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ROLE OF ICTS IN PROMOTING AND PRESERVING THE TRADITIONAL MEDICINAL KNOWLEDGE IN INDIA

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ABSTRACT

Traditional medicinal knowledge is a valuable asset for any country as it plays a major role in making the nation more progressive and transforming its society. Since time immemorial, India has possessed a rich traditional knowledge of ways and means practiced to treat diseases afflicting people. This knowledge has generally been passed down by word of mouth from generation to generation. A part of this knowledge has been described in ancient classical and other literature, often inaccessible to the common man and even when accessible rarely understood. Documentation of this existing knowledge, available in public domain, on various traditional systems of medicine has become imperative to safeguard the sovereignty of this traditional knowledge and to protect it from being misappropriated in the form of patents on non-original innovations, and which has been a matter or national concern. Since time immemorial, India has possessed a rich traditional knowledge of ways and means practiced to treat disease affecting people. The health sector has always relies on technologies. According to WHO (2004), they form the backbone of the services to prevent, diagnose, and treat illness and disease. ICTs are only one category of the vast array of technologies that may be of use. Given the right policies, organization, resources, and institutions, ICTs can be powerful tools in the hands of those working to improve health. Advances in information and computer technology in the last quarter of the 20th century have led to the ability to more accurately profile individual health risks. The paper describes the role of the Traditional Knowledge Digital Library and its activities in preserving traditional medicinal knowledge in India. It also discusses the need for preserving traditional medicinal knowledge.

KEYWORDS: ICT, Traditional systems, digital library and medicinal knowledge.

INTRODUCTION

Traditional knowledge has always been an easily accessible treasure and thus has been susceptible to misappropriation. The traditional knowledge, particularly, related to the treatment of various diseases has provided leads for development of biologically active molecules by the technology rich countries. In other words, traditional knowledge is being exploited for bio-prospecting. Also Traditional knowledge is often misappropriated, because it is conveniently assumed that since it is in public domain, communities have given up all claims over it. Traditional Knowledge includes both the codified (documented) as well as non-codified information (not documented but may be orally transmitted). Bio-piracy of codified Indian traditional knowledge continues, since, this information exists in regional languages, and there exists a language barrier due to which the patent offices are unable to search this information as prior art, before granting patents. Formulations used for the treatment of human ailments from traditional knowledge are time-tested since they have been in practice for centuries. The reliability of the traditional medicine systems coupled with the absence of such information with patent offices, provides an easy opportunity for interlopers for getting patents on these therapeutic formulations derived from traditional medicine systems.

Misappropriations of traditional knowledge

The grant of patents on non-patentable knowledge (related to traditional medicines), which is either based on the existing traditional knowledge of the developing world, or a minor variation thereof, has been causing a great concern to the developing world. In many of these cases the country had to fight for revocation of the granted patents, Revocation, may not be a feasible option possible for all the patents taken on the traditional knowledge since it involves huge costs and time.

Protecting codified traditional knowledge

Patent examiners, in the international patent offices, while examining the patentability of any claimed subject matter, use available resources for searching the appropriate non-patent literature sources. Patent literature, is usually wholly contained in several distinctive databases and can be more easily searched and retrieved whereas non-patent literature prior art is often buried somewhere in the many and diverse sources. Therefore, a need was felt to

create more easily accessible non-patent literature databases on traditional knowledge of India (http://www.tkdl.res.in/tkdl/langdefault/common/ProtectedPlants.asp).

Digital libraries of traditional medicine

A number of countries are using information technologies to develop digital libraries of traditional knowledge both to use the knowledge in current community projects but also to prevent misappropriation of the knowledge through commercial patents. India in particular has developed a Traditional Knowledge Digital Library that contains information on 36, 000 formulations used in *Ayurveda*—India's 5, 000-year-old system of traditional medicine. The information—presented in English, French, German, Spanish and Japanese—was created in a format accessible by international patent offices to prevent the granting of inappropriate patents.

The Indian system uses a classification system similar to that used by the International Patent Classification (IPC). The IPC has agreed to include the Indian system in its own classification, which will be expanded to include about 200 sub-groups of drugs derived from Indian medicinal plants. This will significantly aid patent offices who can search the databases to ensure that proposed patents are truly novel and have not been previously reported.

