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Intellectual Property Rights: Bioprospecting, Biopiracy and Protection of Traditional Knowledge - An Indian Perspective

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Abstract

Patents are the form of IP most often used to seek protection of knowledge related to biological resources. The value of plants as medicinal sources is more widely recognized and the “intellectual property rights” (IPR) associated with their use and protection have been debated around the world. Indeed, being a land of indigenous cultural heritage and traditional knowledge, India is an open treasure box for whole world. IPR provisions under WIPO (World Intellectual Property Organization) and patent rights have attracted the appeal of many researchers, pharmaceutical companies and organizations to explore the potential of traditional knowledge. In this scenario, effective protection and management of Intellectual Property Rights (IPR) is essential, and India is fully committed to this. Similarly IPR and its policy framework equally contribute to development of any nation. This chapter attempts to provide information relevant to national and legal rules and policies regarding Intellectual property rights. Protection of traditional knowledge, Conservation of the rights of local and indigenous peoples to their knowledge and resources are equally important. In this regard, this chapter also discusses the concepts Biopiracy and Bioprospecting. All information is gathered from published articles and legal documents of respective countries and official websites of international organizations as these are the only sources of legal information.

Keywords: IPR, biopiracy, bioprospecting, traditional knowledge, patent

1. Introduction

Intellectual property rights include patents, trademarks, trade secrets, geographical indications and copyrights. IPR is a legal tool to protect industrial innovation in the modern world as well as to promote the protection of biodiversity and to ensure fair and equitable sharing of benefits arising from the use of genetic resources among indigenous custodians [1, 2]. Most of the patented inventions are based on previous knowledge. One of the advantages of the patent system is that it promotes further inventions on a country-by-country basis using knowledge publicly [3]. Many of the herbal products derived from traditional medicine is protected by patent laws.

Phytoconstituents have many facets in intellectual property rights (IPR) in respect of copyrights, patents, and trademark for their medicinal preparations, and registered designs [4]. The most popular forms of IP protection for herbal medicines are trade secrets and trademarks [5].

However, patenting of plant derived medicinal products and processes on the basis of knowledge gained through tradition have become a major dispute in the intellectual property rights domain [6]. Intellectual property rights in connection with indigenous knowledge have given rise to many complex legal challenges to the present world. Issues concerning the preservation of indigenous knowledge are not only legal in nature. Furthermore, the problems encountered in traditional knowledge systems due to intellectual property law can be experienced directly in communities throughout world [7].

Recently activists and some specific non-governmental organizations (NGOs) uses the term Biopiracy' to refer traditional knowledge related illegal or improper use of biological materials [8]. Furthermore, the growing number of patents also represents more exploration about biopiracy. Neem tree cases from India have shown that patents play a central role in biopiracy activity. While there has been much international discussion on disputes pertinent to intellectual property and assets, traditional knowledge and heritage, these international consultants are skeptical about the overuse of biopiracy to describe specific instances of unfair or false intellectual property claims over biological resources and traditional knowledge. Bioprospecting is a recent term constituted to describe the appropriate use of natural resources, respect the rights of indigenous peoples, and identify, commercialize bio products [3, 8–10].

However, while we protect these leading compounds and obtain private rights under the existing patent law system, the rights and interests (such as disclosure of origins, profit sharing, etc.) of the traditional knowledge owners who provide the “source” of these patents must also be respected. Otherwise, it is against the basic principles and concepts of the intellectual property system such as the interest balance [11, 12]. The Trade Related Intellectual Property Rights (TRIPS) is a key international agreement promoting the harmonization of IPR regime [13]. Key agencies like the World Intellectual Property Organization (WIPO) has also been instrumental in establishing new frameworks for the protection of Indigenous interests under intellectual property. Moreover countries at national and regional level are primarily concerned about protecting traditional resources [14]. In this regard the present chapter provides an overview of the different types of intellectual property rights and execution of legal protection of traditional resources in India. The chapter also discussed the concepts like traditional knowledge, biopiracy and bioprospecting.

2. World intellectual property organization (WIPO)

World Intellectual Property Organization (WIPO) is specialized agency of United Nations which was established in 1967, dedicated to the promotion of innovation and creativity for the economic, social and cultural development of all countries through a balanced and effective international IP system. The organization reinforces the protection of intellectual property rights, genetic resources, Folklore and Traditional Knowledge [2]. WIPO is a driving force for the international harmonization of intellectual property standards. WIPO provides a global policy forum, bringing together governments, business groups and civil society to address growing IP issues. Worldwide Protection of intellectual property and assurance of administrative cooperation among the intellectual property unions are the two main objectives of WIPO [15].

