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Intellectual Property Rights for Medicinal and Aromatic Plants in India

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Medicinal plants are those plants that provide medicines - to prevent disease, maintain health or cure sickness. In one or other form, these plants benefit virtually everyone on the Earth. These plants are also related to various other usages, such as for nutrition, toiletry, bodily care, incense and ritual healing. **Aromatic plants** are used for their aroma and flavour and many times these two groups become inseparable in terms of usages. In recent years a great demand of aromatic plants has increased because of increasing interest in aromatherapy. The use of plants for medicines is by far the biggest use of plants in term of the number of species specifically targeted. Plants provide the predominant ingredients of medicines in most traditional systems of healing and have been the source of inspiration for several new drug search to major pharmaceutical companies. There are three kinds of herbal medicines available in the market: raw medicinal plants material, processed medicinal plants material and medicinal plants herbal products.

India has a long history and tradition as well as rich heritage of using medicinal and aromatic plants (MAPs) for health care and beauty in improving the quality of life. India is also fortunate, perhaps, to have the richest reservoir of traditional herbal medicinal plants and prescriptions. The Indian systems of medicines comprise of Ayurveda, Siddha and Unani are having their deep roots in our society. Ayurveda is about 5000 years old and predominantly use medicinal plants for their preparation and formulations. Modern pharmacopeia also enlisted about 25% of drugs derived from plants. A vast majority of modern drugs although synthetic analogues but built on prototype compounds isolated from plants. The present era is witnessing a fascinating rejuvenation in the traditional system of medicine (Task force report of Planning Commission, 2000).

India's plant bio-diversity is one of the richest in the world. It is the home of about 43000 of plant species on the earth many of which have not been fully explored and cultivated. Western Ghat and Himalayas are the most tempting locations for those in the bio-industries causing a serious danger to the wealth due to its over exploitation causing serious depletion. About 7500 plant species out of 43000 that are said to exist in the country are recorded in various folklore medicines. About 1700 species are referred in Ayurvedic texts. From the time immemorial, India has long heritage of use of herbal products not only as medicine but also for cosmetics, health hygiene, toiletries, fragrance and food supplements.

The IPR for MAPs emerges in two different backgrounds: (1) those are found in nature as wild MAPs and collected for use and (2) those are developed through plant breeding systems and used as cultivated MAPs. Plant breeding systems used so far are mostly conventional based on selection and controlled pollination. These methods are remarkably successful in developing a large number of improved varieties () in equally large number of species (). The improvement so far been achieved mostly in terms of yield, intrinsic quality, and to a lesser extent to resistance or tolerance against a few pest and disease. Modern plant breeding molecular techniques to introduce new hereditary characters in to MAPs are in progress in various laboratories. More legal protection of the various process and products of molecular breeding are in demand.

The Global Coalition for Bio-Cultural Diversity established the Working Group for Intellectual Property Rights in 1990 with a mission to unite indigenous peoples, scientific organizations and environmental groups to create and implement of a forceful strategies for the use of traditional knowledge and involvement of local people in conservation as alternative people-centered conservation models (Posey and Dutfield, 1996). The group went through a series of discussion, seminars, workshops with the various associations of indigenous peoples and human rights and finally came to a conclusion that legal instruments used to invoke IPR protection are inadequate for protection of cultural, scientific, intellectual resources and traditional knowledge of indigenous people. The issue in IPR has overgrown and surpassed its name. Therefore, Traditional Resource Rights (TRP) has evolved as a strong arm to define many “Bundles of Rights” related to protection, conservation and compensation for the benefit of indigenous people. In this chapter we wish to discuss various facets of legal IPR protection regimes for MAPs and the isolated active ingredients as well as on the methods of developing new varieties and isolation of chemical compounds in relation to TRP that would benefit the country.

Intellectual Property Rights (IPR) applicable for MAPs

Agriculture has become subject to IPR only after the creation of World Trade Organization (WTO) as a result of the General Agreement on Tariffs and Trade (GATT) Uruguay Round agreement. It was thought that Agreement on Agriculture (AoA) is the central focus of WTO negotiations, since agriculture is lifeline of development of most countries in the world. It plays a pivotal role in ensuring food security, providing livelihoods, generating foreign exchange and determining the allocation of natural resources (Murphy, 2003). However, dominant interest within the AoA circles around greater market access and increase in volume of commodity flows. Agreement on Trade-Related Intellectual Property Rights (TRIPs) is the outcome of WTO which has direct impact on farmers' livelihood, food security and economic development of the country. TRIPs provides mechanism for common protection and enforcement of IPR such as copyrights, trademarks and

patents and also to make rules intended to limit international trade in counterfeit goods. The agreement also recognised that there are no uniform standards in the protection and enforcement of IPR and also no multilateral framework of principles. Various legal protection mechanisms available under the TRIPs for MAPs that can be harnessed to the benefit in country's interest are as follows:

Protection of Plant Varieties and Farmers' Right Act (2001): It allows the registration of three types of plant varieties. These are farmers' variety, extant varieties and new varieties (Bala Ravi, 2004). Although, most of the MAPs that are in cultivation, are farmers' varieties and an instrument is available now to safeguard these varieties from piracy by registration. However, much benefit can not be achieved in MAPs by the farmers because rule states that all the extant varieties are to be registered within the three years from the date of enforcement of this Act. According to the Act, extant varieties include farmers' varieties also. Only possibility left now is to register the farmers' variety as new variety since provision is available for the farmers also to register new varieties.