Following the success of the Indian system, other South Asian countries (Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka) that are members of the South Asian Association for Regional Cooperation (SAARC), have decided to create a composite digital library that will network the individual Traditional Knowledge Digital Libraries (TKDL) from each country (SAARC to set up traditional knowledge digital library, Financial Express, January 04, 2005). The SAARC TKDL will provide a uniform system for organizing, disseminating and retrieving traditional knowledge seamlessly across regions or countries. Accessible via the Internet, the library will initially contain information on traditional medicine including.

- Materials used for treatment e.g., plants, animal products, minerals.
- Generic or specific method of preparations or designs.
- Dosage, mode and time of administration.
- Therapeutic action or application.

The SAARC digital library will be used to fight contentious patent claims by proving the prior existence of knowledge, as well as promoting research on novel drugs, enhancing the region's share of the global herbal medicine market and helping set the international a agenda on intellectual property rights.

Traditional knowledge capture

Indigenous knowledge, also referred to as traditional or local knowledge, refers to the large body of knowledge and skills that has been developed outside the formal educational system. IK is embedded in culture and is unique to a given location or society. It is the basis for decision-making of communities in food, security, human and animal health, education and natural resource management (Indigenous Knowledge Program, World Bank http://www.worldbank.org/afr/ik/index.htm).

Indigenous knowledge encompasses many forms. It includes cultural heritage in the form of traditional stories, songs, dances and ceremonies that reflect beliefs related to spirituality, family, land and social justice. It includes potentially patentable knowledge about traditional medicines, foods, farm practices, architecture and construction, handicrafts, artwork and folk music. It includes knowledge about people, places, plants, animals, historical events associated with a particular community.

The first steps in many Indigenous Knowledge projects involve identifying the material to be preserved and then capturing it in a digital form so that it can be systematically documented, shared, and re-used by permitted groups or individuals. Determining the optimum and most culturally appropriate approach to selecting, eliciting, recording, describing and disseminating this knowledge without insensitivity, intrusion, constraints, degradation or misrepresentation of the content, is a challenge that is often underestimated.

Appropriate consultative processes need to be established to identify and prioritize the material to be captured. Alternative digital technologies and environments for recording and storing the data need to be compared and evaluated. Because of the oral tradition of Indigenous knowledge, audiovisual digital recording devices such as digital video cameras and audio recorders are a primary tool for capturing techniques, practices, stories, language, songs and dances. Scanners are being used to digitize photographs, manuscripts, maps and historic documents. Increasingly 3D scanners are used to generate 3D digital surrogates of physical artifacts in museums and cultural institutions, such as tools, shields, carvings,

clothing and baskets.

Traditional Knowledge Digital Library (TKDL) - A tool for prevention of misappropriation of traditional knowledge.

(Source: http://www.tkdl.res.in/tkdl/langdefault/common/ProtectedPlants.asp).

TKDL targets Indian Systems of Medicine, viz., Ayurveda, Unani, Siddha and Yoga available in public domain. This is being documented by sifting and collating the information on traditional knowledge from the existing literature existing in local languages such as Sanskrit, Urdu, Arabic, Persian and Tamil in digitized format, which will be available in five international languages which are English, German, Spanish, French and Japanese. Traditional Knowledge Resource Classification (TKRC), an innovative structured classification system for the purpose of systematic arrangement, dissemination and retrieval was evolved for about 5, 000 subgroups against few subgroups available in International Patent Classification (IPC), related to medicinal plants. The information is being structured under section, class, subclass, group and subgroup as per the International Patent Classification (IPC) for the convenience of its use by the international patent examiners. Information comprising about 2 lakh formulations has been transcribed for realizing the objective of TKDL Project.

Each Sloka is read and converted into a structured language using Traditional Knowledge Resource Classification by subject (Ayurveda, Unani, Siddha or Yoga) experts. The codes are then filled into the data entry screen. The Slokas are also saved in the database. The translated version of all the TKRC codes is ported in the database. The abstraction is done by the subject experts. The codes once saved in meta data directory are converted in different languages based on Unicode technology. The formulations are presently being converted into English, German, French Japanese and Spanish languages. The converted format of the formulation is readable and can be understood by a layman though it is targeted towards a patent examiner.