WIPO's annual study of intellectual property (IP) activities around the world is known as the World Intellectual Property Indicators. This reputable publication examines global IP activity reports. Based on 2018 filing, it covers patents, utility models, trademarks, industrial designs, microorganisms, plant variety protection and geographic indications [15]. Most international conventions pertaining to intellectual property rights are administered by the World Intellectual Property Organization. The Patent Law Treaty and the Patent Cooperation Treaty (building upon the Paris Convention for the Protection of Industrial Property) facilitate the harmonization of patent laws internationally. WIPO has played a key role in the politics and discussion surrounding IP, traditional knowledge, and biodiversity, while being disregarded by many authors and campaigners. WIPO has created a rhetorically important, but slow-moving forum in the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge in the realm of genetic resources and traditional knowledge (IGC) [15–17].

3. The World Trade Organization (WTO) and TRIPS

The WTO, the primary rule-making body for international trade. In order to set universal standard of protection and enforcement of IPRs among the WTO (World Trade Organization) member states, an influential international treaty came into existence which was termed as Trade-Related Aspects of Intellectual Property Rights (TRIPS). The TRIPS Agreement negotiated during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) between 1989 and 1990 and is administered by the WTO. The trade in services covered by the General Agreement on Trade in Services (GATS). These three agreements have been described as the three pillars of the WTO [18, 19]. The TRIPS Agreement aims to set minimum standards in intellectual property protection. TRIPS is considered to be the most important international agreement on IP, incorporating into it much substantive law from previous international agreements, such as the Berne Convention and Paris Convention [20]. These agreements and treaties include the General Agreement on Tariffs and Trade (GATT), the World Intellectual Property Organization (WIPO), and the Trade-related Aspects of Intellectual Property Rights (TRIPS) treaty. The main contentions in TRIPs include: patentable subject matter (for example genetically engineered products, food, medical and agricultural products, biological processes etc.), duration of protection, limitations on rights, and legal enforcement of rights [21].

4. Intellectual property rights

Intellectual property rights are the legal rights granted to a person to protect the interests of innovators and creators over their creations. It's a privilege granted to creators over their creative efforts for a set period of time [1].

There are two types of intellectual property rights:

- i. Copyright and rights related to copyright
- ii. Industrial property

4.1 Copyright and rights related to copyright

Copyrights are legally described term used to describe the rights of authors of literary and artistic works. Copyrights also include the rights over books and other

writings, musical compositions, paintings, sculpture, computer programs and films, for a minimum period of 50 years after the death of the author. Copyright protection extends solely to expressions and does not embody concepts, procedures, and strategies of operation or mathematical ideas per se. Copyright may or may not be available for a variety of objects such as titles, slogans, or logos, reckoning on whether they contain sufficient authorship.

Under copyright, there are two categories of rights:

1. Economic rights, which allow the owner of the rights to profit financially from the utilization of their work by others; and
2. Moral rights, which protect the author's non-economic interests [1].

4.2 Industrial property

The broad application of the term “industrial property” is set out in the Paris Convention. “Industrial property shall be understood in the broadest sense and shall apply not only to industry and commerce proper, but likewise to agricultural and extractive industries and to all manufactured or natural products, for example, wines, grain, tobacco leaf, fruit, cattle, minerals, mineral waters, beer, flowers, and flour.” Paris Convention – Article 1(3).

Industrial property include patents for inventions, industrial designs, trademarks, service marks, layout-designs of integrated circuits, commercial names and designations, geographical indications and protection against unfair competition [1].

4.3 Patents

Patents also referred to as patents for invention, are the most widespread means of protecting technical inventions. The term “patent”, or letter “patent”, also refers to the document issued by appropriate government authority. Patents are exclusive rights that are valid only in the country or territory where they were filed and granted, under the laws of that country or region.

Requirements of patentability include

- Patentable subject matter
- Industrial applicability (utility)
- Novelty
- Non-obviousness
- Disclosure of the invention.

Once a patent is granted by a state or by a regional office acting for several states, the owner of a patent has the right to prevent anyone else from commercially exploiting the invention for a limited period, generally 20 years [1, 22].