Protection through the Biological Diversity Act (2002): The key features of this Act are (1) to regulate access to biological resources (BR) of the country with the purpose of securing equitable share of benefits arising out of the use of BR and its associated knowledge (2) to conserve and sustainable use of BR (3) to respect and protect knowledge of local communities related to BR (4) to share the benefits with local people as conservers of BR and owner of knowledge and information relating to use of BR and (5) conservation and development of areas of importance for biodiversity. MAPs constitute a great deal of BR and its usage has been recognised by the Act. Even after developing IP by using the country's MAPs bio-resources through proper legal permission, one has also to take approval from the National Biodiversity Authority (NBA) for filling an application for any form of IPR. This provision will take care of benefit sharing that will emerge due to utilization of our BR.

Geographical Indication of Goods (Registration and Protection) Act (1999): Geographical Indications is an important protection measure for safeguarding the agricultural goods or for that matter any other goods manufactured at a given location which has the quality related to that geographical location. With the Geographical Indication of Goods (Registration and Protection) Act 1999, the varieties from which the medicines prepared from certain genotypes and at a particular location having a good quality can be protected after registering it under this act with the Controller General of Patents, Designs and Trade Marks. There are few examples existing in medicinal plants

that a product is known by its location such as Trinvelly senna, Java citronella, Neemach ashwagandha, etc. Many more can be registered in future.

Traditional knowledge digital library (TKDL): Since the time immemorial, folk medicines are using herbs in their preparations. This knowledge is disseminated through person to person through practice without having any written form. Therefore, there is no proper record of these practices. Collection, documentation and validation of various folk medicines, in addition to other various traditional knowledge have been initiated by National Institute of Science Communication and Information Resources of Council of Scientific and Industrial Research and also by few other NGOs. This documentation will help in opposing any piracy of patent as experienced in case of neem and turmeric.

Patent Protection: Varieties of MAPs developed using modern plant breeding techniques can not be patented as such as per the Indian patent law. But the process of developing such varieties can be protected through patents. Similarly, process of extraction of active ingredients, product developments by using MAPs and usages of MAPs for new purposes are patentable subject matter in the national law if they meet the standards of novelty, inventive steps and industrial applicability.

Important Medicinal plants of Indian System of Medicines

1. Ashwagandha (*Withania somnifera* Dunal)

Ashwagandha (*Withania somnifera* Dunal), a member of Solanaceae is distributed throughout India. It is annual to perennial, branched under-shrub to herb of about 30 cm to 120 cm height. The plant is cultivated in northwestern and central India. At present about 10,000 ha of land is covered under the cultivation. Seeds are used for the plant propagation. JA 20 and JA 135 are the two important high yielding varieties available for cultivation. Root is the major medicinally important part apart from leaves and seeds. Alkaloids (mainly withanoloids and withanins) present in the roots are believed to be used for the treatment of stress induced disorders, fatigue, dropsy, male impotency, neurosis, etc. It is commonly used as a general tonic and an important ingredient of Ayurvedic preparations like *Ashwagandha ghruta*, *Ashwagandharishta* and *Narayana taila*.

2. Safed musli (*Chlorophytum borivilianum* Santapu & Fern.)

A number of *Chlorophytum* species are known under the trade name 'safed musli' of which *C. borivilianum* is the commercially exploited species. The species is naturally distributed in the forest

areas of Maharashtra, MP, Rajasthan and Gujarat. The plant, a member of family Liliaceae is a perennial herb with condensed stem disc and with whirl of sessile leaves. Flowering occurs at the onset of monsoon. Raw drug is collected both from wild as well as from cultivation. At present the cultivated area of the crop extend up to 10,000 ha. JA 405 is the high yielding variety available for cultivation. The plant is propagated by the stem disc with the attached fleshy roots as well as by seeds. Unorganised collection of the species from the natural habitat has caused endangered species status. Fasciculated roots contain saponins and are medicinally important. It is used as a general tonic and is a well-known aphrodisiac.