TKDL software with its associated classification system i.e., TKRC converts text in local languages into multiple languages as mentioned above. It may be noted that the software does not transliterate, rather it does a knowledge-based conversion, where data abstracted once is converted into several languages by using Unicode, Metadata methodology. Software also converts traditional terminology into modern terminology, for example, Jwar to fever,

Turmeric to Curcuma longa, Mussorika to small pox etc. TKDL includes a search interface providing full text search and retrieval of traditional knowledge information on IPC and keywords in multiple languages. The search features include single or multiple word searches, complex Boolean expression search, Proximity search, Field search, Phrase search, etc in the form of simple and advance search options. Simple search lets the user search a combination of keywords. Advance search lets the user search using Boolean expressions, using the expressions like "near", "and", "and not". Searches are also available on IPC and TKRC codes.

TKDL acts as a bridge between formulations existing in local languages and a Patent Examiner at a global level, since the database will provide information on modern as well as local names in a language and format understandable to Patent Examiners.

Bio-piracy of traditional knowledge

(http://www.tkdl.res.in/tkdl/langdefault/common/ProtectedPlants.asp).

Turmeric (*Curcuma longa* Linn.)

The rhizomes of turmeric are used as a spice for flavouring Indian cooking. It also has properties that make it an effective ingredient in medicines, cosmetics and dyes. As a medicine, it has been traditionally used for centuries to heal wounds and rashes. In 1995, two expatriate Indians at the University of Mississippi Medical Centre (Suman K. Das and Hari Har P. Cohly, 1995) were granted a US patent (no.5, 401, 504) on use of turmeric in wound healing. The Council of Scientific & Industrial Research (CSIR), India, New Delhi filed a re-examination case with the US PTO challenging the patent on the grounds of existing of prior art. CSIR argued that turmeric has been used for thousands of years for healing wounds and rashes and therefore its medicinal use was not a novel invention. Their claim was supported by documentary evidence of traditional knowledge, including ancient Sanskrit text and a paper published in 1953 in the Journal of the Indian Medical Association. Despite an appeal by the patent holders, the US PTO upheld the CSIR objections and cancelled the patent. The turmeric case was a landmark judgment case as it was for the first time that a patent based on the traditional knowledge of a developing country was successfully challenged. The US Patent Office revoked this patent in 1997, after ascertaining that there was no novelty; the findings by innovators having been known in India for centuries.

***Curcuma longa* Linn.**

Source;

http://www.tkdl.res.in/tkdl/langdefault/common/ProtectedPlants.asp

Neem (*Azadirachta indica*, A. Juss.)

Neem extracts can be used against hundreds of pests and fungal diseases that attack food crops; the oil extracted from its seeds can be used to cure cold and flu; and mixed in soap, it provides relief from malaria, skin diseases and even meningitis. In 1994, European Patent Office (EPO) granted a patent (EPO patent No.436257) to the US Corporation W.R. Grace Company and US Department of Agriculture for a method for controlling fungi on plants by the aid of hydrophobic extracted Neem oil. In 1995, a group of international NGOs and representatives of Indian farmers filed legal opposition against the patent. They submitted evidence that the fungicidal effect of extracts of Neem seeds had been known and used for centuries in Indian agriculture to protect crops, and therefore, was unpatentable. In 1999, the EPO determined that according to the evidence all features of the present claim were disclosed to the public prior to the patent application and the patent was not considered to involve an inventive step. The patent granted on was Neem was revoked by the EPO in May 2000. EPO, in March 2006, rejected the challenge made in 2001 by the USDA and the chemicals multinational, W. R. Grace to the EPO's previous decision to cancel their patent on the fungicidal properties of the seeds extracted from the neem tree.

Azadirachta indica (Source: https://exoticflora.in/products/indian-neem-tree-big-size-plants)

Basmati Rice (*Oryza sativa* Linn.)

Rice Tec. Inc. had applied for registration of a mark "Texmati" before the UK Trade Mark Registry. Agricultural and Processed Food Exports Development Authority (APEDA) successfully opposed it. One of the documents relied upon by Rice Tec as evidence in support of the registration of the said mark was the US Patent 5, 663, 484 granted by US Patent Office to Rice Tec on September 2, 1997 and that is how this patent became an issue for contest. This US utility patent was unique in a way to claim a rice plant having characteristics similar to the traditional Indian Basmati Rice lines and with the geographical delimitation covering North, Central or South America or Caribbean Islands. The US PTO granted the patent to Rice Tec on September 2, 1997. The said patent covered 20 claims covering not only novel rice plant but also various rice lines; resulting plants and grains, seed deposit claims, method for selecting a rice plant for breeding and propagation. Its claims 15-17 were for a rice grain having characteristics similar to those from Indian Basmati rice lines. The said claims 15-17 would have come in the way of Indian exports to US, if legally enforced.

