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The Origin and Identification of Turmeric as Antiseptic Agent in Ancient India

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Abstract: ***Turmeric (Curcuma longa), revered in ancient Indian traditions as a versatile spice, dye, and antiseptic agent, has been integral part of Ayurveda, Siddha, and folk medicine for over 4,000 years, primarily for wound healing, infection prevention, and anti-inflammatory applications. It is also known as "India Saffron" that has been well identified as Ginger family Zingiberaceae which is perennial and rhizomatous, herbaceous plant grown more in India and Southeast Asia. It requires temperatures between 20 to 30^{0}C with high annual rainfall to thrive. The aim and objective of this article is to explore historical evolution from Vedic texts like the Atharva Veda, Charaka Samhita and Sushruta Samhita to modern scientific validation, highlighting its role in religious, rituals, household kitchens, and rural healthcare amid biodiversity hotspots in India and also to provide an overview of potential health benefits of Curcumin. It examines biopiracy challenges, exemplified by the revoked US Patent 5,401,504 in 1997 through CSIR's prior art evidence from ancient Sanskrit and Hindi sources, leading to the Traditional Knowledge Digital Library (TKDL) for defensive Intellectual Property protection. Key bioactive compound curcumin strengthens turmeric's antimicrobial, anticancer, and detoxifying properties, bridging traditional oral knowledge with contemporary research on drug resistance and nano formulations. While global dissemination via trade enriched Unani and Southeast Asian systems, ongoing issues like oral tradition vulnerability and synthetic patents underscore needs for equitable benefit-sharing. This synthesis affirms turmeric's enduring legacy as a safe, natural therapeutic, urging further clinical trials to harness its potential against modern ailments.***

Keywords: Curcumin, Traditional Knowledge Digital Library, Intellectual Property Rights, Traditional Medicine, Ayurveda, Sushruta Samhita

1. Aim and Objective

The aim and objective of the article is to explore "the Origin and identification of Turmeric as Antiseptic Agent in Ancient India"

2. Introduction

The word Turmeric is synonymous with every household in India if not in Asia for extensive use as a spice, food preservative, coloring agent and also used as a medicine for its medicinal value. This Turmeric (Yellow Powder) considered to be the grandmother of medicine is extensively cultivated in India irrespective of regions and its extraction from the raw turmeric spice is identified as an traditional health medicine in India thousands of years back as an antiseptic properties and its healing qualities for wounds are extensively used in India by Tribes when Allopathic has not opened the eyes. Turmeric (Curucuma Longa) was also used as a food preservative, coloring material and as a dietary spice, dietary pigment and also as already mentioned above as a Traditional medicine of India folk as a treatment of illnesses. Use of Medicinal plants is a practice in Ancient India when the Acharyas are able to find their medicinal properties and valuable qualities which has become the source of modern drugs. This turmeric being used as an ingredient in textile, pharmaceutical industries to enhance the quality of the ultimate product. In Ancient India since Vedic period there is no religious ceremony either good or bad without use of Turmeric powder in one form or other. Currently, traditional Indian medicines use it for bilateral disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism and sinusitis. If you go through the Ancient Indian books through the periods of Sushruta, Charaka and Vagabhatta, it is described as an aromatic stimulant and calmative. Turmeric powder mixed with lime is a household remedy in Ancient India for the treatment of sprains and swelling caused by injury applied locally over the affected areas. This Turmeric Powder mixed with water is being applied since ancient India by the women for their feet and face to protect it from bacteria because in those days, the women is to bring water from lakes and rivers, far of places, are subjected to bacteria in water and in the atmosphere. To prevent these things to safeguard the health of the women they insisted to apply turmeric powder mixed with water to the face and feet under the disguise of traditions and to amplify the glory of the ladies.