4.4 Industrial designs

Industrial designs are applied to a wide variety of industrial products and handicrafts. They refer to the ornamental or esthetic aspects of an article, including

compositions of lines or colors or any three-dimensional forms that give a special appearance to a product or handicraft. In registering their industrial designs, manufacturers protect one of the creative elements that determine market success. It grants the owner of the design the exclusive right to make, import, sell, hire or offer for sale articles to which the design is applied or in which the design is embodied. The term for an industrial design rights varies from country to country. The usual maximum term is from 10 to 25 years. The layout-designs of integrated circuits are creations of the human mind [1].

4.5 Trademarks

A trademark is a distinctive indication that distinguishes certain goods or services as those produced or offered by a specific person or organization. Trademarks can be registered for both goods and services. The procedures for registering trademarks are governed by national and regional IP authorities’ rules and laws. A single word, or a mix of words, letters, and numerals, will utterly represent a trademark [1, 22, 23].

4.6 Geographical indication (GI)

A geographical indication is a sign that appears on commodities that have a specific geographical origin and possess qualities or a reputation due to that place of origin. This “geographical indication” is more than just a description of the product’s origin. GI indicates the connection between quality, reputation or characteristic of that good and its territory of origin. The primary role of a GI is to identify a link between a good’s quality, reputation, or characteristic and its origin territory.

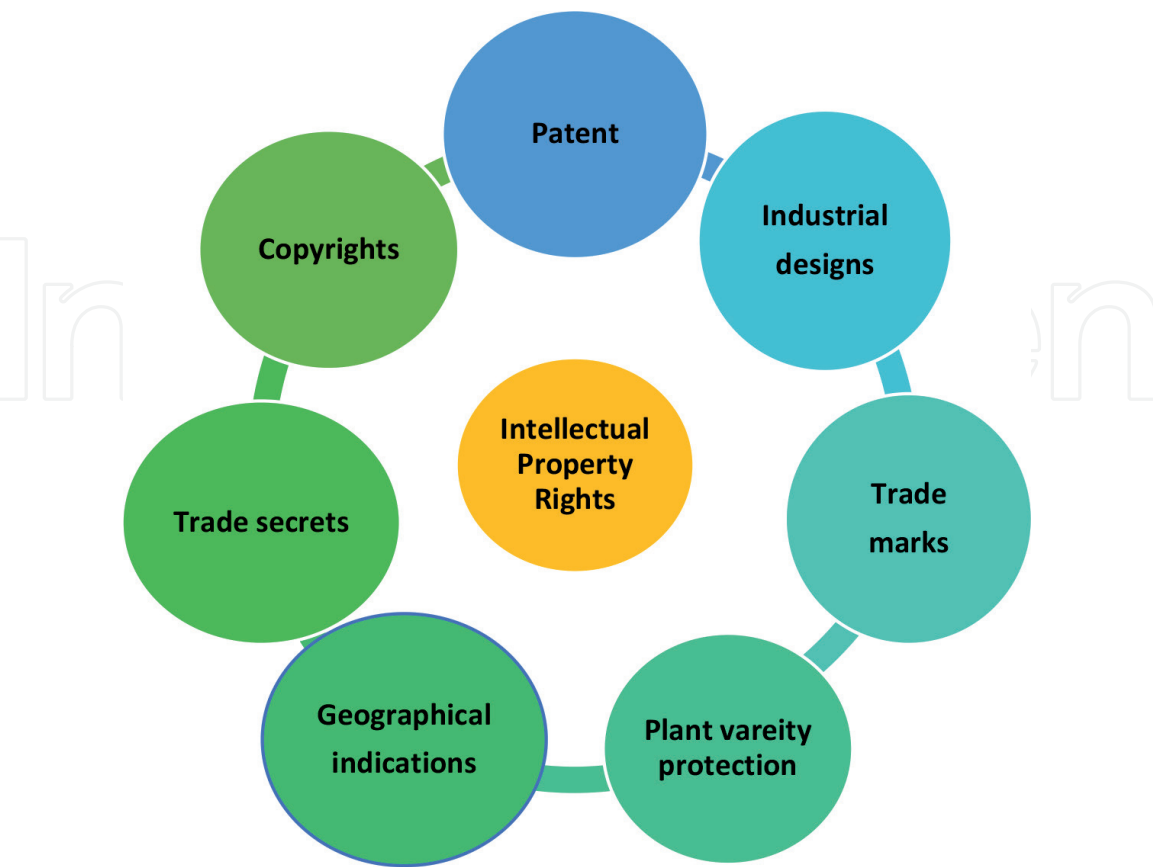


Figure 1.
Types of IPR.

