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Traditional Knowledge Protection: An Indian Prospective

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ABSTRACT

Traditional knowledge is an important element of the intellectual and cultural heritage of indigenous peoples. It reflects their social and historical identity and significantly contributes to the future well-being and sustainable development. This paper analyses the features of indigenous knowledge, protection of traditional knowledge in India and its benefits, biopiracy issues, and Indian experience. It further discusses the national and international initiatives and Traditional Knowledge Digital Library, its benefits and outcomes against biopiracy.

Keywords: Traditional knowledge, indigenous knowledge, biopiracy, traditional knowledge digital library, intellectual property rights

1. INTRODUCTION

Traditional knowledge has got a lot of attention nowadays due to its utility all over the world. It has become a focus in international forums. The protection under intellectual property rights (IPRs) of traditional and indigenous knowledge (TIK) has received growing attention since the adoption of the Convention on Biological Diversity (CBD) in 1992. Most indigenous people have traditional songs, stories, legends, dreams, methods and practices as means of transmitting specific human elements of traditional knowledge. Sometimes it is preserved in artifacts handed from father to son or mother to daughter. The traditional knowledge or indigenous knowledge can be found in multitude field such as nutrition, agriculture and fisheries, human health, veterinary care, handicrafts, performing arts, folk songs, religion and astrology, and many other day to day customs and practices.

The World Bank[1] has stated the following features of indigenous knowledge

- Indigenous knowledge is local knowledge
- It is unique to every culture or society
- It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in communities,
- It provides problem solving strategies for communities
- It is commonly held by communities rather than individuals, and
- It is tacit knowledge and therefore difficult to codify. It is embedded in community practices, institutions, relationships, and rituals.

Knowledge is a broader concept which might contain different facets in it. Traditional knowledge is one of the aspects of knowledge in its totality. According to Berkes,[2] Traditional knowledge is a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including human) with one another and with their environment. Further, traditional knowledge is an attribute of societies with historical continuity in resource use practice; by and large, these are non-industrial or less technologically advanced societies, many of them indigenous or tribal"

2. PROTECTION OF TRADITIONAL KNOWLEDGE

The protection of traditional knowledge is important for communities in all countries, particularly in developing and least developed countries. Traditional knowledge plays an important role in the economic and social life of those countries. Placing value on such knowledge helps strengthen cultural identity and the enhanced use of such

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knowledge to achieve social and development goals, such as sustainable agriculture, affordable and appropriate public health, and conservation of biodiversity.

Two forms of IP-related protection of traditional knowledge have been developed[3]:

(a) Positive Protection

Positive protection gives traditional knowledge holders the right to take action or seek remedies against certain forms of misuse of traditional knowledge. It seeks to secure protective legal rights over traditional knowledge. This is achieved by either using the existing laws or using legislative means to enact new *sui generis* laws.

(b) Defensive Protection

Defensive protection deals with safeguarding against illegitimate IP rights taken out by others over Traditional knowledge subject matter. It seeks to prevent others from using or securing IPR over traditional knowledge. For example, some communities have created traditional knowledge databases to evidence their traditional knowledge as prior art in order to prevent perceived abuses such as biopiracy. Disclosure is a tool to stop the granting of patents, or the revocation of granted patents. In IP law, patents cannot be granted or can be invalidated if it can be shown that there exists "prior art": Knowledge in the public domain that is equivalent to the process or product for which a patent is sought. Disclosure puts the knowledge into the public domain. It does not stop use of the traditional knowledge or associated resource - only the monopolistic use of the knowledge or associated resource for the 20 years of the patent.

Various suggestions to extend protection to knowledge, innovations, and practices include[4]:

- *Documentation of* traditional knowledge: It is one means of giving recognition to knowledge holders. But mere documentation may not enable sharing of benefits arising out of the use of such knowledge, unless it is backed by some mechanism of protecting the knowledge.
- *Registration:* It deals with creating a system for registration of innovations by the inventor Traditional knowledge holders.
- *Development of contracts:* Contacts with biotech or other companies for commercialisation, transfer of technology, benefit sharing, etc;
- *Grant of IPR under existing IPR systems*: Intellectual property refers to creations and innovations of the human mind, such as inventions, literary and artistic works, symbols, names, images and designs. IP system protects such creations and innovations from unauthorised use, including unauthorised copying, adaptation, commercial use, and communication to the public. Practically, all types of intellectual property could, to some extent, be used for protection of traditional knowledge. Traditional knowledge can be protected under various modes of IPR, viz. copyright, patents, plant varieties, industrial designs, trademarks, trade names, geographical indications, and repression of unfair competition.
- *Development of a sui generis system: Sui generis* literally means 'of its own kind' or 'unique'. It consists of a set of nationally recognised laws differing from country to country. A *sui generis* system might consist of some standard forms of IP protection combined with other forms of protections. It is a system that can create legal rights associated with traditional knowledge and promote its access and benefit sharing. Protection under *sui generis* system can assume any form, i.e., patents, trade secrets, copyrights, farmer rights, breeder rights or any form which is presently not covered under IP regime. This differs from country to country[5].

2.1 Protection of Traditional knowledge and Sharing of Profit

Indigenous people have an immense understanding about their ecosystems, flora and fauna, and the techniques to use them. This knowledge when transformed into formal specification is source of wealth. Due to illiteracy and poverty, this knowledge may be exploited by modern industries without permission or sharing of profit. It is worth to mention here the case of Kani Tribes of South India and *Jeevani*.

'Jeevani' is a restorative, immuno-enhancing, anti-stress and anti-fatigue agent, based on the herbal medicinal plant *arogyapaacha*, used by the Kani tribals in their traditional medicine. Within the Kani tribe, the customary rights to transfer and practice certain traditional medicinal knowledge are held by tribal healers, known as *Plathis*. The knowledge was divulged by three Kani tribal members to the Indian scientists who isolated 12 active compounds from *arogyapaacha*, developed the drug '*Jevaani'*, and filed two patent applications on the drug (and another patent based on the same plant but for different use). The technology was then licensed to the Arya Vaidya Pharmacy Ltd., an Indian pharmaceutical manufacturer pursuing the commercialisation of Ayurvedic herbal formulations.

A Trust Fund was established to share the benefits arising from the commercialisation of the traditional knowledge-based drug '*Jevaani'.* The operations of the Fund with the involvement of all relevant stakeholders, as well as the sustainable harvesting of the *arogyapaacha* plant, have posed certain problems which offer lessons on the role of IPR in benefit-sharing over medicinal plant genetic resources and traditional medicinal knowledge[6].

3. INDIA AND TRADITIONAL KNOWLEDGE

India is a country which has been nurturing a tradition of civilisation over about 5,000 years. India's ancient scriptures consist of 4 Vedas, 108 Upanishads, 2 epics, *Bhagavad-Gita, Brahma sutras*, 18 *Puranas, Manusmriti, Kautilya Shastra,* and *Smritis.*

India, known for its rich heritage of biological diversity, has so far documented over 91,200 species of animals and 45,500 species of plants in its 10 bio-geographic regions. Besides, it is recognised as one of the eight vavilovian centres of origin and diversity of crop plants, having more than 300 wild ancestors and close relatives of cultivated plants, which are still evolving under natural conditions. India is also a vast repository of traditional knowledge associated with biological resources.[10]

This multitude of natural wealth has created a renewed interest in the traditional medicinal system, which includes the Ayurveda, Yoga, Unani, Siddha and Homeopathy systems (AYUSH). Ayurveda is the oldest and most effective of these alternative systems of medicine. The ancient scriptures of the Ayurveda are full of instances where herbs with medicinal properties were used not only for curative purposes but for increasing physical and mental efficiency.

4. BIOPIRACY

Biopiracy can be defined as the stealing of biomedical knowledge from traditional and indigenous communities or individuals. The term can also be used to suggest a breach of a contractual agreement on the access and use of traditional knowledge to the detriment of the provider, and also applies to bioprospecting without the consent of the local communities[7]. Biopiracy is the illegal appropriation of life such as microorganisms, plants, and animals–including humans–and the traditional cultural knowledge that accompanies it. Biopiracy is illegal because of violation of international conventions and where these exist (corresponding domestic laws) it does not recognise, respect or adequately compensate the rightful owners of the life forms appropriated or the traditional knowledge related to their propagation, use, and commercial benefit[8].