Since thousands of years ago, Turmeric is considered as Antiseptic Agent. It is also called as key part of Ayurveda. Turmeric has a very long history of medicinal use that dates back more than 4000 years; in India and Southeast Asia, turmeric is used not only as a principal culinary spice but it also holds significance in religious ceremonies. It is also known as "***Indian Saffron***" turmeric is a product of Curcuma Longa, a flowering plant in the ginger family Zingiberaceae. It is perennial, rhizomatous, herbaceous plant native to the Indian Subcontinent and Southeast Asia that requires temperatures between 20 to 30^0 C and high annual rainfall to thrive. The Latin word "Curcuma" is derived from the Arabic word "***Kourkoum***", which means saffron. It grows in hot, humid conditions and requires plenty of water. It has a short pseudo stem and large oblong leaves. It has pale yellow flowers and does not bear fruits. It is cultivated in India, China, Indonesia, Thailand and other tropical regions including Africa.

In Ancient period since 3000 BCE Turmeric is used as natural antiseptic to cure cuts and wounds, skin infections, burns believed to purify the body and prevent infection. Widely it is used in Indian Households as "***Haldi***" applied during injuries to stop infection and symbol of purity in religious and wedding rituals. It is also used in Unani and Siddha medicine. This knowledge has been spread to China, the Middle East and Southeast Asia through trade. Turmeric evolved from a traditional household to a scientifically validated antimicrobial agent proving that ancient knowledge can align strongly with modern science.

Turmeric grows wild in the forests of South and Southeast Asia, where it is collected for use in classical Indian Medicine i.e. Sidhha and Ayurveda. In Eastern India, the plant is used as one of the nine components of "*nabapatrika"* along with young Plantain or banana plant, taro leaves, barley (Jayanti), wood apple (bilva), pomegranate (darimba), Saraca indica, manaka (Arun), or manakochu, and rice paddy. The Haldi Ceremony called *gayeholud* in Bengal (literally "yellow on the body") is a ceremony observed during wedding celebrations of people of Indian culture all throughout the Indian subcontinent. (Wikipedia)

In Tamilnadu and Andhra Pradesh, as a part of Tamil-Telugu marriage ritual, a dried turmeric tuber tied with a string is used to create a Thali necklace. In western and coastal India, during weddings of the Marathi and Konkani people, Kannada Brahmins, turmeric tubers are tied with strings by the couple to their wrists during a ceremony, Kankana Bandhana. In many Hindu communities, Turmeric paste is applied to the bride and groom as part of pre-wedding festivities known as Haldi Ceremony.

It is an astonishing fact to find that in any curry whether it is vegetarian or non vegetarian this yellow colored powder namely Turmeric and also known as Indian Saffron is must. Turmeric has a very long history of medicinal use that dates back to 4000 years in India and Southeast Asia is used not only as a principle "***culinary spice***" but also holds a significant part in religious ceremonies. No ceremony is not a conclusive ceremony without use of Turmeric powder in one form or other.

3. Literature Review

If you go back and look into the history of Turmeric it is observed that Turmeric or Curucuma Longa is a flowering plant in the ginger family and it is perennial, rhizomatous, herbaceous plant native to the Indian subcontinent and Southeast asia that requires temperatures between 20 and 30^0C (68 and 86^0 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. (Wikipedia).

Turmeric originated in South Asia, particularly India, where it was first cultivated more than 4,000 years ago in warm, humid regions. Ancient Indian texts like the Atharva Veda (circa 1500 BCE) reference its use in rituals, cuisine, and healing, establishing it as a sacred plant in Ayurveda. It grew wild in forests of places like Java, Indonesia, by the 5th century AD, marking early spread within Southeast Asia.

Turmeric's origin and evolution have been extensively documented in scholarly literature, confirming its ancient roots in South Asia and subsequent global dissemination. This literature review synthesizes key historical accounts, highlighting consistencies and minor chronological variances across sources.

Most reviews trace turmeric (*Curcuma longa*) to Vedic India around 4000 years ago, where it featured in the Atharva Veda for culinary, ritual, and medicinal uses in Ayurveda. Susruta's compendium (250 BCE) prescribed turmeric ointments for poisoning, underscoring early therapeutic roles. Archaeological evidence supports this, with turmeric found in sites like Farmana (2600–2200 BCE) and Megiddo, Israel (second millennium BCE).

India is one of 17 countries in the world to be designated as a mega diversity hotspot. India is a house to 7.8% of the world's recorded plant and animal species despite of having 2.5% of the land area. In India, the biodiversity is primarily understood at three levels: species, genetics and ecosystem.

