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INDIA –VICTIM OF BIO-PIRACY

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ABSTRACT

Since the last two decades multinational corporations are profiting by patenting the indigenous knowledge and resources of Indian hotspots and associated communities. Bio-piracy is hampering the livelihoods of communities and farmers who have invested their time, care, hard work and knowledge in restoring their heritage. An account of various medicinal plants like *turmeric*, *neem*, *basmati rice*, *ashwagandha*, *pudina*, *kalmegh*, *aloe-vera*, *karela*, *jamun* and *brinjal* have been given, which are victimized by bio-piracy and where India have successfully put forward its perspective in the international courts and came forth as a winner. This is the ripe time where genuine efforts are required from government, Non Government Organization (NGO)'s, scientists and publishers to restrict highly ambitious pharmaceutical and biotechnological firms to escort our national wealth. There is a dire need of modification or amendments in international and national rules in order to safeguard national interests and to negate the privatization of international knowledge and resources. So far, the best solution provided by India has been the construction of databases and traditional knowledge archives -Traditional Knowledge Digital Library (TKDL) to endorse the preservation, promotion, dissemination and exercising suitable use of traditional knowledge as 'Prior art'. This article will bestow limelight on the loot practice of western world under the guise of Intellectual Property Rights (IPRs) and some possible suggestions to forbid such practices.

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INTRODUCTION

India is a land of traditions and here knowledge is acquired over centuries unknown. India supports about 15% of world's population owing to its unique geographical location and diverse cultures. Our traditional knowledge (TK) is an integral part of our cultural identity and has been playing a vital role in our day to day life from time immemorial as TK is the only means of livelihood in rural areas. [1] Besides India, about 80% populations of developing countries depend on medicines obtained from traditional plants to meet their health care needs. [2]

Local communities of a particular country imbibe traditional knowledge regarding medicinal values of plants and the same is passed on with incremental improvements over generation. Although, a part of this knowledge is documented but its interpretation is cumbersome because of the involvement of local script used. Due to this unsynchronized documentation of TK, patents are often granted to facilitate those persons who traditionally don't owe this knowledge but reap massive profits, thereby leading to conflicts in the market interests of the parties involved as the original stakeholders of the traditional knowledge are dissatisfied as no profit flows back to them.[3]

Bio-piracy implies any attempt to acquire proprietary rights over biological resources and its associated indigenous knowledge, or upon product(s) based on them, neglecting the consent and contribution of the bearers of such resources and knowledge. [4] Put differently, bio piracy is defined as a process in which living resources or traditional knowledge and practices are patented, thus applying intellectual property restrictions to their use. [5] These practices will lead to inequality between the developed countries (supported by transnational corporations) and developing countries (dependent solely on their indigenous resources). [6] The issue of bio-piracy is touching threatening horizons because the western countries are toying with the patents of crucial traditional and indigenous products of the progressing nations.[7]

Recently, Ayurveda has captured the interest and excitement of the western part of globe, especially Europe and United States. [8] The ayurvedic knowledge is gaining global attraction as well as adoption due to the awareness regarding the adverse effects of allopathy leading to bio piracy. [3] The Convention on Biological Biodiversity has added up a synergistic effect to the problem by providing a tool of free accession in the hands of multinational companies to the indigenous natural resources and after screening the indispensable resource, gets the exclusive rights for such plants and debarring the natives of their rights of cultural and traditional use.[9] Similarly, Geographical Indications (GIs) are under serious threats from bio-pirates as domestic regulations of individual nations are inefficient in international markets without suitable rectifications in TRIPS where commodities are moving beyond borders. [10]

Bio pirates carry out their operations under a veil of legality i.e., the international patent system. They make the fields and forests of developing countries their target and apply for exclusive rights in the form of patents- the Intellectual Property Rights (IPR) Protection. An invention should be novel, useful and non-obvious to be patentable but in countries like Japan, United States and Europe, patents are granted for plant varieties which are hardly novel. As stated by the United Nations Human Development Report of 1999 "the current patent system is leading to the silent theft of centuries of knowledge from the developing to developed countries" demands amendments in the current patent law. [11]