Biopiracy can be described as grant of wrong patents to invention that are neither novel nor inventive having regard to traditional knowledge already in public domain. Such patents may be granted due to lack of documentation or recognition of taditional knowledge as a prior art. Biopiracy may also happen in cases where patents are granted according to the national legislations which does not recognise certain form of public disclosure as prior art. Biopiracy is misappropriation of genetic resources or related traditional knowledge through patent system. It is the exploitation of resources of a community which lack development. It can be regarded as a double theft because: (a) it allows theft of creativity and innovation and (b) it establishes exclusive rights on stolen knowledge and steal economic options of everyday survival of indigenous communities on the basis of their common knowledge[9].

4.1 Biopiracy: Indian Experience

Transnational corporations have been racing against each other to manufacture pharmaceutical products for several years. The main ingredients of such products are often the genetic material of the medicinal plants used by the indigenous peoples of third world countries like India. This quest for 'green gold' by the multinational pharmaceutical companies is penetrating not only India but all other biodiversity-rich third world countries as well. The rise in the problem of biopiracy is alarming.

The knowledge and uses of specific plants for medicinal purposes are important components of traditional knowledge. Traditional medicines are a major source of material and information for the development of new drugs.

In 2000, the Council of Scientific and Industrial Research (CSIR), India, found that almost 80 per cent of the 4,896 references to individual plant-based medicinal patents in the United States Patents Office (USPTO) that year related to just 7 medicinal plants of Indian origin. Three years later, there were almost 15,000 patents on such medicines spread over the US, UK and other patent office registers. In 2005, this number had grown to 35,000, which clearly demonstrates the interest of the developed world in the knowledge base of the developing countries.[11]

With reference to Yoga, the study conducted by Traditional Knowledge Digital Library (TKDL) team on the international patent databases in February 2004 found 249 patents taken on Yoga: in May 2005 found over 2300 patents, 2315 trademarks at USPTO and nearly 150 copyrights at USPTO, taken on Yoga.The reason for this misappropriation at international patent offices, as identified, is that the traditional medicinal knowledge exists in local languages, such as Sanskrit, Urdu, Arabic, Persian, and Tamil which is neither available nor can be understood by patent examiners even in case of availability, at international patent offices since the information exists in local languages. In other words, there exists a language and format barrier due to which patents are being taken on the existing traditional knowledge of India.[12] A few examples of bio-piracy of traditional knowledge are:

- Turmeric (*Curcuma longa Linn*: A US patent (US 5,401,504) was granted to the University of Mississippi Medical Center in 1995 on the use of turmeric in healing wounds. This patent also granted

them the exclusive right to sell and distribute turmeric. The CSIR challenged this patent on grounds of prior art, supporting their claim by documentary evidence of traditional knowledge, including ancient Sanskrit text and a paper published in 1953 in the *Journal of Indian Medical Association*. USPTO revoked this patent in 1997 after ascertaining that there was no novelty; the innovation having been used in India for centuries. But for two years the patent on turmeric had stood, although the process was non-novel and had in fact been traditionally practiced in India for thousands of years, as was eventually proven by ancient Sanskrit writings that documented turmeric's extensive and varied use throughout Indian history[13].