Evidence from the IARI (Indian Agricultural Research Institute) Bulletin was used against claims 15-17. The evidence was backed up by the germplasm collection of Directorate of Rice Research, Hyderabad since 1978. CFTRI(Central Food Technological Research Institute) scientists evaluated the various grain characteristics and accordingly the claims 15-17 were attacked on the basis of the declarations submitted by CFTRI scientists on grain characteristics. Eventually, a request for re-examination of this patent was filed on April 28, 2000. Soon after filling the re-examination request, Rice Tec chose to withdraw claims15-17 along with claim 4.Biopiracy of traditional knowledge is not limited to India alone. In fact, there have been several examples from other countries where traditional knowledge biopiracy has become a concern. Some of these examples are given below.

Basmati Rice (Source: https://www.indiamart.com/proddetail/sugandha-steam-basmati-rice-14987883748.html)

Kava (*Piper methysticum* Forster)

Kava is an important cash crop in the Pacific, where it is highly valued as the source of the ceremonial beverage of the same name. Over 100 varieties of Kava are grown in the Pacific, especially in Fiji and Vanuatu, where it was first domesticated thousands of years ago. In North America and Europe, Kava is now promoted for a variety of uses. French company L'Oreal - a global giant with US $10 billion a year in sales - has patented the use of Kava to reduce hair loss and stimulate hair growth.

***Piper methysticum* (https://es.wikipedia.org/wiki/Piper_methysticum)**

Ayahuasca (*Banisteriopsis caapi* Mort.)

For generations, Shamans of indigenous tribes throughout the Amazon basin have processed the bark of B. caapi Mort. to produce a ceremonial drink known as "Ayahuasca". The Shamans use Ayahuasca (which means "wine of the soul") in religious and healing ceremonies to diagnose and treat illness, meet with spirits, and divine the future. American, Loren Miller obtained US Plant Patent (no.5, 751 issued in 1986), granting him rights over an alleged variety of B. caapi Mort. which he had collected from a domestic garden in Amazon and had called "Da Vine", and was analyzing for potential medicinal properties. The patent claimed that Da Vine represented a new and distinct variety of B. caapi Mort., primarily because of the flower colour.

The Coordinating Body of Indigenous Organisations of the Amazon Basin (COICA), which represents more than 400 indigenous tribes in the Amazon region, along with others, protested about a wrong patent that was given on a plant species. They protested that Ayahuasca had been known to natives of the Amazon rainforest and it is used in traditional medicine and cultivated for that purpose for generations, so Miller could not have discovered it, and should not have been granted such rights, which in effect, appropriated indigenous

traditional knowledge. On reexamination, USPTO revoked this patent on 3rd November 1999. However, the inventor was able to convince the USPTO on 17th April 2001. The original claims were reconfirmed and the patent rights restored to the innovator.

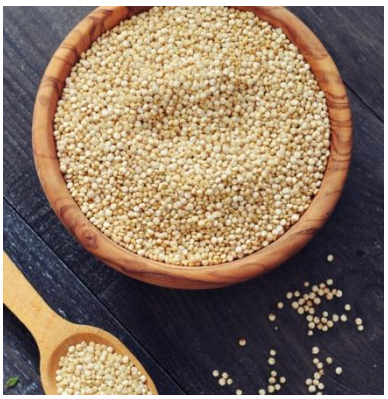
Banisteriopsis caapi

Source

https://erowid.org/plants/show_image.php?i=banisteriopsis/banisteriopsis_caapi18.jpg

Quinoa (*Chenopodium quinoa* Willd.)

Quinoa is a staple food crop for millions in the Andes, especially Quechua and Aymara people who have bred a multitude of quinoa varieties. One traditional quinoa variety, Apelawa, is the subject of US patent 5, 304, 718 held by two professors from Colorado State University who claim the variety's male sterile cytoplasm is key to developing hybrid quinoa. The patent claims any quinoa crossed with male sterile Apelawa plants.