Well-known examples embrace “Champagne”, “Scotch Whiskey”, “Tequila”, and “Roquefort” cheese [1, 15, 24].

4.7 Protection against unfair competition

Protection against unfair competition supplements the protection of inventions, industrial designs, trademarks and geographical indications. It is particularly crucial for the protection of non-patentable knowledge, technology, or information that may be necessary to make the best use of a patented invention eg: The legal protection of trade secrets also part of protection of unfair competition, depending upon the legal system [1].

4.8 Plant variety protection

Plant variety protection, also known as a “plant breeder’s right,” is a type of intellectual property right granted to the breeder of a new plant variety in connection with certain acts relating to the exploitation of the protected variety that require the breeder’s prior authorization. Prior inspection and granting by the proper authority, as in the case of patents, trademarks, and industrial designs, are required [25].

Figure 1 represents different types of intellectual property rights.

5. Traditional knowledge and intellectual property rights

Patent, copyrights, trademarks, trade secrets, geographical identification and traditional knowledge are part of IPRs [26]. The term “traditional knowledge” refers to knowledge, possessed by indigenous people, in one or more societies and in one or more forms, including, but not limited to, art, dance and music, medicines and folk remedies, folk culture, biodiversity, knowledge and protection of plant varieties, handicrafts, designs, literature (WIPO, 2011). ‘It is knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity’ (WIPO, 2000). Traditional knowledge (TK) is integral to the identity of most local communities. Indigenous people, especially in rural communities, use Traditional Medicinal Knowledge (TMK) to maintain their health system [27–30].

The term traditional knowledge can be categorized into three classes: Traditional Medicinal Knowledge (TMK), Traditional Agricultural Knowledge (TAK) and Traditional Ecological Knowledge (TEK). Indigenous knowledge is a subset of traditional knowledge category, held and used by communities, peoples and nations. Indigenous people, especially in rural communities, uses Traditional Medicinal Knowledge (TMK) maintain their health systems [30, 31].

Traditional knowledge (TK) is integral to the identity of most local communities and its preservation as such is of paramount importance for the community’s social and physical environment. This knowledge is an outcome of their connection with local biodiversity that is, plants, fungi, animals, and other endemic biological materials. Traditional societies and communities are responsible for the discovery, development and preservation of a wide variety of medicinal plants, healthy herbal formulations, and agricultural and forest products that are traded internationally and generate substantial economic value. Thereby TK plays an important role in the global economy. Pharmaceutical industries have shown an interest in developing traditional medicines, from many plant species can provide important leads for the discovery of new drugs. An example is the development of the anticancer drugs vincristine and vinblastine from *Catharanthus roseus* (Apocynaceae) indigenous

to Madagascar. Innovations based on TK may benefit from patent, trademark, and geographical indication protection, or be protected as a trade secret or confidential information. Traditional knowledge, on the other hand, which has ancient roots and is frequently passed down orally, is not protected by traditional intellectual property (IP) regimes. Intellectual Property (IP) rights have been claimed over biological resources and/or traditional knowledge (TK) by modifications of known properties [28, 32, 33].

However a few issues pertaining to safeguarding of traditional knowledge and traditional cultural expressions should be addressed as well [30, 31]. It is disturbing to note that keen interest have been shown by researchers from universities and large industries in indigenous plant use today for taking out the patents to profit financially, has opened up the more than hundreds of million peoples living in traditional communities around the world life in jeopardy [30, 31, 34]. While we use the existing patent law system to protect these leading compounds and secure private rights, we must also respect the rights and interests of traditional knowledge owners who offer a “source” for these patents. Moreover, potential of patent derived products from traditional medicines provides an important incentive for pharmaceutical companies, since it creates possible benefits that increase over the period of time and, thus, ultimately, for sharing such information will lead to the betterment of the mankind [35, 36].

Knowledge on indigenous plants in selected areas where the people are using for ages are many times attempted for patent provoked significant condemnation because they are based upon already existing indigenous or traditional knowledge and therefore should not meet the standard of ‘new’ for the patent grant. Examples of this include patents issued related to the neem tree. The European Patent Office (EPO) revoked a controversial patent on the use of antifungal agents extracted from the neem tree, it sensitize the world against biopiracy [37, 38].

Exploiting traditional knowledge resources for commercial or industrial benefits might prompt its embezzlement and can bias the interests of its legitimate custodians.