With these modern generous policies, the supremacy of rural India is under threat. TRIPS has opened the channels for multinational corporations based on agro-business to involve themselves in bio piracy, geographical indication and genetically modified (GM) seed dominance, thus a set back to our rural and traditional localities. The companies are manipulating the IPR's according to their own advantage, thus making the patents ineffective which in turn put the traditional farmers on a defensive side. A big chunk of farmers have lost their right to grow and possess control over the production cycles leading to indebtedness, disempowerment and posing as a danger to their survival. [12]

India has aggressively commenced its struggle against bio-piracy and is successful in revoking a number of patents around the world. The following is an account of ayurvedic drugs against which India has opposed and emerged as a winner.

Turmeric

In 1995, the United States Patent and Trademark Office (USPTO) issued a patent (#5,401,504) to two non-resident Indians linked with University of Mississippi Medical Center for "Use of Turmeric in Wound Healing" [Fig-1]. [13] The India's industrial research organization, Council for Scientific and Industrial Research (CSIR), challenged the patent on the basis that ayurvedic professionals were already cognisant for the healing properties of turmeric for age long [14] and therefore its medicative properties were not a novel invention. Their challenge was reinforced by factual proofs of TK, including age old Sanskrit scripts and a publication in the Journal of the Indian Medical Association in 1953. [9] After taking into consideration all the debates, in August 1997, the USPTO rejected six claims mentioned in the patent [15] and annulled it on the basis of lacking the novelty indispensability. [16]



Figure 1: Turmeric

Basmati rice

In 1997, the Texas based RiceTec Inc. was granted a patent (# 5663484) by the USPTO on *Basmati* rice [Fig-2] lines and grains. The Research Foundation of Science, Technology and Ecology (RFSTE), India and co. filed an appeal in Supreme Court of India in public interest on March 4, 1998, which compelled Government of India to file a "Request for Re-examination" against the aforementioned patent at USPTO [17] to re-establish the validity of the "*Basmati* Rice Lines and Grains" patent.[18] The financial and trade interests of basmati rice exporters in the country appeared to be a significant contributory factor to this request.[19]

In reality, the Indian Government was unaware of the patent application filed, until it was protested against The United Kingdom for registering Ricetec's trademark "Texmati" in 1998. India's claim was based on the fact that genuine *Basmati* rice breed can only be produced from the indo-gangetic plains of India and Pakistan due to the distinctive and complicated union of cultivation factors and genetic code of the *Basmati* varieties.[20] Due to these developments there arose a diplomatic crisis between United States (US) and India, with India threatening to take the case to World Trade Organization (WTO) as violation of TRIPS leading to US embarrassment.[21] The original patent application was a skilfully drafted document embracing 20 claims of which US Ricetec was compelled to drop 15 claims.[22] This was a grand victory for Indian cultivators who could have been deprived tremendous financial rewards from the patent. [21]



Figure 2: Basmati Rice

Neem

In 1985, Robert Larson obtained a patent on the extraction process of his preparation of *neem* [Fig-3] seed extract called as Margosan-O and later sold it to a US company WR Grace. In 1995 United States Department of Agriculture (USDA) and the US chemical major W.R. Grace gained patent rights (European Patent Office patent #436257) for an extraction technique of *neem* oil for its fungicidal properties. W.R. Grace possessed patents for *neem*-based bio pesticides, including Neemix for use in agriculture. In more than 200 species of insects, Neemix overpower and crush their growth and feeding behaviour. [23] After gathering their patents and clearance from the Environmental Protection Agency (EPA), Grace started commercializing its product by setting up manufacturing plant in collaboration with P.J. Margo Pvt. Ltd in India. The commencement of campaign in opposition to bio-piracy pertained to *Neem* (*Azardictica indica*) was carried by the RFSTE India, in collaboration with the International Federation of Organic Agriculture Movements and Magda Aelvoet, Green member of European parliament in 1993 in contrast to patenting of a natural living resources and its products[24] The information relating to application of *neem* as fungicide, insect repellent, soaps, cosmetics and contraceptive was known to Indians for more than thousand years and proved to be the structural stone to object the US claim for