A saying by Marcus Garvey,

"People without the knowledge oftheir past history, origin andculture is like a tree without roots."

Ancient Traditional Medicines in Rural India:

Traditional medicines have always played a central role in rural health care. In Villages, where access to modern medical facilities is limited, local healers and Vaidyars rely on centuries-old knowledge passed down through generations. This knowledge is deeply intervened with the use of medicinal plants, poly-herbal formulations, and natural remedies. The Indus Valley Civilization, for example, already demonstrated an understanding of sanitation and hygiene, and excavations reveal the use of various herbs and drugs for treatment. The golden age of Indian medicine, from around 800 BCE to 1000 CE, was marked by the compilation of seminal works such as the Charaka Samhita and Sushruta Samhita. These texts describe not only herbal remedies but also advanced surgical techniques, dietetics, and preventive health measures. Rural communities continue to use these traditional practices, often adapting them to local needs and available resources.

Turmeric has been in use in Asia for centuries and it has taken the important place in preparation of Ayurvedic Siddha medicines and Unani. If we trace out the history of Turmeric and is being used as a dye. Later it was found that it has medicinal properties and is being used as a folk medicine in a traditional manner. As the time passed off because of these extensive properties it has taken the place of dye in textile industry to color the cloth and ropes. Turmeric is a perennial and herbaceous plant that reaches upto 1 meter in tall to the number of branches.

In ancient India, the Acharyas who practiced medicine in Ayurveda and Siddha have identified the biological activities of Turmeric and also diabetic activities. Diabetes mellitus is

a group of metabolic condition that have arrived at pandemic extents around the world. It is a well known fact that diabetes is a metabolic condition due to increase of blood sugar levels in the body. This turmeric powder is being used in one form or other or as an ingredient in controlling the blood glucose production by enhancing the insulin signalling. That is why in Ancient India it has become one of the, the use ingredient in all the foods whether vegetarian or non vegetarian. As already mentioned above Turmeric is having the antibacterial activity which is one of the biggest challenges facing by mankind is antimicrobial resistant's against antibiotics; namely the diseases caused by bacteria, fungus and viruses influence human population all over the world. This led to discovering the unconventional therapeutic approaches to overcome the problem; for this turmeric extracts have better properties to penetrate into the cells of bacteria causing cell permeabilization resulting into the leakage of inorganic cat ions thus inhabiting pathogenic properties at low or zero toxic doses. Due to fungal infections, increasing and alarming rate and the resistance against antifungal drugs which causes health related problems, this turmeric powder plays an important role due to its medicinal value is also being used as an anti-inflammatory drug in one form or other to control the same.

It is not uncommon to say Turmeric Powder has been used especially in India in Traditional occasions from birth to burial and is considered to be sacred, auspicious and harbinger of prosperity. And it is not uncommon to mention here, in India this Turmeric tied to an yellow thread in some of the tribes as a Mangalasutra instead of metal ornament.

Transmission and Preservation of Traditional Knowledge:

Much of this Traditional Medicinal Knowledge (TMK) has been transmitted orally, from teacher to student and from generation to generation, rather than through formal documentation. This has led to a rich, decentralized system of health care that is highly adaptable but also vulnerable to loss and misappropriation. The knowledge is considered a part of the cultural and spiritual identity of the communities that hold it.

Traditional Medicine and Intellectual Property Rights:

The enormous rich heritage in identifying normally useful available material like Turmeric though identified by our ancestors in ancient India for their enrichment in making use of them for the benefit of mankind and did not claim any authenticity nor copy right nor patent to get benefit out of it shows our ancestors magnanimity in giving whatever they identified for the benefit of mankind irrespective of caste, religion or creed. One such identified material is turmeric and our ancestors its invaluable properties as a medicine especially as an antiseptic dose. However, some greedy people who want financial gains on others identification filed patent rights as if they found the material and its properties. In this article i would like to bring out the truth of such property right towards turmeric. In US, patent number 6007795 (Thomas Masterman, Zean Spencer) made futile attempt in getting patent right *"discloses a method for inhibiting bacterial in the mouth of a patient that includes placing a particle containing a degradable material and an antimicrobial agent in the mouth of a patient as a tooth paste and mouth rinse, US Pat No. 5061106 (Steven Kent) discloses capsules or microspheres in the tuft holes in which the bristles of a tooth brush are mounted. These capsules or microspheres includes medicament that is released during the use. US Patent No. 4780320 (Richard Baker) discloses a controlled release during delivery system for placement in the periodontal pocket. Patent WO 20800325A2 (Swati Pramal) discloses a bioadhesive composition for oral application which comprises Curucuminoid substance as an active ingredient. However, the Indian Government has responded by creating the traditional knowledge digital library (TKDL) an initiative to document medicinal knowledge and prevent its misappropriation. However, current Intellectual Property Rights frameworks such as patents and copyrights are not always well suited to protecting traditional knowledge. Traditional Knowledge is often collective, evolving and not attributable to a single inventor making it difficult to fit into conventional IPR models.*

The rise of global interest in traditional medicines has brought both opportunities and challenges for rural communities in India. On one hand, there is growing demand for herbal products and natural remedies, leading to increased economic potential. On the other hand, the lack of formal documentation and legal protection has made traditional knowledge susceptible where multinational companies patent and commercialize remedies derived from indigenous knowledge without adequate compensation or recognition for the original knowledge holders.

Legal framework of Traditional Knowledge and Intellectual Property Rights:

The intersection of traditional knowledge and intellectual property rights in India presents a complex landscape. Historically, Traditional Medicinal Knowledge was transmitted orally leading to challenges in its formal documentation and legal protection. The India Patents Act, particularly after the amendment in 2005, explicitly excludes traditional knowledge from patentability. According to Section 3(P) of the Act prevent the patenting of inventions that are essentially traditional knowledge and safeguarding ancient formulations from misuse. Additionally, this Act recognizes oral knowledge as prior art, allowing opposition to patent claims based on information available within indigenous communities, even if undocumented. This defensive approach is complemented by the creation of Traditional Knowledge Digital Library which documents thousands of traditional formulations and serves as evidence to block unjust patent claims internationally. In the past four decades, the international community has endeavoured to protect human and cultural rights. The concept of Traditional Knowledge and Traditional Cultural Expressions and protection thereof has become a vital issue. Indian Biodiversity Act 2002 and Access and Benefit sharing mechanisms aim to ensure that communities traditional knowledge receive equitable benefits. A notable example is the Jeevani case, where the Kani tribe of Kerala shared their knowledge of Arogyapaacha Plant, leading to the development of a commercial drug and a formal benefit-sharing agreement between the tribes, researchers and industry partners. Such arrangements recognize the customary rights of traditional healers and promote ethical

use of indigenous knowledge. Efforts are underway to develop specific legal frameworks that recognize and protect traditional knowledge, ensuring that rural communities receive fair compensation and recognition for their contributions. The Convention on Biological Diversity (CBD) and other international agreements provide a basis for national sovereignty over genetic resources and associated knowledge, but implementation at the local level remains a challenge. Convention of Biological Diversity came into force on December 29, 1993 and it was administered by the United Nations Environmental Program (UNEP) and three main objectives of the CBD are • Conservation of Biological Diversity; • Sustainable use of its components and;• Fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

According to Article 8(j) of the CBD, refers to "***the Knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity. India has historically protected its traditional knowledge particularly in medicine***".

Landmark Legal case on Turmeric:

In early 90's, India won a battle on patent against two US scientists who discovered the healing qualities of Turmeric famously known as "***Turmeric Patent Case***"

*"**In 1995, the University of Mississippi Medical Centre was granted a US Patent on use of turmeric for its wound healing property. The claim covered a method of promoting healing of a wound by administering turmeric to a patient afflicted with the wound. This patent also granted them the exhaustive right to sell and distribute turmeric worldwide. The question arose whether "Use of Turmeric in Wound Healing' developed by the American researchers constituted prior art or not?***

According to the Indian Patent Act, 1970, an invention is: "a new product or process that involving an inventive step and capable of industrial application"..." Novelty is a requirement for a patent claim to be patentable that means an invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, ie., the subject matter has not fallen in public domain or that it does not form part of the state of the art."