3. Guggal (*Commiphora wightii* (Arn.) Bhandari =*Commiphora mukul* Hook ex Stock):

Guggal is one of the important medicinal plants belongs to family Burseraceae. It is a perennial shrub or small sized tree of about 5 m. It is a slow growing plant with crooked and knotty branches bearing sharp spines. In India, Guggal is distributed in dry areas Gujarat, Rajasthan and Madhya Pradesh. It grows in rocky and sandy soil The species includes male, female and hermaphrodite plants in the population. Apomixis is also reported in the species. Propagation is done by stem cuttings. The species status is threatened in nature and is included in the Red data book (IUCN) as over exploited species in the country. Despite its unique utility and rare occurrence, this native medicinal shrub has received very little attention by the agricultural research scientists. The Guggal gum, usually known in trade is a mixture of 61 % resins and 29.3 % gum, in addition to 6.1% water, 0.6 % volatile oil and 3.2 % foreign matter. Guggulosterol and guggulosterone are the important active ingredients of the gum resin. The oleo- gum-resin of guggal is highly effective in the treatment of obesity, arthritis and several other diseases in Indian System of Medicine. Many therapeutic claims of guggal have been substantiated by subjecting its oleo-gum-resin to modern analytical techniques.

4. Tinospora (*Tinospora cordifolia* Miers ex Hook f. & Thoms.)

It is a deciduous perennial climber belongs to the family Menispermaceae. In India, it is distributed almost throughout the country, extending from the Himalayas down to southern part of Peninsular India. It usually grows in wastelands and in deciduous forests and over hedges and bushes. It tastes intensely bitter and odourless. Leaves are simple, alternate, long-petioled, lamina broadly ovate-cordate with a broad sinus and shortly acuminate at apex. The species has a lot of aerial roots. It is propagated by stem cuttings as well as by seeds. The stem and leaves are medicinally used as raw drug. Tinospora stem is a common constituent of a number of ayurvedic vital tonics for the treatment of general debility, dyspepsia, fevers and urinary diseases. It cures fever, jaundice, thirst, burning sensation, diabetes, piles, skin ailments, respiratory disorders, neurological diseases and

improves intellect. Externally the drug is used against rheumatic complaints. Starch present in the stem along with alkaloids is the active principle of the species. Leaf also contains a number of alkaloids. Leaf is used for the treatment of gout, jaundice and rheumatism. Raw drug is mainly obtained from the wild habitats of the species.

5. Satavary (*Asparagus racemosus* Wild)

Satavary is a perennial spiny climber belongs to the family Liliaceae. It is distributed through out tropical and subtropical India. Cladodes are in tufts of 2-6 and leaves are reduced to spines. Flowering occurs in September to November. Fasciculated roots are medicinally important. It contains saponins and is used for the treatment of dysentery, tumours, rheumatism and kidney and liver disorders. Powdered root is a common ingredient of a number of vital tonics, which is believed to cure sexual weaknesses, leucorrhoea and increase lactation in feeding mothers.

6. Kalmegh (*Andrographis paniculata* Nees)

Kalmegh belongs to family Acanthaceae is a branched annual herb of about 30-100 cm tall with simple opposite leaves. The species is distributed in India, Srilanka, Bangladesh and Malaysia. In India it is found in the plains of Himachal Pradesh to Assam and Mizoram and also in Peninsular India. It is also cultivated in some parts of the country. It is sown in kharif season and harvesting is done in October. The whole herb is medicinally useful. The drug is also known as 'green chiraita'. Andrographolide is the active principle for the therapeutic action. The herb is used for treating diabetics, bronchitis, pile, jaundice and fever. It is considered as a blood purifier and used for the treatment of skin diseases.

7. Chiraita (*Swertia chirayita* (Roxb.ex Flem.) Karst.)

It is an erect annual herb belongs to family Gentainaceae. It is distributed in temperate Himalayas from Kashmir to Bhutan. The plant is propagated by seeds. It grows well in moist, temperate forests of Himachal Pradesh. Flowering occurs in July to October. Dried herbage portion is used as raw drug. The drug is extremely bitter in taste. Chiraita is also known as brown or white chiraita. The bitter tonic made from the raw drug improves bile secretion and used for the treatment of bronchial asthma, liver disorders, and anaemia. The active ingredient of the raw drug includes ophelic acid, glycosides, ophenols, etc. Annual demand of the species in India is about 38, 000 kg and to meet the requirement, majority of the raw drug is obtained from Nepal. Cultivation also has been initiated in the species and seeds are used for propagation.