Neemix. The revocation of patent by the European Patent Office (EPO) in May 2000, was based on the evaluation of proofs of prior art and it was revealed that there is no involvement of any inventive step. [7]



Figure 3: Neem

The Indian Ginseng –Ashwagandha

In May 2001, American and Japanese firms filed applications for the issue of patents in their favour regarding formulations or extracts of *Ashwagandha* [Fig-4]. [25] The patent application by Japanese firm Pola Chem Tech [26] was regarding topical skin ointment for cosmetic purposes and to promote fertility whereas the US based the New England Deaconess Hospital was successful in getting a patent relating to its use to alleviate the symptoms regarding arthritis. [25] On 27th July, 2006 Natreon Inc, an America based multinational company filed a patent application in the EPO on *Ashwagandha*'s age long use in treatment of anxiety induced stress, depression, insomnia, gastric ulcers and convulsions [27] titled "*Method of Treatment or Management of Stress*". (European patent #1906980). [28]

Out of several patents granted in favour of *Ashwagandha*, India was successful in revoking only one. In order to crush their attempt, Indian authorities replied back on 6th July 2009 by submitting evidences from Traditional Knowledge Digital Library (TKDL) and some documents dating back to 12th century. [29] In our traditional ayurvedic system of medicines, the parts of this wonder plant find a well recognized status as aphrodisiacs, diuretics and for restoring loss of memory. [25] As a result of the breathless efforts, on 25th march 2010, EPO decided to dismiss the American's firm claims over the Indian Ginseng. [29]



Figure 4: Ashwagandha

Pudina and Kalamegha

On January 19, 2007 M/s Livzon Pharmaceutical Group Inc, Guangdong filed a patent plea at EPO staking novelty in utility of *pudina* (mint) [Fig-5] and *kalamegha* (andrographis) [Fig-6] for the therapy of H5N1 avian influenza. On February 25, EPO after scrutinizing the plea communicated a positive response to allot the patent. In a joint venture of CSIR and India's TKDL, formulations from ancient Ayurveda and Unani scripts were excavated dating back to 9th century, to unveil the age long use of '*pudina*' and '*kalamegha*' in India since ages for influenza and epidemic fevers. [30] On April 27, India's TKDL sent a letter to the EPO apprising the evaluators of the references regarding the traditional medicinal properties of *pudina* and *kalamegha* in India, thereby rejecting any novelty and inventiveness in the stakes claimed in the plea (European patent # 1849473). [30,31] After going through the elaborated

proofs from CSIR that corroborated India's stand, on June 10, EPO called off the determination to grant patent to Livzon, a major Chinese pharmaceutical company, on the medicinal properties of *pudina* and *kalamegha* for treating bird flu. Thus India thwarted a major attempt at bio-piracy by successfully blocking Chinese bid to patent the use of medicinal plants *pudina* and *kalamegha*. [32]



Figure 5: Pudina



Figure 6: Kalamegha

Aloe Vera

M/s. Cognis IP Management GmbH, Germany, filed a patent application on 09-03-2007 for the treatment of obesity using *Gheekawaar* (Aloe vera) [Fig-7]. TKDL evidences based on *Rasendrachintamanih* (time of origin 16th century) and other Ayurveda and Siddha books were submitted on 20-07-2009. On 27-11-2009 applicant decided to withdraw its claims/patent application. [33]