Since the subject matter of the patent application, i.e... "Use of Turmeric in Wound Healing had already been published in ancient Indian texts, and turmeric preparations had been in use in India to treat wounds since ancient times, the purported developments by the American researchers had no novelty in invention.

The Council of Scientific and Industrial Research (CSIR) of India in 1996, filed an application for re-examination against the patent which was given to the University, citing enough documentary evidence of traditional knowledge, including an ancient Sanskrit text and a paper published in the Journal of the Indian Medical Association in 1953. The Council of Scientific & Industrial Research (CSIR) argued that turmeric was known in India and had been used for thousands of years for healing wounds alongside use as a food Ingredient, and argued that its medicinal use was not a novel invention. Their claim was supported by 32 references written in different languages such as ancient Sanskrit, Urdu and Hindi texts, a paper published in 1953 in the Journal of the Indian Medical Association. The USPTO, after ascertaining that there was indeed no novelty in their purported invention, revoked the patent granted to the University of Mississippi Medical Centre in 1997, and acknowledged that use of turmeric and its medicinal properties had been known to India for thousands of years 16). In this particular case of grant of a foreign patent, the traditional knowledge indigenous to India was thankfully rescued from foreign monopoly". *(https://ssrana.in/articles/nature-of-ipr-protection-given-by-law-in-turmeric-case).*

Gist of this case, patent was ultimately revoked by the United States Patent and Trademark Office (USPTO) in 1997 after evidence was presented showing that the use of turmeric for wound healing was traditional knowledge in India and lacked novelty setting a precedent for using legal means to protect traditional knowledge.

4. Discussions and Analysis

Before analyzing the benefits of Turmeric in our daily life it is worth mentioning about its properties as a medicine are,

1) It is a natural antiseptic and antibacterial agent, useful in disinfecting cuts and burns.
2) When combined with cauliflower, it has shown to prevent prostate cancer and stop the growth of existing prostate cancer.
3) Prevented breast cancer from spreading to the lungs in mice.
4) May prevent melanoma and cause existing melanoma cells to commit suicide.
5) Reduces the risk of childhood leukemia.
6) Is a natural liver detoxifier
7) May prevent and slow the progression of Alzheimer's disease by removing amyloyd plaque buildup in the brain.
8) May prevent metastases from occurring in many different forms of cancer.
9) It is a potent natural anti-inflammatory that works as well as many anti-inflammatory drugs but without the side effects.
10) Has shown promise in slowing the progression of multiple sclerosis in mice.
11) Is a natural painkiller and cox-2 inhibitor.
12) May aid in fat metabolism and help in weight management.
13) Has long been used in Chinese medicine as a treatment for depression.
14) Because of its anti-inflammatory properties, it is a natural treatment for arthritis and rheumatoid arthiritis.
15) Boosts the effects of chemo drug paclitaxel and reduces its side effects.
16) Promising studies are underway on the effects of turmeric on pancreatic cancer.
17) Studies are ongoing in the positive effects of turmeric on multiple myeloma.

18) Has been shown to stop the growth of new blood vessels in tumors.
19) Speeds up would healing and assists in remodelling of damaged skin.
20) May help in the treatment of psoriasis and other inflammatory skin conditions.

Turmeric powder or raw turmeric is like a closely knitted fabric and has penetrated into the social and religious functions as a symbol of purity especially in Hindu culture. Turmeric Powder has become a part of our life and widely used in various day-to-day religious and social ceremonies like the Turmeric Powder mixed with water made like a small hill put it on the leaf and regarded as Ganesha before any ceremony and is worshipped in Hindu Culture. In a word there is no Hindu function in India, the first place occupied is Turmeric or in various forms. It is also not an antiseptic traditional medicine but also gives a beautiful skin to uplift the beauty of a person and is being used in the female youth. It is also being used as a ingredient in number of cosmetic drugs that are being flooded in the market as shine your skin/Glow your skin.

As already mentioned above especially in India and China and Southeast Asia, Turmeric is one of the main ingredients and also valued its properties in Ayurveda for its healing properties more than 5000 years ago. However, the present form of turmeric that is available in the market is being polluted with chemicals and other ingredients to make it more attractive if used are giving negative impact.