8. Bankakai (*Podophyllum hexandrm* Royle= *P. emodi*)

The species is an erect, succulent herb with creeping perennial rhizome bearing numerous roots. The species is distributed in the inner ranges of Himalayas from Kashmir to Sikkim in an altitude of 3000- 4200 m. The raw drug is collected mainly from the wild since the cultivation is not gained momentum. The under ground rhizome remain dormant during winter. Seeds and rhizome are used for the propagation. The rhizome and the root are medicinally important. The resin, podophyllin or podophyllin resin which is the active ingredient for therapeutic action. Podophyllotoxin is the active principle of podophyllin. The raw drug is used for the treatment of ulcers, cuts and wounds. It is a purgative and used in curing skin diseases and tumorous growth. Podophyllin has acquired special attention during recent time due to its action against cancers.

9. Asoka (*Saraca asoca* (Roxb.) De Wilde):

It is a medium sized; evergreen tree belongs to family Caesalpiniaceae. The tree is distributed through out India particularly in humid areas. It is considered as sacred tree of Hindus and Buddhists. Flowers are also used for the treatment of bleeding piles and skin diseases. It is propagated by seeds and is frequently cultivated as an ornamental. The increased demand of the raw drug in recent years has caused the overexploitation of the species in wild habitats. Increased trend in cultivation efforts of the species is also getting momentum. Asoka bark is widely used in Indian medicine for the treatment of uterine disorders. Bark also contains tannins. The activity of the drug is believed to due to the presence of steroidal component and calcium salt.

10. Isabgol (*Plantago ovata* Forsk.)

Isabgol belongs to family Plantagianacea is an annual herb grown during the rabi season. It is a native of Persia. The raw drug collected solely from cultivation. It is cultivated in the drier tracts of North Gujarat, adjoining Rajasthan and Madhya Pradesh over an area of about 1,00, 000 ha. A number of high yielding varieties viz., GI 1, GI 2, GI3, JI 4, HI 5 and Niharika are available in the crop for cultivation. India is the leader in Isabgol production and largest exporter of husk. On an average of about thirty three million rupees is obtained from its export annually. Seed coat, which is known as 'isabgol husk' under trade, is medicinally important. The swelling property of the husk after absorption of water is the cause of its use as a famous medicine against constipation and gastrointestinal irritations. It is also used for the treatment of number of other stomach related disorders. In addition, it is used in food industries for the preparation of ice creams, candy, etc.

11. Senna (*Cassia angustifolia* Vahl)

It is a member of family Fabaceae. The species is native of Yemen and Saudi Arabia and introduced to India and cultivated in the marginal lands of some parts of Tamil Nadu, Rajasthan and Gujarat. It is cultivated both as irrigated and rain fed crop. In world market, there are two sources of senna raw drug, one is Tinnevely Senna, which has gone from India and the other is Alexandrian senna that has gone from Arabian Countries. The former species is *C. angustifolia* and the latter is *C. acutifolia*. Dried young leaves, flowers and 3-5 days old pods are used as source of raw drug. It contains sennosides, which is responsible for the purgative action. In European Countries, it is used as herbal tea.

12. Aloe (*Aloe barbadensis* Mill)

Aloe is a member of family Liliaceae and is indigenous to African countries and naturalized in India. The plant is perennial herb with fleshy leaves and condensed stem. Flowering occurs in winter and the inflorescence stalk is about 90-150 cm long with orange coloured flowers. The crop is under cultivation in limited areas of Tamil Nadu, Gujarat, Madhya Pradesh and Andhra Pradesh. and raw material is collected both from wild and cultivation for the industry. Leaves contain gel (polysaccharides) and leaf exudates contain aloins, which are commercially useful. Gel has a cooling and moisturizing action and hence used in cosmetic industries and the leaf exudates contains aloins and aloe emodin which are used as pain killer, purgative and also used in cancer therapy.

13. Periwinkle (*Catharanthus roseus* (L) G.Don)

Periwinkle belongs to the family Apocynaceae is an erect annual or perennial herb with white or pink flowers. Flowering occurs mainly during rainy season. The plant is mainly cultivated for its alkaloids and sometimes as an ornamental. The major cultivation areas spread in Tamil Nadu and also in West Bengal, Assam, and Karnataka. Different flower colours are available in the species, however, pink flowered varieties are preferred in cultivation due to its higher yield. Generally it is propagated through seeds or by cuttings. All parts of the plant, especially roots contain alkaloids. Leaves are used to treat menorrhagia and the plants are also used to treat diabetics in Ayurveda. However, the alkaloids vincristine and vinblastine present mainly in the roots of the plant is used to treat a number cancers including leukaemia in modern medical systems.

14. Amla (*Emblica officinalis* Gaertn. = *Phyllanthus emblica* L.)

The plant belongs to family Euphorbiaceae and is a small or medium sized deciduous tree. Flowers are unisexual and flowering mostly occurs during March to June and fruits ripen in the coming

winter. The species is a native of India and Sri Lanka, China and Indonesia. In India the plant is found wild as well as in organized cultivation. The fruit commonly known as *amla* or 'emblic myrobalan' is a highly reputed drug of Indian System of Medicines. It is one of the richest sources of vitamin C. The fruits are used for the treatment of vomiting, biliousness, urinary discharges, constipation, leprosy, piles and diseases related to eyes. 'Triphala', an ayurvedic formulation includes amla as one of the three constituents.