- *Neem*: *(Azadirachta indica)*, which is taken from the Persian name for the tree, *Azad-Darakth*, meaning "the free tree." It is in India that the tree is most widely used. It is mentioned in Indian texts written over 2000 years ago and has been applied for centuries in agriculture as an insect and pest repellent, in human and veterinary medicine, toiletries and cosmetics. It is also venerated in the culture, religions, and literature of the region[14].
- In 1994, European Patent Office (EPO) granted a patent to the US Corporation W.R. Grace Company and US Department of Agriculture for a method for controlling fungi on plant by the aid of hydropholic extracted *Neem* oil. This decision brought significant opposition from many NGOs and environmental organisations that oppose biopiracy. It drew up a petition against this patent, for the following reasons:
  - Biological resources are a common heritage and should not be patented
  - A patent would prevent local communities (who have used the product for centuries) to continue using the *Neem*
  - The patent could block economic development of developing countries.
  - European Patent Office agreed to withdraw the patent in May 2000 confirming that 'nothing has been invented, and that knowledge and use of *Neem* have been widespread in India and elsewhere for many decades'[15].
- *Basmati Rice* (*Oryza sativa Linn*): In 1997, Texas-based RiceTec was granted US patent 5,663,484 on basmati rice lines and grains. This patent allowed the company to grow and sell a 'new' variety, which it claims to have developed under the name of *basmati*, in the US and abroad. But it was revoked due to the efforts of Indian Agricultural and Research Institute.
- Nap Hal: MONSANTO, the biggest seed corporation, was assigned a patent (EP 0445929 B1) on wheat on 21 May 2003 by the European Patent Office (EPO) in Munich under the simple title 'plants'. On 27 January 2004, Research Foundation for Science Technology and Ecology (RFSTE) along with Greenpeace and *Bharat* Krishak Samaj (BKS) filed a petition at the EPO, Munich, challenging the patent rights given to MONSANTO on Indian Landrace of wheat, Nap Hal. The patent was revoked in October 2004 and it once again established the fact that the patents on biodiversity, Indian knowledge and resources are based on biopiracy and there is an urgent need to ban all patents on life and living organisms including biodiversity, genes, and cell lines[16].
- USPTO has granted five patents on amla (*phyllanthus emblica*), a tree that is widely grown and used in India. Amla is one of the three ingredients of *triphala*, a traditional ayurvedic formulation used for thousands of years. One of the patents, filed by Unilever Corporation, claims an invention using extracts of *amla* in a hair coloring preparation. Four further patents involving *amla* have been filed in the Japanese Patent Office[17].
- US Patent No. 5,900,240 was granted to Cromak Research Inc., based in New Jersey. The assignees are two non-resident Indians, Onkar S. Tomer and Kripanath Borah, and their colleague, Peter Gloniski. The use of *'karela'*, *'jamun'* and brinjal for control of diabetes is common knowledge and everyday practice in India. Their use in the treatment of diabetes is documented in authoritative treatises such as the 'Wealth of India', the 'Compendium of Indian Medicinal Plants' and the 'Treatise on Indian Medicinal Plants'[18].
- Other examples are *Kala Jeera* (*Cuminum cyminum)* US 5653981, *Kumari* (*Aloe barbadensis)* US 5652265, *Amaltas* (*Cassia fistula)* US 5411733, Pomegranate (*Punica granatum)* US 5411733, *Harad* (*Terminalia chebula)* US 5529778, *Aswagandha* (*Withania somnifera)* US 5466452, etc[19].

The US government has justified the problems posed by these patents due to 'Informal systems of knowledge often depend upon face-to-face communication, thereby limiting access to the information to persons in direct contact with one another'. Public at large does not benefit from the knowledge nor can the knowledge be built upon. In addition, if information is not written down, then it is completely inaccessible to patent examiners everywhere as prior art when they are examining patent applications.

It is possible, therefore, for a patent to be issued claiming as an invention technology that is known to a particular indigenous community. The fault lies not with the patent system, however, but with the inaccessibility of the knowledge involved beyond the indigenous community[20].

5. INTERNATIONAL INITIATIVES TO PROTECT TRADITIONAL KNOWLEDGE

There are two international conventions that can be applied when dealing with biopiracy: (a) CBD and (b) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

The CBD is the first international agreement acknowledging the role and contribution of indigenous and local communities in the conservation and sustainable use of biodiversity. The CBD entered into force on 29 December 1993. It has three main objectives[21]:

(a) Conservation of biological diversity,

(b) Sustainable use of the components of biological diversity, and

(c) Fair and equitable sharing of the benefits arising out of the utilisation of genetic resources

Under the CBD, states are recognised as the owners of the natural biological resources in their territories including their genetic resources and thus have a sovereign right to exploit their natural resources and determine access. Access to genetic resources must be consistent to the parties obligation to respect, preserve, and maintain traditional knowledge, innovation and practices. States have a responsibility under the CBD to facilitate access to, and benefit sharing arising from the use of biological resources and to subject all access to prior informed consent according to mutually agreed terms[22]. The main goal of the CBD is to preserve biological diversity while the goal of TRIPS is to stimulate technological advancement, giving individual rights to the inventor through IPRs. The WIPO, Inter-Governmental Committee on Intellectual Property and Genetic Resources, traditional knowledge and Folklore is working on issues relating to contractual practices, traditional knowledge databases and preparation of a document with elements for a possible *sui generis* system for the protection of traditional knowledge[23] databases and registries compiled by WIPO Member States are depicted in Table 1.