In the face of such risks, there is a need to develop ways and means to protect and nurture TK for long term development that befits the interests of Traditional knowledge-holders. The preservation, protection and promotion of the TK-based innovations and practices of local communities are particularly important for developing countries. Their rich endowment of TK and biodiversity plays an essential role in their health care, food security, culture, religion, identity, climate, trade and development [39].

According to the Summary for Policymakers of the 2019 IPBES Global Assessment on Biodiversity and Ecosystem Services:

‘Recognizing the knowledge, innovations, practices, institutions and values of indigenous peoples and local communities, and ensuring their inclusion and participation in environmental governance, often enhances their quality of life and the conservation, restoration and sustainable use of nature, which is relevant to broader society. Governance, including customary institutions and management systems and co-management regimes that involve indigenous peoples and local communities, can be an effective way to safeguard nature and its contributions to people by incorporating locally attuned management systems and indigenous and local knowledge. The positive contributions of indigenous peoples and local communities to sustainability can be facilitated through national recognition of land tenure, access and resource rights in accordance with national legislation, the application of free, prior and informed consent, and improved collaboration, fair and equitable sharing of benefits arising from the use, and co-management arrangements with local communities [37, 40].

5.1 Protection of traditional knowledge

Through the Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore (IGC-GRTF), the World Intellectual Property Organization (WIPO) is trying to prepare a draft of an international legal instrument for protection of TK that allow access to those outside the country/community of its traditional holders. According to WIPO, Traditional knowledge is a living body of knowledge that is developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity. WIPO's work on traditional knowledge addresses three domain areas: traditional knowledge, traditional cultural expressions and genetic resources, which are related to each other. Two types of intellectual property protection are being sought for traditional knowledge [2, 39].

5.1.1 Defensive protection

Which target to prevent people outside the community from acquiring intellectual property rights over TK. Defensive strategies might also be used to protect sacred cultural manifestations, such as sacred symbols or words from being registered as trademarks.

For example India developed a searchable database Traditional Knowledge Digital Library (TKDL) which is an evidence that treatments already used in indigenous system of medicine and ensure that patents are not granted and thus prevent the biopiracy followed by a well-known case in which the US Patent and Trademark Office granted a patent after turmeric. Defensive protection is meant to prevent piracy and application for IP as new inventions. TKDL is a prime example of a measure for defensive protection [2, 38, 39].

5.1.2 Positive protection

It empowers the communities for granting of rights to promote their traditional knowledge, control its uses and benefit from its commercial exploitation. Some uses of traditional knowledge can be protected through the existing intellectual property system, and a number of countries have also developed specific legislation [39].

6. Biopiracy

'Biopiracy' is an emergent term used to name illegal or improper appropriation of traditional knowledge and biological materials the fight against biopiracy, the preservation of biodiversity and the need for sustainable practices hence constitute one of the major challenges for the twenty-first century [30, 32]. "Natural" space of India is described through its biodiversity; a biodiversity which can be appreciated but also exploited. Bioprospecting turns into biopiracy. Vandana Shiva interpreted that, biopiracy is a phenomenon of claiming property rights to biodiversity and its products through intellectual property rights regimes and patents based on indigenous and traditional knowledge [41].

6.1 Categories of biopiracy

6.1.1 Patent-based biopiracy

The patenting of (often spurious) inventions based on biological resources and/or traditional knowledge that are extracted without adequate authorization

and benefit sharing from other (usually developing) countries, indigenous or local communities [42].

6.1.2 Non-patent biopiracy

Other intellectual property control based on biological resources and/or traditional knowledge that have been extracted without adequate authorization and benefit-sharing from other (usually developing) countries, indigenous or local communities [42].

7. Bioprospecting

The emergence of the discourse of 'Bioprospecting' was discussed in (in the late 1980s or early 1990s) for the search of biological resources that can help to contribute for the conservation as well as the discovery of beneficial products [42]. Bioprospecting is defined as 'the search for biodiversity, for valuable genetic and biochemical information found in wild animals, plants or microbial organisms' for product development as a purely scientific and commercial endeavor [43]. Bioprospecting is the exploration of biodiversity for new biological resources of social and economic value. It is carried out by a wide variety of industries, the best known being the pharmaceutical industry, but also by a variety of branches of agriculture, manufacturing, engineering, construction and many others [44]. The bioprospecting concept is based on recognition of the importance of natural product discovery for the development of new crops and medicines, often based on traditional knowledge [42]. Pharmaceutical bioprospecting has been sharply criticized for what has become known as 'biopiracy' in which large international pharmaceutical corporations make use of local medicinal knowledge without acknowledging that it is indigenous intellectual property [44, 45].