15. Long pepper (*Piper longum* L.)

Long pepper is a slender aromatic perennial climber belonging to the family Piperaceae. It is distributed in Central Himalayas to Assam, Khasi, Bengal, Western Ghats and Andaman and Nicobar Islands. Raw drug is collected both from the wild and cultivated areas. The crop is under cultivation in parts Maharashtra, Kerala, West Bengal, Assam and Tamil Nadu. Stem cuttings are used for the propagation of the species. Under cultivation the crop is grown for about 4-5 years and in the fourth year the roots are collected which is used as the source of raw drug, pipalmool. India imports a large quantity of raw drug from Malaysia and Singapore. The fruits are used as spice also. It has a pepper like taste. Commercially, the raw drug of long pepper is mixed with material from *P.retrofractum* or *P. peepuloides.*, and it is very difficult to distinguish the raw drug from these different species. *P.longum* is considered as most effective in therapeutic action. Ripened green fruits and roots are used as the raw drug. Piperine and pipartine are the two important alkaloids responsible for the therapeutic action. The raw drug contains a number of essential oils also. The fruits as well as the roots are used for the treatment of diseases related respiratory tracts viz., bronchitis, asthma, cough, etc. It is also used in muscular pains, inflammations, drowsiness, epilepsy, leprosy, dysentery and ailments related gall bladder and bile duct.

16. Vach (*Acorus calamus* L.)

It is a member of family Araceae and is a small perennial aromatic herb grown naturally in marshy fields. It is a native of Europe and now found naturalised throughout India. The species is cultivated in some parts of India mainly in Andhra Pradesh. The rhizomes are used for medicinal purposes. The dried rhizomes constitute the commercial raw drug of 'Calamus'. In Ayurveda the raw drug is known as 'vaca' and is believed to improve memory power and intellect. It is also useful in the treatment of diarrhoea, dysentery, abdominal obstructions and colic. Anticarcinogenic property of the species is also reported recently.

17. Sarpagandha (*Rauvolfia serpentina* (L.) Benth.ex Kurz)

Sarpagandha, a member of family Apocynaceae is a perennial under shrub distributed through out India. The species attain a height of about 75 cm –1 m with inflorescence arranged in cymes with deep red flowers. Although the species is cultivated in selected parts of the country, over-exploitation of the species from the wild has caused its threat of extinction. Roots contain alkaloids (rauwolfinin) which are sedative and used to control high blood pressure. It is also used for the treatment of insomnia, asthma and acute stomachache. Ruthless collection of the species from its wild habitats and the Government of India has prohibited its collection from the wild. The crop is under cultivation in an area of about ----ha. The crop is propagated by seeds.

18. Bhui amla (*Phyllanthus amarus*)

It is a small herb of about 60 cm height and belongs to the family Euphorbiaceae. The species is distributed throughout India as a weed in the cultivated lands. The whole herb is used for the medicinal purposes. It is bitter in taste and is used mainly for the treatment of jaundice. It is also used in dyspepsia, dairrhoea and dysentery. The herbage portion contains the bitter principle phyllanthin, which is responsible for the therapeutic action.

Some of the Important Indian Patents of Medicinal and Aromatic Plants

(Patent Applications Filed/Granted in India from January 1995 to December, 2004¹)

Crop: Aloe (*Aloe brabadensis*)

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	A process for preparation of an improved <i>Aloe vera</i> composition and product thereof for various therapeutic use.	510/CAL/2001		Dr. Mrinal Kanti Majumdar	Sept. 07, 2001	
2.	A synergistic <i>Aloe vera</i> hair nourishment composition.	509/CAL/2001		Dr. Mrinal Kanti Majumdar	Sept. 07, 2001	
3.	A process for preparation of a novel anti inflammatory and analgesic oil/ointment from the plants <i>Wattakaka volubilis</i> <i>Aloe barbadensis</i> camphor and coconut oil.	1751/MAS/98	187724	Tropical Botanic Garden and Research Institute	Aug. 05, 1998	June 15, 2002
4.	A method of preparing	410/CHE/2004		Fr. John		

¹ Ekaswa A & B Database, TIFAC

food products such as jams
pickles and the like from
Aloe vera jelly

louis

Crop: Ashwagandha (*Withania somnifera*)