Figure 7: Aloe Vera

Karela, Jamun and Brinjal

Bio-piracy was once again in highlights by the grant of patent for the anti-diabetic properties of *Karela* [Fig-8], *Jamun* [Fig-9] and Brinjal [Fig-10]. US firm Cromak Research Inc., based in New Jersey, has been granted a US Patent # 5900240 to a group of three persons including two non-residents Indians Onkar S. Tomer and Kripanath Borah, and their professional partner, Peter Gloniski [34] despite of the fact that their use has been mentioned in several Indian texts and are routinely recommended in Indian households.[35]The medicinal use of *Syzygium cumini*, popularly known as *jamun*; *Momordica charantia* (bitter gourd or *karela*); *Solanum elongata* (brinjal or eggplant) has been clearly indicated in the *Wealth of India, compendium of Indian medicinal plants*, and *Treatise on Indian Medicinal Plants I* which has no reference in the patent granted. [36]



Figure 8: Karela



Figure 9: Jamun



Figure 10: Brinjal

So far we have discussed the cases where India successfully fought back to revoke the patents granted in favour of bio-piracy. The list where bio-pirates have been awarded by patents is long-lasting and can't be compiled in one article only. **Table-1** gives an account of Indian traditional drugs which are a victim of bio-piracy.

Table: 1 List of Traditional Indian Drugs Targeted by Bio-Piracy

S.No.	Common Name	Indigenous use	Patent Number	Patentee	Purpose	Reference
1.	Turmeric [<i>Curcuma longa</i>]	heal wounds and rashes	US Patent 5401504	University of Mississippi Medical Center, Mississippi	Wound-healing agent	[4,37]
2.	<i>Neem</i> [<i>Azadirachta indica</i>]	Antiseptic toothbrush, Insect repellent, Diabetes	EP436527	US Corporation W.R. Grace Company and US Department of Agriculture	Neem Extracts	[4,38]
			US Patent 5047242	Native Plant Institute ("NPI") Salt Lake City	Azadirachtin derivative insecticides	[39]
			US Patent 4943434	Rohm and Haas Company, Philadelphia	Insecticidal hydrogenated <i>neem</i> extracts	[40]
			US Patent 5110591	PPG Industries, Inc., Pittsburgh	<i>Neem</i> -oil-emulsifier	[41]
			US Patent 5405612	W. R. Grace & Co.-Conn., New York	Hydrophobic extracted <i>neem</i> oil—a novel insecticide	[42]
			US Patent 4556562	Vikwood, Ltd. Sheboygan	Stable anti-pest <i>neem</i> seed extract	[43]
3.	<i>Anar</i> [<i>Punica granatum</i>]	Anti diarrhoea, womicidal	US Patent 5411733	Toyoharu Hozumi, Takao Matsumoto, Haruo Ooyama, Tsuneo Namba, Kimiyasu Shiraki, Hattori Masao, Masahiko	Anti-viral agent	[4,44]