***Chenopodium quinoa* Willd.**

(Source: https://draxe.com/10-quinoa-nutrition-facts-benefits/)

Hoodia (*Hoodia gordonii* Masson) Sweet ex Decne

For thousands of years, African tribesmen have eaten the Hoodia cactus to stave off hunger and thirst on long hunting trips. The Kung bushmen, San who live around the Kalahari desert in southern Africa used to cut off a stem of the cactus about the size of a cucumber and munch it. Hoodia is now at the centre of a bio-piracy row. In 1995, South African Council of Scientific & Industrial Research (CSIR) patented Hoodia's appetite-suppressing element (P57) and hence, its potential cure for obesity. In 1997 they licensed P57 to British Biotech Company, Phytopharm. In 1998, Pfizer acquired the rights to develop and market P57 as a potential slimming drug and cure for obesity (a market worth more than £ 6 billion), from Phytopharm for $ 32 million. The San people eventually learned of this exploitation of their traditional knowledge, and in June 2001, launched legal action against South African CSIR and the pharmaceutical industry on grounds of bio-piracy. They claimed that their traditional knowledge has been stolen, and the South African CSIR had failed to comply with the rules of the Convention on Biodiversity, which requires the prior informed consent of all stakeholders, including the original discoverers and users.

Hoodia gordonii

(Source: http://foodandtraditions.com/5-hoodia-cactus-facts/)

Other Examples

To cite some more examples of biopiracy, the plant *Phyllanthus amarus* Schum.et Thonn. is used for Ayurvedic treatment for jaundice, a US patent has been taken for use against Hepatitis B. The plant *Piper nigrum* Linn. is used for Ayurvedic treatment for vitiligo (a skin pigmentation disorder). A patent has been taken in UK for the application of a molecule from *Piper nigrum* Linn. for use in treatment of vitiligo.

The appropriation of elements of this collective knowledge of societies into proprietary knowledge for the commercial profit of a few is one of the concerns of the developing world. An urgent action is needed to protect these fragile knowledge systems through national policies and international understanding linked to IPR, while providing its development and proper use for the benefit of its holders. What is needed is a particular focus on community knowledge and community innovation, enterprise and investment is particularly important.

The local communities or individuals do not have the knowledge or the means to safeguard their property in a system, which has its origin in very different cultural values and attitudes. The communities have a storehouse of knowledge about their flora and fauna, their habits, their habitats, their seasonal behaviour and the like-and it is only logical and in consonance with natural justice that they are given a greater say as a matter of right in all matters regarding the study, extraction and commercialization of the biodiversity. A policy that does not obstruct the advancement of knowledge, and provides for valid and sustainable use and adequate intellectual property protection with just benefit sharing is what is needed.

Source of information

TKDL is a database containing codified literature from Indian Systems of Medicine. TKDL contains more than 2.97 lakh formulations from the texts of traditional medicine systems of India which are Ayurveda, Unani and Siddha. The knowledge related to these areas of medicine is enormous and compiling all the available information is an immense task. The task of digitizing the medicinal information available is being done in a phased manner and has started with public domain knowledge in published books. The selection of books was done based on the decisions of the Task Force Committees of eminent experts from the respective fields of medicine. After each phase of completing a set of books, the task is continuing on a new sets of books. Time of origin as mentioned, refers to the lifetime of authors of the respective books. In case of compiled books, the time of origin is not given since it is dependent upon the time of origin of back-references from which information is taken.

Current status of transcription of the traditional medicine formulation in the Traditional knowledge Digital Library is given in the following table.

Discipline	No. of texts (including volumes) used for transcription	Transcribed
Ayurveda	75 books	97, 337
Unani	10 books	1, 75, 150
Siddha	50 books	23, 016
yoga	15 books	1, 680
Total	150 books	2, 97, 183

Source: http://www.tkdl.res.in/tkdl/langdefault/common/ProtectedPlants.asp

TKDL outcomes against bio-piracy

Patent office wise

S.No	Patent Office	No. of Cases
1.	European Patent Office (EPO)	129
2.	United States Patent and Trademark Office (USPTO)	25
3.	Controller General of Patents Designs and Trademarks (CGPDTM)	24
4.	Canadian Intelectual Property Office (CIPO)	37
5.	IP Australia (AIPO)	4
6.	United Kingdom Patent & Trademark Office (UKPTO)	1
	Total	220