6. INDIAN INITIATIVES TO PROTECT TRADITIONAL KNOWLEDGE

Recently amended patent law of India contains provisions for mandatory disclosure of source and geographical origin of the biological material used in the invention while applying for patents in India. Provisions have also been incorporated to include non-disclosure or wrongful disclosure of the same as grounds for opposition and for revocation of the patents, if granted. To protect traditional knowledge from being patented, provisions have also been incorporated in the law to include anticipation of invention by available local knowledge, including oral knowledge, as one of the grounds for opposition as also for revocation of patent. In order to further strengthen these provisions, a new provision has been added to exclude innovations which are basically traditional knowledge or aggregation or duplication of known properties of traditionally known component or components from being patented[24].

Other important initiatives in India towards documentation of indigenous knowledge are:

- Preparation of village-wise Community Biodiversity Registers (CBRs) for documenting all knowledge, innovations and practices has been undertaken in a few states.
- State Plan for Kerala has also actively promoted documentation of local knowledge regarding biodiversity in People's Biodiversity Registers (PBRs). One pilot project has been completed in Ernakulum district, in which NGO *Kerala Shastra*

Table 1. Databases and registries compiled by WIPO member states

Member	Genetic resources or traditional knowledge database	URL	Coverage
China	China Traditional Chinese Medicine Patents Database	http://chmp.cnipr.cn/englishversion/help/help.html	China Traditional Chinese Medicine (TCM) Patent Database English Version contains 12,024 deeply indexed records of China TCM patent literature with 31,283 TCM formulas in Chinese.
India	Traditional Knowledge Digital Library (TKDL)	www.tkdl.res.in	TKDL is a collaborative project between CSIR, Ministry of Science and Technology and Department of AYUSH, Ministry of Health and Family Welfare. TKDL involves documentation of the knowledge available in public domain on traditional knowledge from the existing literature related to Ayurveda, Unani and Siddha in digitised format, in five international languages which are English, French, German, Spanish, and Japanese.
Republic of Korea	Korean Traditional Knowledge Portal	www.koreantk.com/en/	Korean Intellectual Property Office (KIPO) decided in 2004 to formulate information strategy planning for the building of a database of traditional knowledge. The database, which was compiled between 2005 and 2007, is based on traditional Korean medicine. A search service of the database commenced in December 2007. The KTKP database is based on scholarly articles about traditional knowledge. The articles were selected from 47 Korean academic journals from various fields such as Oriental medicine, pharmacology, serology and biology.

Sahitya Parishad played an instrumental role. Another interesting development in Kerala is the development of a benefit-sharing arrangement between the Tropical Botanical Garden Research Institute and the Kani tribe; based on whose knowledge a drug was developed and then marketed[25].