Use of Turmeric powder or Turmeric as a traditional medicine in India, China and Southeast Asia has the following benefits. As we know that Turmeric is a member of the ginger family grown and harvested in Indian and other tropical countries is rich and contains proteins, vitamins, minerals, carbohydrates and yellowish, orange volatile oils called Curuminoids that are responsible for the biological activity of turmeric. A brief functioning and the biological activity of turmeric are mentioned below:

1) Beneficial derivative: Curucumin is the principle curuminoid derived from Turmeric and is best known as an anti-inflammatory.
2) Anti-cancer Agent: Turmeric shows real promise as an anti-cancer agent to its anti-oxidant activity. Several research studies shown that the frequent use of turmeric has been linked to lower rates of breast, lung, colon and prostate cancer and laboratory tests have a conclusive proof that Curucumin may prevent the development of tumors and slow the spread of cancer cells and it is in a nacent stage.
3) As a dietary asset: This Turmeric Powder is a best cholesterol fighter and there is no kitchen without Turmeric Powder. Turmeric powder stimulates the livers production of bile to help break down fats. However, the research found that Turmeric should be used in limited quantity otherwise it may cause stomach upset at times.

As many as 133 species of Curucuma have been identified globally and most of them have common local names and are used for various medicinal formulations. Normally turmeric plant needs temperature between 20 to 30 degrees and considerable amount of rainfall annually to survive. India produces nearly the world's entire turmeric crop and also consumes 80% of it and also the Indian turmeric and its inheritant qualities and high content of the important bioactive compound, Indian turmeric is considered to be best in the world.

The other benefit of turmeric is for its external application especially in remote areas where allopathic medicines are not available or chance of getting them less. Those people use turmeric powder on fresh wounds, and also to insect strings and to help the healing process in Chickenpox and smallpox. In Ayurvedic medicine, Turmeric is considered as readily available medicine for cuts, burns and bruises and as a remedy for stomach problems. In India it is customary to add turmeric powder in every vegetable, pulses dish cooked in Kitchen. It is a blood purifier. Turmeric is a good dermatologic antibiotic used in India and in addition as a bacterial, fungal infections are prevented by the application of Turmeric Powder.

The various uses of Turmeric as food additive:

- Turmeric is a mild aromatic stimulant used in the manufacture of curry powders.
- Turmeric is used in products that are packaged to protect them from sunlight.
- The oleoresin component of turmeric is used for oil-containing products.
- The curcumin solution or curcumin powder dissolved in alcohol is used for water containing products.
- Sometimes in pickles and mustard, turmeric is used to compensate for fading.
- Turmeric is also used for coloring cheeses, salad dressings, margarine, yoghurts, cakes, biscuits, popcorn, cereals, sauces, etc.
- Turmeric also forms a substitute for mustard in the cattle feed.

The Turmeric Patent Case (U.S. Patent No. 5,401,504, revoked 1997) catalyzed defensive mechanisms against bio piracy worldwide by demonstrating prior art's efficacy in invalidating TK-based patents. It spurred India's Traditional Knowledge Digital Library (TKDL) and influenced international IP discourse.

Creation of Traditional Knowledge Digital Library:

CSIR's successful challenge prompted Traditional Knowledge Digital Library's 2001 launch, digitizing 30+ million pages of Indian Traditional Knowledge in multilingual patent formats. Accessible via non-disclosure agreements to USPTO, EPO, JPO, and others, it has blocked or revoked 250+ wrongful patents, reducing opposition costs from $0.2-0.6M and 5-13 years. This model serves as a blueprint for defensive protection, preventing ex-post revocations.

Global Patent Office Reforms:

The case exposed examiners' inability to recognize non-English Traditional Knowledge, leading toTraditional Knowledge Digital Library collaborations: USPTO (2000), EPO (2008), JPO (2009). It has flagged misappropriations like Colgate's nutmeg mouthwash and Monsanto's melon patents, embedding Traditional Knowledge prior art searches in global processes.

WIPO and Policy Shifts

It fuelled WIPO's Intergovernmental Committee on Traditional Knowledge, Genetic Resources, and Folklore (IGC), advocating disclosure requirements, benefit-sharing, and sui generis protections. Discussions emphasize "defensive" (anti-patent) and "positive" (rights-granting) measures, though binding treaties remain elusive. Similar wins (neem, basmati) amplified calls for reform in CBD/TRIPS contexts.