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	A process for preparation of an antidiabetic herbal drug from the plants <i>Trichopus zeylanicus</i> , <i>Withania somnifera</i> and <i>Piper longum</i>	305/MAS/99		Tropical Botanic Garden and Research Institute	Mar. 17, 1999	
2.	A process for preparation of 'Jeevani' a novel immunoenhancing antifatigue antistress and hepatoprotective herbal drug from the plants, <i>Trichopus zeylanicus</i> ssp <i>travancoricus</i> <i>Withania somnifera</i> , <i>Piper longum</i> and <i>Evolvulus alsinoides</i>	2356/MAS/98		Tropical Botanic Garden and Research Institute	Oct. 21, 1998	
3.	A process for preparation of "Jeevani" a novel immunoenhancing antifatigue antistress and hepatoprotective herbal drug from the plants, <i>Trichopus zeylanicus</i> ssp <i>travancoricus</i> <i>Withania somnifera</i> , <i>Piper longum</i> and <i>Evolvulus alsinoides</i> .	959/MAS/96		Tropical Botanic Garden and Research Institute	June 04, 1996	
4.	Preparation of an antidiabetic herbal drug from the plants, <i>Trichopus zeylanicus</i> ssp <i>travancoricus</i> <i>Withania somnifera</i> and <i>Piper longum</i> .	957/MAS/96		Tropical Botanic Garden and Research Institute	June 04, 1996	
5.	An improved process for the manufacture of an extract obtained from ayurvedic medicinal plant such as ashwagandha		177429			
6.	A process for the isolation of peptides having mol mass in the range of 110 to 1200 daltons from the plant <i>Withania somnifera</i> .	1195/DEL/94	183291	Council of Scientific and Industrial Research	Nov. 06, 1999	
7.	A process for the isolation	640/DEL/94	182519	Council of	April	

of polysaccharides having immunomodulation activity from the plant *Withania somnifera*.

Scientific and Industrial Research 24, 1999

Genus: Cassia

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	Preparation of a new anti-fungal and anti-inflammatory topical ointment from the indigenous plants <i>Cassia tora</i> linn and <i>Camellia sinesnsis</i> (linn) O Kuntze.	579/CAL/2002		Dr. Tapan Kumar Chatterjee	Oct. 09, 2002	
2.	A method of manufacturing spices oleoresin ball such as cassia , cardamom, clove, clove leaf, pepper, nutmeg, mace, ajwain, asafoetida and cumin	619/MAS/2000		Mysore sandal products	Aug.03, 2000	
3.	Process for the preparation of <i>Cassia tora</i> gum	1542/DEL/99		Forest Research Insitute	Dec. 16, 1999	
4.	A process for the preparation of a <i>Cassia tora</i> gum	1108/DEL/94	189451	Forest Research Insitute		Feb. 22, 2003
5.	<i>Cassia fistula</i> linn seeds and seed powder for selective inhibition of microorganisms in the beverage industry.	636/MAS/95		Shree Chitra Tirunal Institute for Medical Sciences and Technology	May 29, 1995	
6.	<i>Cassia fistula</i> linn seeds and seed powder for selective inhibition of spoilage bacteria in coconut toddy while permitting the ongoing fermentation toddy into wine.	635/MAS/95		Shree Chitra Tirunal Institute for Medical Sciences and Technology	May 29, 1995	
7.	A process for the preparation of dye from <i>Cassia tora</i> seeds	191180		Forest Research Insitute		
8.	Process for the preparation of a binding agent based on <i>Cassia</i>	6/DEL/95	191061	Hindustan Gum and Chemicals		Sept. 13, 2003

	<i>tora</i> seed powder for use in the manufacture of agarbatti sticks			Ltd.		
9.	A process for the extraction of silk enhancing fraction from the aerial parts of the plant <i>Cassia tora</i>	513/DEL/93	183772	Council of Scientific and Industrial Research		April 08, 2000

Crop: Guggal (*Commiphora wightii*)

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	A process for the isolation of lipid fraction containing Z and E gosterones useful as cholesterol lowering drug from aerial branches of <i>Commiphora wightii</i> (guggul)	242/DEL/99	191415	Council of Scientific and Industrial Research	Feb. 12, 1999	Nov. 29, 2003

Crop: Plamarosa (*Cymbopogon martini*) and Lemongrass (*Cymbopogon flexuosus*)

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	A composition useful for hybridization or palmarosa for increased herbage and essential oil yield	2135/DEL/97				
2.	1 bisabolone isolated from <i>Cymbopogon flexuosus</i> and antibacterial activity thereof	2936/DELNP/2004		Council of Scientific and Industrial Research	Sep. 29, 2004	
3.	1 bisabolone isolated from <i>Cymbopogon flexuosus</i> and antibacterial activity thereof	PCT/IN03/00107		Council of Scientific and Industrial Research	Mar.3 1, 2003	
4.	“Jal Pallavi” water logging tolerant <i>Cymbopogon winterianus</i>	237/DEL/99		Council of Scientific and Industrial Research	Feb. 12, 1999	
5.	A process for the extraction of the essential oil(s) from <i>Cymbopogon</i> species	1508/DEL/98		Council of Scientific and Industrial Research	June 03, 1998	
6.	An improved process for	1512/DEL/98	189740	Council of	June	April

the isolation of methyl eugenol oil from a new source of plant sp *Cymbopogon flexuosus* var sikkimentsis

