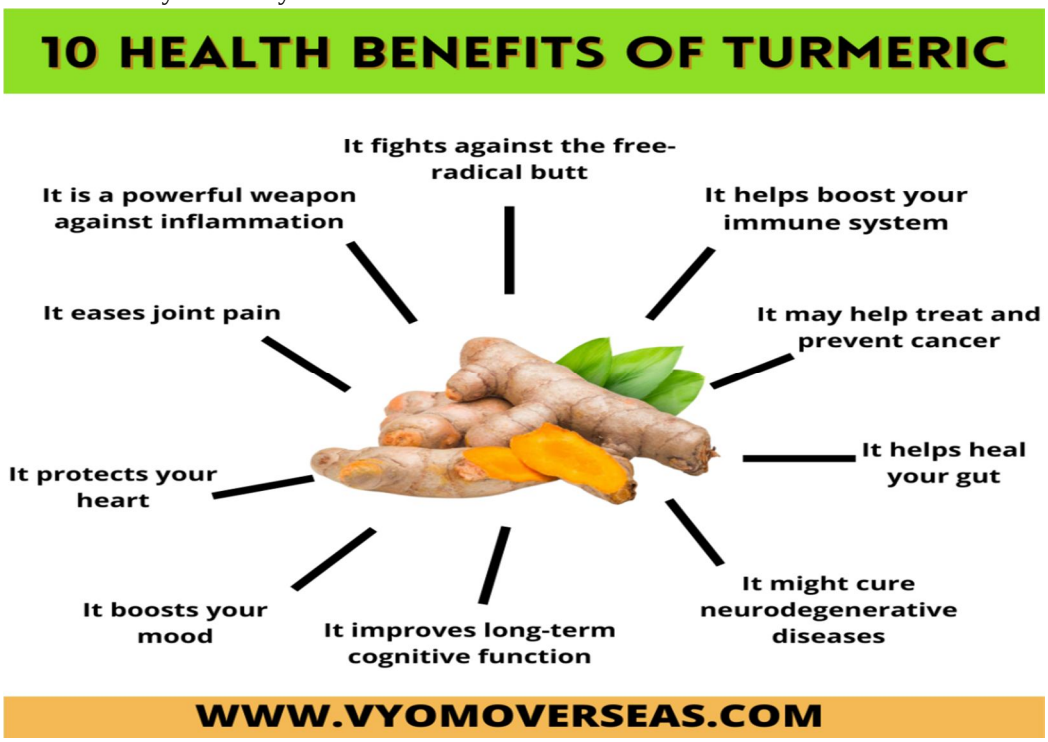
- Skin Brightening: Turmeric paste is a traditional ingredient in facial masks to enhance complexion and make the skin glow.
- Antiseptic Properties: It's applied to the skin to ward off harmful bacteria and as a remedy for skin conditions.
- Hair Removal: In some parts of India, women apply turmeric paste to remove unwanted hair.

3) Culinary Uses

- Spice and Coloring Agent: Turmeric is a well-known spice and seasoning, used to add its distinct color and flavor to food and beverages.
- Health-Boosting Foods: It can be incorporated into dishes like soups and eggs to gain its potential health benefits.

4) Cultural & Spiritual Significance

- Religious Ceremonies: In Hinduism and Buddhism, turmeric symbolizes fertility, prosperity, and purity and is used in many ceremonies, including weddings.
- Dyes: It has been historically used to dye the robes of Buddhist monks.



IV. CONCLUSION

Turmeric is concluded to be a potent, natural medicinal compound with wide-ranging health benefits, primarily due to its active ingredient, curcumin, which boasts strong antioxidant and anti-inflammatory properties. Historically used in traditional medicine, modern science has validated its potential in preventing and treating conditions like inflammation, cancer, Alzheimer's, and diabetes, though its solubility and degradation in the body present challenges.

A. Key Conclusions

1) Powerful Active Compounds: The primary active compounds in turmeric, called curcuminoids, are responsible for its therapeutic effects.