Ongoing Challenges

While transformative, Traditional Knowledge Digital Library focuses on documented knowledge, leaving oral traditions vulnerable; critics note limited benefit-sharing and emerging synthetic curcumin patents. It has inspired databases in China, South Africa, and Peru, fostering North-South equity debates.

Global protection of traditional knowledge (TK) faces persistent hurdles due to mismatched IP frameworks and emerging tech threats. Despite initiatives like India's TKDL, biopiracy and enforcement gaps undermine communal heritage.

From an article titled "***A brief review on Turmeric Patent Case with its implications on the documentation of Traditional Knowledge***" written by Anusree Bhowmick, Smaranika Deb Roy and Mitu De, Department of Botany, Gurudas College, Kolkata it has stated that,

*"**The turmeric patent cancellation is the earliest example of a successful challenge to a patent over traditional knowledge. It was the first time that a patent based on Traditional knowledge of a developing country had been successfully challenged. It demonstrated both that 'unjustified patent can be challenged' and the difficulty of checking in one country (in this case the United States) whether public knowledge about an idea already exists in another country (in this case India). The legal cost incurred by India was estimated to be about at US $10,000 but the intangible value to the Indian users is immense. In a publication in Nature K. Jayaraman writes 'CSIR's Director of Council for Scientific and Industrial Research (CSIR) during 1995 -2006, R. A. Mashelkar, said the success of the case had far-reaching consequences for the protection of the traditional knowledge base, "not only in India but in other Third World countries" [8]. In the paper the author goes on to state that the CSIR then Director R. Mashelkar had said 'the case also highlights the importance of documenting traditional knowledge, to provide evidence of prior knowledge' To avoid/ prevent patent grants to TK in India, an initiative has been taken to document and publish all the TK by an e-library and such library is called as Traditional Knowledge Digital Library (TKDL). TKDL provides with details of scientific and traditional knowledge arranged in a manner according to the classification of international patents. This type of intellectual property protection aims to prevent people outside the community from getting Intellectual Property Rights over Traditional Knowledge. The Traditional Knowledge Digital Library (TKDL) is a searchable database of traditional medicine compiled by India. This supplies for evidence that support prior art by patent examiners when assessing plant application.**"*

5. Conclusion

This explorative article on Turmeric has comprehensively explored the historical background and its medicinal properties, the journey of the product namely Turmeric in intellectual property mileage, its medicinal value and out of all a must ingredient in all the Indian household kitchens are properly identified and brought out. However, the cultivation, different varieties and other properties of Turmeric in any form are not touched because they out of boundaries of the present explorative study of Turmeric. Therefore, Turmeric (Curcuma Longa L.) is highly useful due to its manifold uses and close association with social, cultural, religious, folk and classical art forms besides its medicinal, cosmetic and ethno-botanical uses in human beings. It is considered to be safe, non-toxic and effective alternative for may conventional drugs due to its distinguished therapeutic properties and multiple effects on various systems on the human body. According to World Health Organization, 75% of the people are using herbs for basic healthcare needs. In India, Ayurveda system of herbal medicine, creates strengthening and warming effects on the human body by using turmeric. It is known to be one of the oldest spices that have been used in India since ages. The primary bioactive compound in turmeric has emerged as a promising therapeutic agent with a wide range of pharmacological activities. Numerous clinical studies have taken it as a major challenge limiting its therapeutic potential. To overcome this limitation, many researchers have explored various strategies, including nanoformulation and combination of therapies. Future studies on identifying novel drug delivery systems, optimizing combination therapies and conducting well-desgined clinical trials it can be harnessed to its full potential as safe and effective therapeutic agent in using of herbs to the latest modern technology associated with traditional knowledge.

However, much has to be explored about Turmeric and its medicinal properties because it is not an artificial agent manufactured with some chemicals/compounds either inorganic or organic but a natural product bestowed on the mankind by the super human power and the only object is to explore its usage in its entirety. So that, the humans can be saved from using artificial medicines that are flooding in the market.

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