Scientific and Industrial Research

03, 19, 1998 2003

Crop: *Andrographis paniculata*

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	A process for preparation of a novel anti-pyretic herbal drug from the plants <i>Andrographis paniculata</i> , <i>Piper nigrum</i> and <i>Piper betle</i>	1750/MAS/98	187723	Tropical Botanic Garden and Research Institute	Aug. 05, 1998	June 15, 2002

Crop: *Tinospora cordifolia*

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	An efficient medium composition for clonal propagation of <i>Tinospora cordifolia</i> from the nodal explant	479/DEL/2004		Council of Scientific and Industrial Research	Mar. 16, 2004	
2.	A process for the preparation of a radioprotective herbal extract from <i>Tinospora</i> sps plant	1036/DEL/01	195062	Defence Research and Development Organisation		Dec. 25, 2004
2.	A process for the isolation of bergenin from <i>Tinospora crispa</i> with antioxidant and free radical scavenging activity	1099/DEL/01	193547	Council of Scientific and Industrial Research		July 24, 2004
3.	A novel process for the preparation of a protein enriched fraction from the plant <i>Tinospora cordifolia</i>		191504			
4.	A process for the isolation of 3- (4-O- D Glucosyl 1 "5" -O- d-apiosyl 3' 5'dimeoxyphenyl)-2-trans propene -101 designated as cordifolioside b from <i>Tinospora</i> species	558/DEL/93	184422	Council of Scientific and Industrial Research		Aug. 26, 2000
5.	A process for the	89/DEL/94	183192	Council of		Oct. 02,

isolation of a fraction possessing immunostimulant properties from <i>Tinospora cordifolia</i>			Scientific and Industrial Research	1999
A novel process for the preparation of a protein enriched fraction from the plant <i>Tinospora cordifolia</i>	2609/DEL/98	191504	National Institute of Immunology	Dec. 06, 2003

Crop: Phyllanthus

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	Use of <i>Phyllanthus</i> for targeted stimulation of the immune system	IN/PCT/2001/00979/DEL		CMI-Centers for Medical Innovation AG	Oct. 25, 2001	
2.	Use of <i>Phyllanthus</i> for treating chronically inflammatory and fibrotic processes	IN/PCT/2001/00978/DEL		CMI-Centers for Medical Innovation AG	Oct. 25, 2001	
3.	An enriched fraction prepared from <i>Phyllanthus amarus</i> for the treatment of hepatitis and for preparation thereof	PCT/IN00/00029		Southern Petrochemical Industries Corporation Ltd.	Mar. 23, 2000	
4.	Active extract prepared from the plant <i>Phyllanthus amarus</i> for the treatment of infection caused by herpes simplex virus and a process for the preparation thereof	580/MAS/99		Southern Petrochemical Industries Corporation Ltd.	May 21, 1999	
5.	Active fractions prepared from the plant <i>Phyllanthus amarus</i> for the treatment of hepatitis	579/MAS/99		Southern Petrochemical Industries Corporation Ltd.	May 21, 1999	
6.	An enriched fraction prepared from <i>Phyllanthus amarus</i> for use in the treatment of hepatitis and a process for the preparation thereof	339/MAS/99		Southern Petrochemical Industries Corporation Ltd.	March 24, 1999	
7.	Pharmaceutical composition for the treatment of hepatitis b comprising extract of	1392/CAL/96		Dae Yeong Co Ltd.	August 05, 1996	

Phyllanthus usuriensis
and/or *Phyllanthus*
urinaria

8	A process for preparing <i>Phyllanthus amarus</i> showing anti hepatitis viral activity	68/CAL/02	194885	Bose Institute	Dec. 04, 2004
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Genus: Piper

Sl. No.	Title	Application Number		Applicant	Date of Filing	Patent Gazette Date
1.	An improved process for making white pepper from fresh green pepper <i>Piper nigrum</i>	309/DEL/2002	193549	Council of Scientific and Industrial Research	Mar. 26, 2002	July 24, 2004
2.	Process for preparing piper dines	374/MUM/2001		Bayer Aktiengesellschaft	April 24, 2001	
3.	A process for extraction of piperine from piper species	1238/DEL/99		Council of Scientific and Industrial Research	Sept. 16, 1999	
4.	Preparation of an antidiabetic herbal drug from the plants trichopuszeylanics withania somnifera and <i>Piper longum</i>	957/MAS/96		Tropical Botanic Garden and Research Institute	June 04, 1996	
5.	A process for the isolation of anti cancer compound (crotepoxide) from the berries of <i>Piper attenuatum</i>	1178/DEL/90	175610	Council of Scientific and Industrial Research		July 15, 1995