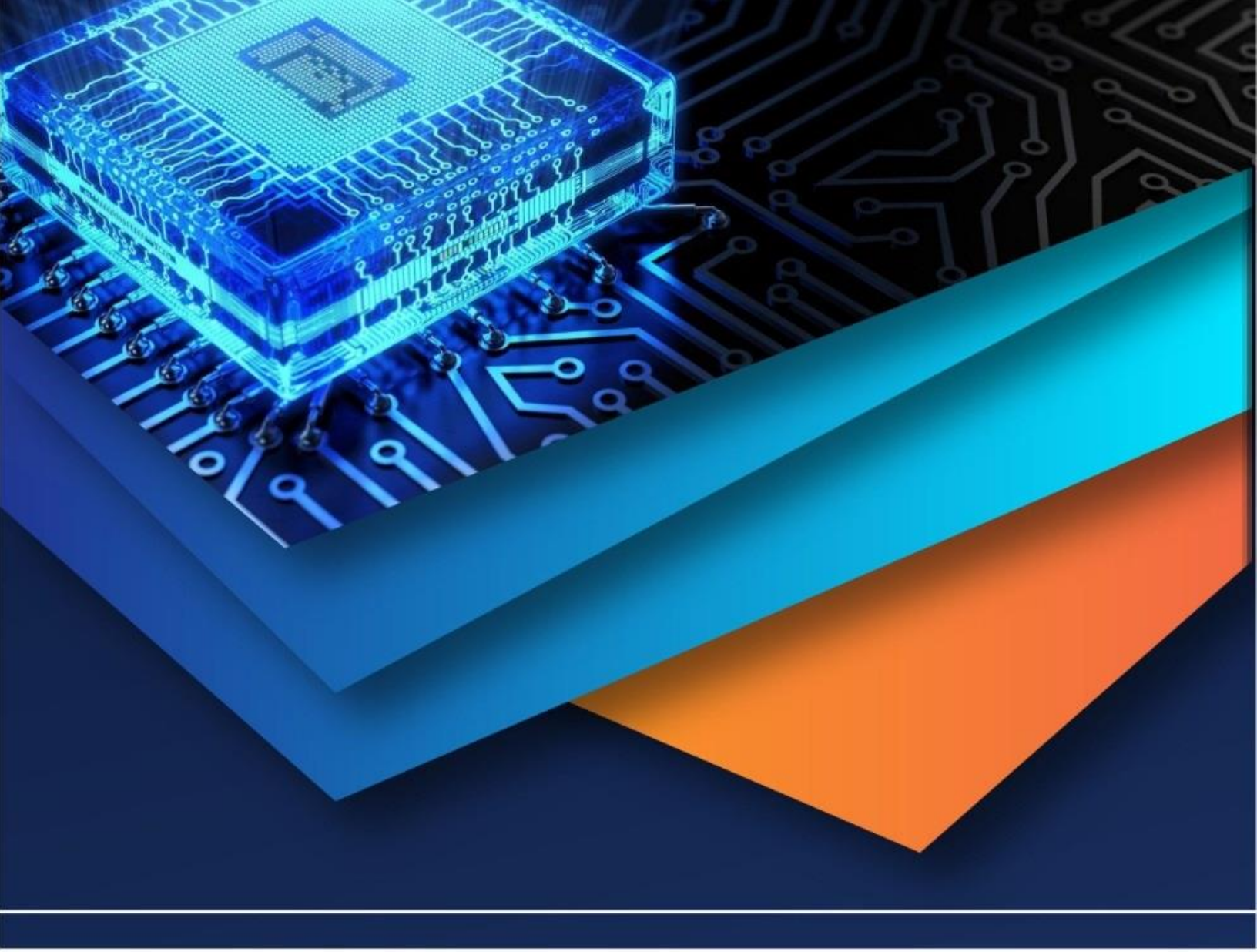
2) Therapeutic Potential: Turmeric is shown to have antioxidant, anti-inflammatory, antimicrobial, and anticancer properties.

3) Disease Prevention and Treatment: Research suggests turmeric can benefit conditions such as arthritis, chronic inflammatory disorders, diabetes, and Alzheimer's disease.

4) Traditional and Modern Use: Its use extends from traditional Asian practices to contemporary pre-clinical and clinical trials, validating its role as both a culinary spice and a potential therapeutic agent.

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