Figure 2.
*Kani tribe with *Trichopus zeylanicus* collected from southern Western Ghats Kerala (source: The Hindu news paper dated October 18, 2012).*

However, bioprospecting has received more attention in recent years due to the increasing awareness that new drugs will be urgently needed in the near future, either to cure currently incurable diseases affecting an increasing global population or replacing increasingly ineffective drugs to treat health problems. Bioprospecting can impact any industry that depends (wholly or partly) on accessing, sourcing, processing, or production of genetic resources to develop commercially viable products for the world market [46].

An example of bioprospecting that has been cited as a success story of benefit sharing is the Kani model of access and benefit sharing (ABS). *Trichopus zeylanicus* known as 'Arogyapacha' used to treat fatigue and stress by the Kani tribe, inhabiting from Southern Western Ghat region of Kerala State in India (**Figure 2**). The lead provided by this tribal community has led to the development of a scientifically validated drug "Jeevani" by the Tropical Botanic Garden and Research Institute (TBGRI). While transferring the technology for production of the drug to the pharmaceutical firm, TBGRI agreed to share the license fee and royalty with the tribal community on a fifty-fifty basis. This is the first benefit sharing model in the world. However Kani case has criticized for whether the commercialization got informed consent from tribal community and sharing financial benefits equitably. This benefit-sharing model have been criticized for not yielding the desired the results [47–51].

8. National legislations and policies

India has a tremendous legacy of written and oral TK about elements, conservation and different applications of biodiversity for the benefit of humans, animals, and the planet. This asset of knowledge is important for preservation and human prosperity. Intellectual Property Rights is an unavoidable tool for the present globalized economy. Its more extensive use should be empowered. Notwithstanding, such utilize should not prompt the getting of Intellectual Property Rights (IPR) which cannot be advocated for something that has been made by individuals, nor can revelations made on that premise happen without recognizing the contribution of TK and sharing benefits to the makers of information fairly and equally [52]. Fostering innovation is one among the sustainable development goals set by Indian government. "An India where Intellectual Property stimulates creativity and innovation for the benefit of all" is the vision of India's National IPR Policy. Several initiatives have already proven to foster innovation like the Make in India, Start-up India, Digital India and Skill India [53]. The current laws were either enacted or revised after the TRIPS Agreement and are completely consistent with it. These laws along with various judicial decisions provide a stable and effective legal framework assurance and advancement of IPRs [54].

Systems have been planned and executed to perceive and ensure India's immense Traditional Knowledge (TK) resources. Suitable administrative and institutional components have been put in place, important plans are being carried out and funds have been set aside for this purpose. In India, institutional mechanisms and programs directly related to the use of medicinal plants are under the Ministry of Ayurveda, Yoga and Natural Therapy, Unani, Siddha and Homeopathy (AYUSH). The main legislation related to traditional knowledge is the Biological Diversity Act, 2002 and The Patents Act, 1970, build up equity in the distribution of benefits with the traditional knowledge holders and the profits derived from the use of such knowledge, and prevented improper filing of patent application for an invention based on traditional knowledge [52, 55].

8.1 India's biological diversity act, 2002

The Biological Diversity Act of 2002 (BDA) is part of an Indian law that emerged in response to compliance with the Convention on Biological Diversity (CBD), of which India is a ratified member. In fact, India has taken the lead among developing and developed nations both in introducing a substantive legislation in conformance with the objectives of the CBD. It governs the conservation of biological diversity, and sustainable utilization and equitable sharing of benefits from the use of biological resources and knowledge [53, 54]. In terms of Section 6(1) of the Biological Diversity Act, 2002 a person is prohibited from applying for any intellectual property in or outside India for any invention based on any research or information on a biological resource obtained from India, without first obtaining prior consent from the (National Biodiversity Authority) NBA. The BD Act makes admittance to TK and filling of applications for IPRs for products or invention that utilize TK, subjected to the approval of competent authorities [56–58].