- State of Karnataka presents a unique example of NGO initiatives in the formulation of PBRs which proves to be a valuable tool for conservation and sustainable use of biodiversity and the preservation of related knowledge.
- Efforts of the Centre for Ecological Sciences, Indian Institute of Science, Bangalore, were the pioneering effort in this field. By mid 1998, 75 Plant Biodiversity Registers had been established in 10 states with the help of Indian Institute of Science and others.
- Gene campaign has documented biodiversity and associated indigenous knowledge in Jharkhand, Madhya Pradesh, and Uttarakhand. It has focused on three tribal populations: the Munnars in the Chotanagpur region of Jharkhand; the Bhils of Madhya Pradesh; and the Tharus of the Terai region of Uttarakhand. Department of Science and Technology of Indian government supported the documentation. In addition to the collection of information on indigenous knowledge, the project also involved making these communities aware of the threat of biopiracy, and the implications of IPRs and various national and international developments concerning the protection of biodiversity and indigenous knowledge. Medicinal plants and knowledge related thereto was sought to be documented with the help of educated tribal youth. Elders in the village, medical practitioners and traditional healers were consulted in the collection and understanding of the information[26].
- Research Foundation of Science, Technology and Ecology (RFSTE) initiated a movement called the *Jaiv Panchayat:* Living Democracy in early 1999. Activists from RFSTE and Navdanya have been interacting with local villagers in different parts of India (their strongest presence being in Uttar Pradesh) to constitute informal community-level institutions called Jaiv Panchayats, comprising volunteers from a village.The first *Jaiv Panchayat* to complete the register was in Agasthyamuni village, Garhwal district, Uttar Pradesh, where on 5 June 1999, the CBR prepared by the local people was presented[27].
- SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) based in Ahmedabad, has been involved in documenting innovation developed by individuals at the village level. The initiative is known as Honeybee Network, which documents the elements of biodiversity as well as their uses and in particular innovation surrounding these elements. This network has been growing since the late 1980s[28].
- Efforts of *Kalpavriksh* and *Beej Bachao Aandolan* (Save the Seeds Campaign), Tehri-Garhwal, UP—*Kalpavriksh*, in collaboration with the villagers in Jardhar of the Tehri-Garhwal district of UP, initiated an exercise in 1995 to document the various bio-resources used by the community and conservation practices. The members of the *Beej Bachao Aandolan*—a network of local farmers, who have been involved for a number of years now in reviving and spreading indigenous crop diversity, actively collaborated with the *Kalpavriksh* members. By mutual agreement between *Kalpavriksh* and the villagers, it was decided that a copy of the register would be kept in the village and another copy would be kept by *Kalpavriksh*, and that all the information in the register can be used and distributed only with the consent and knowledge of the villagers[29].

7. DOCUMENTATION OF TRADITIONAL KNOWLEDGE

It is sometimes believed that the proper documentation of associated traditional knowledge could help in checking biopiracy. It is assumed that if the material/knowledge is documented, it can be made available to patent examiners the world over so that prior art in the case of inventions based on such materials/ knowledge are/is readily available to them. It is also hoped that such documentation would facilitate tracing of indigenous communities with whom benefits of commercialisation of such materials/knowledge has to be shared. India has woken up to the task of protecting its traditional knowledge from patent biopiracy. The trigger was the successful revoking by the CSIR of patents granted by developed countries. Protection and preservation of traditional knowledge have been a matter of concern to the developing countries in general and India in particular. Grant of wrong patents at international level happens owing to non-availability of information in a language known to international patent examiner and also, the information not being in retrievable form. Therefore, need was felt to adopt a practical and scientific approach to the problem of grant of wrong patents on our traditional knowledge systems at international level.[30] The TKDL was the initiative to provide platform for documentation and disclosure of Indian traditional knowledge.

7.1 Traditional Knowledge Digital Library

The TKDL provides information on traditional knowledge existing in the country, in languages and format understandable by patent examiners at International Patent Offices (IPOs), so as to prevent the grant of wrong patents. The TKDL, thus, acts as a bridge

between the traditional knowledge information existing in local languages and the patent examiners at IPOs. The TKDL is a collaborative project between CSIR, Ministry of Science and Technology and Department of AYUSH, Ministry of Health and Family Welfare, and is being implemented at CSIR. An inter-disciplinary team of traditional medicine (Ayurveda, Unani, Siddha and Yoga) experts, patent examiners, IT experts, scientists, and technical officers are involved in creation of TKDL for indian systems of medicine. The project TKDL involves documentation of the traditional knowledge available in public domain in the form of existing literature related to Ayurveda, Unani, Siddha and Yoga, in digitised format in five international languages which are English, German, French, Japanese, and Spanish. Traditional knowledge resource classification (TKRC), an innovative structured classification system for the purpose of systematic arrangement, dissemination and retrieval has been evolved for about 25,000 subgroups against few subgroups that was available in earlier version of the International patent classification (IPC), related to medicinal plants, minerals, animal resources, effects and diseases, methods of preparations, mode of administration, etc.[31]