Crop: Podophyllum hexandrum

Sl. No.	Title	Application Number		Applicant	Date of Filing	Patent Gazette Date
1.	A process for isolating podophyllum particularly the plant species emodiwall	235/BOM/98		Department of Atomic Energy	April 22, 1998	
2.	An improved process for the isolation & purification of podophyllotoxin - 1 - o - beta- d glucopyranoside	1457/DEL/95		Council of Scientific and Industrial Research	Aug. 04, 1995	

and 4 -
demethylpodophyllotoxin
- 1 - o - beta - d -
glucopyranoside from
roots/rhizomes of

3. ***Podophyllum emodi***
A process for preparation of a radioprotective herbal formulation from ***Podophyllum hexandrum*** 192177
4. A process for preparation of radioprotective herbal extract from ***Podophyllum hexandrum*** 191821
5. A process for preparation of a radioprotective extract from ***Podophyllum hexandrum*** 191747
6. An improved one step process for the isolation of podophyllotoxin from ***Podophyllum emodi*** roots/rhizome 178874

Crop: *Swertia chirata*

Sl. No.	Title	Application Number	Patent Number	Applicant	Date of Filing	Patent Gazette Date
1.	A process for the isolation of amarogentin a novel seco-iridoid glycoside possessing anticarcinogenic (cancer preventive) and antitumour (cancer therapeutic) action from <i>Swertia chirata</i> Buch Ham (Gentianaceae)	169/CAL/2002	191129	Central Council for Research in Ayurveda and Siddha	Mar.26, 2002	Sept. 27, 2003
2.	A process for the preparation of a composition from <i>Swertia chirata</i> buch ham (Gentianaceae) having anticarcinogenic (cancer preventive) and antitumour (cancer therapeutic) action	168/CAL/02	191128	Central Council for Research in Ayurveda and Siddha		September 27, 2003
3.	Media compositions for	PCT/IN01/00209		Council	Nov.	

faster propagation of
Swertia chirata

of 26,
Scientific 2001
and
Industrial
Research

Patent applications published in official Journal of Patent office (18 month publications) from January, 2005 to December, 2006²

Crop: Aloe (*Aloe brabradensis*)

Sl. No.	Title	Application Number	Applicant	Date of Filing
1.	An emulsion <i>Aloe vera</i>	565/CHE/2006	NagarathinaM, Ponniah Vivekanand H and Varunkumar	March 29, 2005
2.	Negatively charged polysaccharide derivable form <i>Aloe vera</i>	1423/CHENP/2004	2QR Research BV, Netherlands	June 24, 2004
3.	A process of manufacturing clear juice from the leaves of the <i>Aloe vera</i> plant	1349/MUM/2004	Agashe Mandar Dnyaneshwar	May 12, 2004

Crop: Liquorice (*Glycyrrhiza glabra*)

Sl. No.	Title	Application Number	Applicant	Date of Filing
1.	Process for producing hydrophobic <i>glycyrrhiza</i> extract with high qualities	1154/KOLNP/2004	Kaneka Corporation, Japan	August 11, 2004

Crop: Safed musli (*Chlorophytum borivilianum*)

Sl. No.	Title	Application Number	Applicant	Date of Filing
1.	Process for extraction of safed musli and characterization of the extracts thereof.			

Genus: *Cymbopogon*

Sl. No.	Title	Application Number	Applicant	Date of Filing
1.	A method of extraction of an essential oils from <i>Cymbopogon winterianus</i> plant using clevenger and cleisen apparatus for protection against pests.	187/MUM/2004	Phukan S Kalita	February 17, 2004

² Ekaswa C Database, TIFAC

Conclusion

As the legal instruments available to invoke IPR are inadequate to protect the vast intellectual resources (IR) available in the country with the indigenous people, we need to be agile and alert in watching the IPR infringement by others and claiming the benefit sharing in proportion to the commercialization of our ITK as well as IR of MAPS. The IPR system and the misappropriation of ITK without prior knowledge and consent of the indigenous tribal community are bound to evoke feelings of anger, frustration, of being cheated and helplessness of knowing nothing about IPR and ITK piracy. Even now, for indigenous tribal community, life is a common property that can not be owned, commercialized and monopolized by an individual or a group and majority of Indians are unaware of IPR intricacies of how the system operates. We are now in the process of learning the new world order of IPR and have to tight our nuts and bolts to develop efficient safeguarding strategies by developing capacity building of the people through networking with various groups who own the IR in their interest in particular and nation as a whole.

References

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5. Planning Commission 2000. Report of the Task Force on Conservation and Sustainable Use of Medicinal Plants. Government of India.