8.2 The Patents act, 1970

Indian law has adequate provisions for the protection of TK and Biological Resources. The Patents Act, 1970, which defines that “invention means a new product or process involving an inventive step and capable of industrial application”. Further, under Section 3(e) of the Patents Act “a substance obtained by a mere admixture resulting only in the aggregation of the properties of the components thereof or process for producing such substances” is not an invention and hence, not patentable. The Indian Patents Act also has a unique provision under Section 3(p), wherein “an invention which, in effect, is traditional knowledge or which is an aggregation or duplication of known properties of traditionally known component or components. The patents Act warrants that the subject-matter claimed in a patent application must be novel. The inventive step is another cardinal principle of patentability. Often it is said to be the final gate keeper of the patent system. The applications related to TK and/or biological material shall also be critically examined with respect to requirements of full and particular disclosure of the invention, its operation or use and the method by which it is to be performed along with the best method of performing the invention by way of working examples known to the applicant in the complete Specification as provided under Section 10(4) (a) and (b) of the Patents Act [57].

8.3 Protection of Plant Variety and Farmers' Rights Act, 2001

The Protection of Plant Varieties and Farmers' Rights Act, 2001 is a *sui generis* legislation in India providing protection for plant varieties and rights of farmers and is under the aegis of the Ministry of Agriculture. India having ratified the Agreement on Trade Related Aspects of the Intellectual Property Rights has to make provision for giving effect to agreement. To give effect to the aforesaid objectives the Protection of Plant Varieties and Farmers' Rights Act, 2001 has been enacted in India. The Act, provides a system for protection of plant varieties, farmers' and plant breeders' rights including rights in respect of their contributions made at any time in conserving, improving and making available plant genetic resources for the development of new plant varieties. It also facilitate development of seeds and their commercialization by farmers [54, 59, 60].

8.4 The National Green Tribunal Act, 2010 (NGT Act, 2010)

The National Green Tribunal is a specialized body set up under the National Green Tribunal Act, 2010 for the expeditious disposal of civil cases that are

related to environmental protection, conservation of forest and other natural resources. The tribunal plays a significant role in the sustainable development of the environment [61].

8.5 Forest rights act, 2006

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, was enacted to protect the rights of the forest dwelling tribal communities who had been residing in such forests for generations. The act also empowers the balance of rights with the responsibilities for sustainable use, conservation of biodiversity and maintenance of ecological balance so that forests are conserved while ensuring the livelihood and food security of the forest dwelling Scheduled Tribes and other traditional forest dwellers. Section 3(1) of the act enumerates the types of rights that the act recognizes. These include “Right of access to biodiversity and community right to intellectual property and TK related to biodiversity and cultural diversity”.

The act covers rights of self-cultivation and habitation as Individual rights; and grazing, fishing and access to water bodies in forests as community rights, habitat rights for particularly vulnerable tribal groups, traditional seasonal resource access of nomadic and pastoral community, access to biodiversity, community right to intellectual property and traditional knowledge, recognition of traditional customary rights and right to protect, regenerate or conserve or manage any community forest resource for sustainable use [59, 62].

8.6 Geographical Indication of Goods (Registration and Protection) Act (1999)

The Geographical Indications of Goods (Registration and Protection) Act, 1999 is an act provide for the registration and better protection of geographical indications relating to goods. India, in compliance with its obligation under TRIPS, has taken legislative measures by enacting the Geographical Indications of Goods (Registration and Protection) Act, 1999, which came into effect on 15th September, 2003 and the Geographical Indications of Goods (Registration and Protection) Rules, 2002.

Emphasis would be laid on creating awareness regarding the rich heritage of India in terms of our Geographical Indications. As per the act “Geographical Indication”, in relation to goods, means an indication which identifies such goods as agricultural goods, natural goods or manufactured goods as originating, or manufactured in the territory of a country, or a region or locality in that territory, where a given quality, reputation or other characteristic of such goods is essentially attributable to its geographical origin and in case where such goods are manufactured goods one of the activities of either the production or of processing or preparation of the goods concerned takes place in such territory, region or locality, as the case may be. Geographical indications in India include Darjeeling tea, Kancheepuram Silk, Palakkadan Matta Rice, Mysore Sandalwood Oil, Alleppey Green Cardamom, Wayanad Jeerakasala Rice etc. [15, 63].

8.7 National IPR policy

Government of India adopted the National IPR Policy in 2016, to facilitate promotion, creation and commercialization of IP assets, through a Cell for IPR Promotion and Management (CIPAM) under the aegis of Department for Promotion of Industry and Internal Trade (DPIIT) (IPR P, 2016). The national policy encourages researchers in public funded academic and R&D institutions in IPR

creation by linking it with research funding and career progression. It aims to raise awareness of the value of copyright for creators, the importance of their economic and moral rights and to promote India's rich heritage of traditional knowledge with the effective involvement and participation of those knowledge holders. The main focus of this policy is related to the slogan "Creative India; Innovative India", which subsequently is aligned to different government initiatives and missions in recent times that include "Make in India", "Atal Innovation Mission", "Start Up India", and "Stand-Up India" promoting creativity, innovation and entrepreneurship in the country [57, 64, 65].