4.	<i>Karela, Jamun, Brinjal</i>	Control of Diabetes	US Patent 5900240	Kurokawa, Shigetoshi Kadota, Japan. Cromak Research Inc.	Anti-diabetic properties	[4,45]
5.	<i>Basmati Rice</i>	Unique aroma and Flavour	US Patent 5663484	RiceTec	New Variety of basmati lines	[4,46]
6.	<i>Amla [Phyllanthus emblica]</i>	Greyness of hair	JP9110661	Unilever in the Japanese patent office	Hair blackening composition extracted from the <i>amla</i> fruit	[4]
7.	<i>Guggul [Commifora mukul]</i>	Lowering fat	US Patent 643699	SABINSA Corporation, US	Nutritional/ Nutraceutical improvement of cardiovascular disease.	[4,47]
			US Patent 6113949	Prolab Nutrition, Inc.	Weight control product and method of treating hyperlipidemia	[48,49]
8.	<i>Kala jeera [Nigella sativa]</i>	Jaundice, Halitosis, Skin diseases	US Patent 6042834	Baraka, Mohamed Wasif	Herbal composition for diabetes and method of treatment	[4,50]
			US Patent 5653981	Medenica, Rajko D.	To increase immune Function	[51,52]
9.	<i>Aswagandha [Withania somnifera]</i>	Treatment of depression, insomnia, gastritis, gastric ulcer and convulsions	EP 1906980	Natreon Inc., US Multinational	Method of Treatment or Management of Stress	[53,54]
10.	<i>Bel [Aegle marmelos]</i>	Leaves useful in diabetes	US Patent 5886029	Dhaliwal, Kirpal S.	Method and composition for treatment of diabetes	[4,55]
11.	<i>Latjira [Achyranthes aspera]</i>	Skin diseases and anti-inflammatory	US Patent 6080401	Reddy; Malireddy S. Englewood, CO	Enhancement of the curative action of the drugs	[56]
12.	<i>Amaltas [Cassia fistula]</i>	Prevention of dysentery	US Patent 5411733	Toyoharu Hozumi, Japan	Antiviral agent	[4,57]
13.	<i>Tulsi [Ocimum sanctum]</i>	Skin diseases	US Patent 6264995	Newmark; Thomas Schulick; Paul	Herbal composition for reducing inflammation	[4,58]
14.	<i>Kalimirch [Piper nigrum]</i>	Dermatopathy, Used in the preparation of pipla	US Patent 6346539	Raman; Amala Lin; Zhixiu Robert; Charles Hider	Treatment of skin conditions	[4,59]

				London		
			US Patent 5536506	Majeed, Muhammed Badmaev, Vladimir Sabinsa Corporation	Use of piperine to increase the bioavailability of nutritional compounds	[4,60]
15.	<i>Bhoomi Amla</i> [<i>Phyllanthus niruri</i>]	Cures liver disorders used for treating everything from jaundice to sluggish livers.	US Patent 4673575	Baruch Blumberg, Venkateswaran; Pinayur S. Fox Chase Cancer Center	Composition,Phar maceutical preparation and method for treating viral hepatitis	[61,62,63]
16.	<i>Sharifa</i> [<i>Annona squamosa</i>]	Inflammation, constipation, urinary infection, infertility	US Patent 4762716	Moeschler; Heinrich F. Pflugler; Wolfgang Wendisch; Detlef	Insectide Annonin obtained from pulverized <i>annona squamosa</i> extract.	[4,64]
			US Patent 5955497	Mclaughlin, Jerry L. Hopp, David C.	Novel acetogenins isolated from Annona squamosal exhibit cytotoxicity to human tumor cell lines	[4,65]
17.	<i>Harad</i> [<i>Terminalia chebula</i>]	For dysentery and diarrhea, stomach complaints, ulcers, vomiting and worms Flatulence	US Patent 6187313	Alvin Burton Segelman, Nature's Sunshine Products,USA	Composition and method for treating and preventing helicobacter- pylori-associated stomach gastritis, ulcers and cancer	[4,66]
18.	<i>Imli</i> [<i>Tamarindus indica</i>]	Fruit Drink	US Patent 5474791	Linda Zablocki; Suzanne Pecore; The NutraSweet Company, (Deerfield)	Beverages using tamarind extract and method of making such beverages	[4,67]
19.	<i>Manjistha</i> [<i>Rubia cordifolia</i>]	Skin diseases	US Patent 6258344	The Procter & Gamble Company, Cincinnati	Skin lightening compositions	[68]
20.	<i>Chandrabhaga</i> [<i>Rauwolfia serpentina</i>]	Useful in epilepsy	US Patent 6323236	Susan McElroy; University of Cincinnati,Cincin nati	Use of sulfamate derivatives for treating impulse control disorders.	[4,69]
			US Patent 2870140	Marvin R. Thompson, Robert E. Thompson.	Therapeutic agents derived from <i>rauwolfia serpentina</i>	[70]