Source: http://www.tkdl.res.in/tkdl/langdefault/common/ProtectedPlants.asp

The issue of biopiracy and unethical bioprospecting made headlines after the government of India successfully revoked or limited turmeric and basmati rice patents granted by United States Patent and Trademark Office (USPTO) and the neem patent granted by European Patent Office (EPO) in the late 1990s. Soon more such patent claims came to light. India's vast traditional medicine knowledge existed in languages like Sanskrit, Hindi, Arabic, Persian, Urdu, and Tamil, making it inaccessible for examiners at international patent offices to verify claims. This experience prompted the Department of AYUSH, government of India to create a task force of experts in the areas of traditional medicine systems of India (i.e., Ayurveda, Unani, Siddha and Yoga), patent examiners, IT experts, scientists and technical officers, for the creation Traditional Knowledge Digital Library (TKDL). It was initiated in 2001. The tasks included, for example, transcribing Sanskrit shlokas which describe an Ayurvedic formulation in text, using Traditional Knowledge Resource Classification (TKRC) devised for the purpose, so that it is easily understandable to any patent examiner,

anywhere in the world. For this reason, the entire 34 million pages of text is available in English, German, French, Spanish and Japanese (“About TKDL’’. TKDL website).

The database project reached its completion, in 2006 the government allowed access to the library to international patent offices, including European Patent Office (EPO), Japan and the UK, subject to a non-disclosure clause. This allows patent examiners to evaluate patent applications and stop attempts to patent traditional knowledge as "new" inventions. (“Know Instances of Patenting on the UES of Medicinal Plants in India” PIB, Ministry of Environment and Forests. May 6, 2010, CSIR wing objects to Avesthagen patent claim’’. Live Mint. Apr.28, 2010).

Agreements were signed with EPO in February 2009, with United Kingdom Trademark & Patent Office (UKPTO) in January 2010, and with the U.S. Patent and Trademark Office(USPTO) after the summit meeting between US President Barack Obama and Prime Minister Manmohan Singh, also in January 2010. With patent examiners getting access to the TKDL database, legal cases regarding unethical patent claims, which had taken years and vast expenditure for each case, could be avoided.

Another project to include data relating to 1, 500 postures in yoga began in 2008, after new reports of a large number of false gurus and yoga masters, who attempted to patent this ancient knowledge in their own countries. For example, 131 yoga-related patents were traced in the US alone in 2007. After an uproar in the parliament and media, the government of India took up the issue with the USPTO. Thereafter, a team of yoga gurus from nine schools working with government officials and 200 scientists from the Council of Scientific and Industrial Research (CSIR) scanned 35 ancient texts including the Hindu epics, the Mahabharata and the Bhagwad Gita, and Patanjali's Yoga Sutras to register each native pose. At the end of 2009, 1500 asanas were to be added.

In 2010, Union Environment Minister, Jairam Ramesh stated that over eight years 34 million pages of information have been collected at an estimated cost of Rs 7 crore; at least 36 cases had been identified by the EPO and 40 cases by USPTO, using TKDL. As a future project, a people’s Register of Biodiversity, is being set up by the government, to document and protect, traditional knowledge passed down through the oral tradition, under India’s National Biodiversity Act of 2002.
(https://en.wikipedia.org/wiki/Traditional_Knowledge_Digital_Library).

CONCLUSION

As per the information received from CSIR, till date TKDL has been successful in preventing the grant of wrong patents in 220 cases. For further facilitating the prevention of grant of wrong patents at International Patent Offices (IPOs), International Access Agreements on TKDL have been concluded with United States Patent & Trademark Office, European Patent Office, Canada Patent Office, Germany Patent Office, Japan Patent Office, United Kingdom Patent Office, Australia Patent Office, Malaysia Patent office, Chile Patent office and Indian Patent office. There has been as much as a 44% decline in patent claims filed on Indian systems of medicine. Now TKDL also includes videos of the most common yoga postures. This is avoids grating wrong patents for Yoga exercise in the west which is an increasing trend. Apart from bio-piracy, to prevent misappropriation of Yoga, Ministry of AYUSH through Sangeet Natak Akademi (the nodal organization of Ministry of Culture) has filed nomination of Yoga at UNESCO to include Yoga in the representative list of the Intangible Cultural Heritage of Humanity. Indian Patent Office had also brought out Guidelines for processing Patent Applications relating to Traditional Knowledge and Biological Material to help Patent examiner to analyze what constitute novelty and inventive step in Traditional Knowledge (TK) related invention. The Biological Diversity Act, 2002 also aims conservation of biological resources, sustainable use of its components and fair and equitable sharing of benefits arising out of the use of biological resources. Further, the Biological Diversity Act, 2002 requires every local body to constitute a Biodiversity Management Committee (BMC) within its area with the objective to prepare People's Biodiversity Register in consultation with local people. The Register shall contain comprehensive information on availability and knowledge of local biological resources, their medicinal or any other use or any other traditional knowledge associated with them.

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