The policy suggests some measures, such as expanding the ambit of the Traditional Knowledge Digital Library (TKDL), and expanded to include other fields besides Ayurveda, Yoga, Unani and Siddha. The policy also states that traditional knowledge holders will be provided necessary support and incentives for furthering the knowledge systems that they have nurtured through civilization. The policy also seeks Activities for promotion of traditional knowledge with effective participation of holders of such knowledge. By documentation of such oral traditional knowledge will preserve the integrity of the said knowledge and traditional ways of life of the communities [54].

8.8 Traditional Knowledge digital library (TKDL)

The TKDL in India is a collaborative project between the Council of Scientific and Industrial Research (CSIR) and the Ministry of Agriculture, Food and Public Health (AYUSH). It is a nationally developed effort to ensure that patent offices around the world do not grant patents for applications based on India's ancient TK. The idea of establishing TKDL arose as a result of India's attempt to revoke a patent granted by the United States Patent and Trademark Office (USPTO) for the wound healing properties of turmeric (*Curcuma longa*), and a patent granted by the European Patent Office (EPO) on the antifungal properties of neem (*Azadirachta indica*). Concrete measures have been taken to develop a programme aimed at documenting the knowledge and information contained in the ancient texts of Ayurveda, Siddha and Unani, as well as creating a database on the medicinal plants involved and their medical use. TKDL has transcribed more than 2.90 lakh medical formulations of Ayurveda Unani and Siddha in five internationally recognized TKDL is a collective resource in the management of intellectual property rights [52, 65].

9. International forums

9.1 The Nagoya Protocol

The Nagoya Protocol on access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization was adopted in Nagoya, Japan on 29 October 2010. It is a new international treaty that builds on and supports the implementation of the Convention on Biological Diversity (CBD), in particular one of its three objectives, the fair and equitable sharing of benefits arising from the utilization of genetic resources. The Nagoya Protocol is a landmark agreement in the international governance of biodiversity and is relevant for a variety of commercial and non-commercial sectors involved in the use and exchange of genetic resources. It also covers genetic resources and traditional knowledge (TK) associated with genetic resources, as well as the benefits arising from their utilization [66].

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization was adopted in Nagoya, Japan on 29 October 2010. It is a new international treaty that expands on and upholds the execution of the Convention on Biological Diversity (CBD), specifically one of its three goals, the fair and equitable sharing of benefits emerging from the use of genetic resources. The Nagoya Protocol is a milestone agreement in the international governance of biodiversity. It supports various commercial and non-commercial sectors involved in the use and exchange of genetic resources. Indeed it covers genetic resources and traditional knowledge (TK) associated with genetic resources, as well as the benefits derived from their use [66].

9.2 Convention on biological diversity (CBD)

Convention on Biological Diversity (CBD) is an international treaty designed to promote sustainable development of biological diversity, conservation as well as the fair and equitable sharing of the benefits arising out of the utilization of genetic resources” CBD has been ratified by 196 nations including India. Its overall objective is to encourage actions, which will lead to a sustainable future. The Convention on Biological Diversity covers biodiversity at all levels: ecosystems, species and genetic resources [67].

10. Conclusion

Perhaps the most fundamental prerequisite for all social, economic and cultural advancement is the encouragement of intellectual creation. All branches and forms of intellectual property are therefore important, whether copyright, trademarks, industrial designs, patents or unfair competition, for the protection of traditional cultural expressions. This chapter explored briefly about the intellectual property rights with special emphasis on protection of traditional knowledge. It also discussed the overview about the concepts like biopiracy and bioprospecting. India is one of the world’s most biologically and culturally diverse countries. The intellectual property law regime has seen rapid change in the last decade or so. India, a hub of TK and unique endowment has considerable unexplored potential for developing, promoting and utilizing traditional knowledge. Bioprospecting encompasses the search for the commercial potential of medicinal natural products. Consequently, it is important to deal with issues of biopiracy at the global scale. Hoping that the existing international mechanisms and national level legislations will be effective at reducing the prevalence of Biopiracy. It is the responsibilities of governments and various NGOs and corporates and the communities to nurture all forms of innovations under traditional knowledge for the benefit of mankind under the frameworks of intellectual property rights.

Conflict of interest

The authors declare no conflict of interest.

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