21.	<i>Banaba</i> [<i>Lagerstroemia speciosa</i>]	used as a remedy for the symptoms associated with elevated blood glucose levels	US Patent Application 20060198907	Alex Moffett, Parag Shah	Pharmaceutical, therapeutic, and dietary compositions derived from <i>Lagerstroemia speciosa</i> L. plant	[4,71]
			US Patent 6589573	Ito En, Ltd. ,Tokyo, Japan	Xanthine oxidase inhibitor and method for producing the same	[72]
22.	<i>Arjuna</i> [<i>Terminalia arjuna</i>]	Useful in bilious affections	US Patent 5411733	Hozumi Toyoharu Matsumoto Takao et.al.	Antiviral agent containing crude drug	[4,73]
23.	<i>Bahera</i> [<i>Terminalia bellirica</i>]	Germicidal	US Patent 5693327	Eladevi Shah	Herbal compositions	[4,74]
24.	<i>Adrak</i> [<i>Zingiber officinale</i>]	in rheumatism and inflammation of the liver	US Patent 6274177	Tian-Shung Wu; National Science Council ,Taipei	Method of preparing an extract potent in anti-inflammation and anti-platelet aggregation from <i>Zingiber officinale</i>	[4,75]
		promotes digestive power	Patent application number: 20090104293	Medical and Pharmaceutical Industry Technology and Development Center, Taipei	Use of an extract from rhizomes of <i>Zingiber officinale</i> in treating a disease associated with <i>Helicobacter pylori</i>	[4,76]

TKDL Status –A boon or curse in the battle against bio-piracy

There was great exhilaration in the atmosphere on India's proposal of setting up a TKDL as the genesis of Indian effort to fight bio-piracy as a joint venture of CSIR, Ministry of Science and Technology and Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Ministry of Health and Family Welfare to assuage the organized structure and recovery of the traditional knowledge.[77] The TKDL squad incorporated representatives from many fields viz., traditional medicine, patent, information technology (IT), scientists and technicians which were involved in documentation of the TK available in local community arena in the form of surviving written records and texts associated to Ayurveda, Unani, Siddha and Yoga, in digital format in five global languages. The digital Library proved copulative between TK (referred in public records) and Patent evaluators at international platform and hence valuable in preventing the granting of indefensible patents [38] and thus, endorse the preservation, promotion, dissemination and exercising suitable use of TK. So far TKDL database comprises about 2.12 Lakh medicinal formulations (Ayurveda: 82,900; Unani: 1, 15,300; Siddha: 12,950), from 148 books available in public domain, and the database exists in 34 million A4 size pages. On 29th June 2006, under a non-disclosure agreement, Government of India has sanctioned the access of TKDL databases by International Patent Offices. [78]

If we give a look at other side of the TKDL operation, it will be unwrapped that TKDL has made the situation more vulnerable by opening the gates to the multinational companies to manipulate the TK as an invention or novelty. US companies are fiddling with the traditional knowledge and gaining several patents by presenting the old knowledge in a new packet. The digital library will act as a pathfinder for such companies who just have the mean motive of earning money by exploiting the already existing original medicinal information. International companies will just make dewey-eyed alterations which add up to cost addition and assist them to get the patent in their lap. The digital library will easily serve the rare and indigenous information on the platter to British and US private companies. TKDL may provide the crucial and indigenous knowledge to corporate sector inadvertently which will in one way or another demolish the fundamental and financial rights of traditional people to use their own ancestral knowledge. [79].