7.2 TKDL Benefits to India

Once the traditional knowledge is recorded in TKDL, legally, it becomes public domain knowledge. Under the patent law, this means that it is considered to be prior art and hence, is not patentable. Such a written record, in a form easily accessible to patent offices around the world, would provide all such offices with a record of India's prior art. Patent examiners could easily check this database and reject any patent application that might be a mere copy of traditional knowledge. Thus, it helps in preventing cases of biopiracy. The TKDL has a rich database of information and proved to be extremely useful to research and industry, both in India and abroad, providing an impetus to invention, and the development of products such as medicines, which would be of immense value to all of mankind. The TKDL serves the purpose of integrating the various documents related to traditional

Table 2. TKDL outcomes against biopiracy

Name of country	Criteria	No. of patents	List of patents
European Patent Office	Setting aside of decisions to grant patents / cancellation of intent to grant patent	02	1747786, 1520585
	Patents application withdrawn	59	1607006, 1781309, 2044850, 1889638, 1737475, 1807098, 1967197, 2065031, 2090315, 1906980, 1825845, 2015761, 1937231, 1991241, 1855701, 1906982, 2223616, 1998758 1361864, 2094287, 1959977, 2133089, 2133080, 2070545, 2101800, 1949889, 1709995, 1958641, 2116253, 1729593, 1971354, 2089505, 1942917, 2175848, 2218455, 2014295, 2008661, 1759706, 2091353, 2167072, 1789065, 1804815, 2029150, 2263481, 1140123, 1553851, 1755402, 2124983, 1604677, 2146739, 2144591, 1962875, 2266586, 2152252, 1925311, 2152282, 2152284, 1609476,
	Amendment/ modification of claims by applicants due to TKDL prior art evidence	06	1849473, 1880719, 2062883, 1795200, 2112929, 1858507
Canadian Intellectual Property Office (CIPO)	Applications declared 'dead'	08	2387703, 2579562, 2448513, 2366318, 2572031, 2616602, 2697020, 2409051
Intellectual Property, Australia	Amendment/ modification of claims by applicants due to TKDL prior art evidence	01	2009217410
	Patent applications withdrawn	01	2009240851
United States Patent and Trademark Office (USPTO)	Case where the examiner rejected/cancelled the claims by utilising the TKDL independently without the submission of the evidences by TKDL	01	20090093450
	Amendment/modification of claims by applicants due to TKDL prior art evidence	01	20100203117
	Claims rejected by the examiner due to TKDL prior art evidence	02	20110097424, 20100203078
UKPTO	Applications terminated	01	GB2436063

knowledge in a common language and in an easy retrieval form. It is of enormous benefit in developing the traditional knowledge further[32].

7.3 TKDL Outcomes against Biopiracy

Government of India, on 29 June 2006, has approved to provide the access of TKDL database to IPO, under Non-disclosure Agreement, between CSIR and respective IPO. Access to TKDL has been given to European Patent Office (having 35 member states), German Patent Office, Indian Patent Office and USPTO (the agreement for which was signed in November 2009). After this, citation of TKDL references as prior art have led to significant strides towards achieving the goal of preventing misappropriation of Indian traditional knowledge. The TKDL outcomes against biopiracy have been illustrated in Table 2[33]. The TKDL has become a model for other countries on defensive protection of their traditional knowledge from misappropriation. Present status of transcription of the traditional medicine formulation in the TKDL is given in Table 3.

Table 3. Status of transcription of traditional medicine

Discipline	No. of books (including volumes) used for transcription	Transcribed
Ayurveda	75	93,280
Unani	10	1,33,470
Siddha	50	16,764
Yoga	15	1,346
Total	150	2,44,860

Source: TKDL, August 2011

8. NATIONAL KNOWLEDGE COMMISSION AND TKDL

The National Knowledge Commission, Government of India, in December 2007, recommended that the work on TKDL should be diversified and expanded. Further, the Commission suggested that steps should be taken for the use and incorporation of TKDL, with all pertinent sources of information, into the minimum search documentation lists of international search authorities and other offices while processing patent applications[34].

11. CONCLUSIONS

Traditional knowledge is not something new or innovative but the distillation of practices or knowledge in the society. India has experienced various initiatives regarding the protection of traditional knowledge under intellectual property rights, including the TKDL, which is a major step to curb biopiracy and in many of these cases the country had to fight for revocation of the granted patents which involved huge costs and time. India has taken misappropriations of its traditional knowledge by developed countries through patenting system.

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