Remedies to combat bio-piracy

The probability of India being prone to bio piracy are high because of its being the earth's richest biodiversity hot spots with over 81,000 species of recorded fauna and 47,000 species of flora, of which 15,000 are unique to the country.[80] The current expansion of global trade to launch international regulations for IPRs provides opportunities that may demolish biodiversity. Nations are compelled to amend their IPR laws to be in line with the TRIPS agreement of the General Agreement on Trade and Tariffs (GATT) which overpower national interests and promote privatization of international knowledge and resources. [81]

TRIPS already infringe Convention on Biodiversity as the latter supports that IPRs must not be in opposition with conservation and sustainable use of biodiversity. [80] So there is a dire need to take steps to combat bio-piracy. The international companies engaged in bio prospecting are relaxed to patent bio-materials but no efficient regulations are framed to acknowledge and repay the contributions of individuals accountable for breeding and preserving bio-diversity in the habitat. [82] Government should negotiate and make amendments in TRIPS, Biodiversity bill, Seed bill and Patent bill as these are enforced in a hurry to comply with global changes in order to safeguard TK, indigenous innovations and biodiversity.

GIs address only exports, of a small number of commodities, not the rights of our farmers to use, save, exchange, improve and protect of our indigenous knowledge. GIs should also work to forbid bio-piracy of ayurvedic plants in the same way as protection is provided to wines and spirits. To prevent the rampant bio-piracy of our plants and knowledge we need a genuine 'sui generis' system, which protects the collective, cumulative innovations, embodied in TK as a societal common property. Domestic laws are ineffective without suitable changes in TRIPS. [46] The laws should blacklist a bio-pirate and legal penalties including jail should be enforced. [83]

The miserable level of ayurvedic education is also a matter of concern. The syllabus of ayurvedic graduation courses should be re-examined and reframed so that they should be at par with the current burning topics relevant to IPRs. In addition to this, ayurvedic educationists should be motivated to get trained in standard research methodology and documentation of the same so that they can contribute to evidence creating database for ayurvedic medicinal plants and preparations. [84] In India, majority of professionals are unaware about IPR protection, so mass awareness programmes and workshops should be carried out by the government to make people well verse with its protection. [1]

Government should reinforce the non-governmental organizations, lawyers organizations, scientists organizations and publishers of scientific journals to favour and publish the activities related to traditional knowledge. [85] The toll to confront and fight patent infringements against bio-piracy in international courts is discouraging. Leave behind the developing countries, even the amply rich nations find it cumbersome to carry out these legal patent battles in international courts. If bio-piracy is anticipated, then the losing side should reimburse the overall cost involved in the legal battle to the other defending the traditional knowledge. [79].

Limitations of bio-piracy

Firstly, firms possessing patents make large profits without the welfare of traditional communities from which the basic idea was derived. Secondly, user population is prohibited to utilize the biological product or plant as its exclusive rights are with the patenting organisation. Finally, traditional communities are compelled to pay for consuming the patented products which primitively belongs to them without any boundaries. [86].

CONCLUSION

India is prone to Bio-piracy because of its being the earth's richest biodiversity. Bio-piracy provides scarce biological resources to the monopoly control of corporations thus depriving local communities the benefits of its use. It creates market monopolies and excludes the original stakeholders (farmers) from their rightful share to local, national and global markets. In order to restrict bio-piracy there is a desperate need to make amendments in TRIPS, Biodiversity Bill, Seed Bill and Patent Bill as these are enforced in a hurry to comply with global changes. Ayurvedic courses should be upgraded to accommodate patent awareness among professional, academicians and researchers. GIs should also address the rights of our farmers to use, save, exchange, and improve their seeds for domestic production or protection of our indigenous knowledge. Bio-piracy is a serious tool used by highly desirous pharmaceutical and biotechnological firms which should be restricted and opposed and demands attention and efforts from government, Non-government organizations, scientists and publishers in public and national interests. An attempt has been made in this article to support the developing countries who are victim of bio-piracy by the highly covetous developed countries who are toying with the traditional knowledge of the indigenous residents under the veil of legality-the international Patent System.

Authors' Statements

Competing Interests

The authors declare no conflict of interest.

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