

Overview of the Nagoya Protocol and Korean ABS Implementation Law

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Ministry of Environment

The Status of Implementation in Korea

- ◆ The Protocol entered into force on 12 October 2014
 - **73 Parties** (78 Ratifications) with the accession of China (as of 7 July 2016)
- ◆ Submitted the National legislation for the implementation of the Nagoya Protocol to the 19th National Assembly (23 October 2014)
- ◆ Scheduled to submit **the Ratification bill** of the Nagoya Protocol and **“Access to Genetic Resources and Benefit Sharing Act”** to the 20th National Assembly

Contents

- 1. Overview of the Nagoya Protocol**
- 2. Overview of (draft) the Access to Genetic Resources and Benefit Sharing Act**

1. Overview of the Nagoya Protocol

1. Overview of the Nagoya Protocol

◆ ABS Developments under the CBD

Convention on Biological Diversity (1992)

- Article 15: Access to Genetic Resources
 - Paragraph 4 : Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article
 - Paragraph 5 : Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party
 - Paragraph 7 : Each Contracting Party shall take legislative, administrative or policy measures, as appropriate and in accordance with Articles 16 and 19

Bonn Guideline (2002)

- Provided basic principles and concepts of ABS
 - Concerns expressed by developing countries that the Bonn Guidelines are **not legally binding** so does not guarantee compliance

Negotiations of an international regime on ABS (2002-2010)

- The World Summit on Sustainable Development (2002) : Recommendation on an international regime on ABS
- COP 8 (2006) : Agreed to a timetable to complete this negotiation by COP10
- COP9 (2008) : Adopted Bonn Roadmap

1. Overview of the Nagoya Protocol

◆ the Nagoya Protocol on ABS

■ Official Title

- Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits arising from their Utilization to the Convention on Biological Diversity

■ Adoption and effective date

- 29 October 2010 in Nagoya, Japan / 12 October 2014 in Pyeongchang, Korea

■ Main Objective

- Access to genetic resources and the fair and equitable sharing of benefits



1. Overview of the Nagoya Protocol

◆ Main Provisions of the Protocol (Provider Measures)

■ Fair and equitable benefit sharing

- The protocol Set out fair and equitable sharing of benefits through mutually agreed terms
 - Such Sharing shall be upon **mutually agreed terms(MAT)** (Article 5)

■ Access

- Provided **legal certainty, clarity** and **transparency** to implement ABS requirements
 - Each party requiring prior informed consent shall take the necessary legislative, administrative or policy measures, as appropriate (Article 6)

1. Overview of the Nagoya Protocol

◆ Main provisions of the Protocol (User measures)

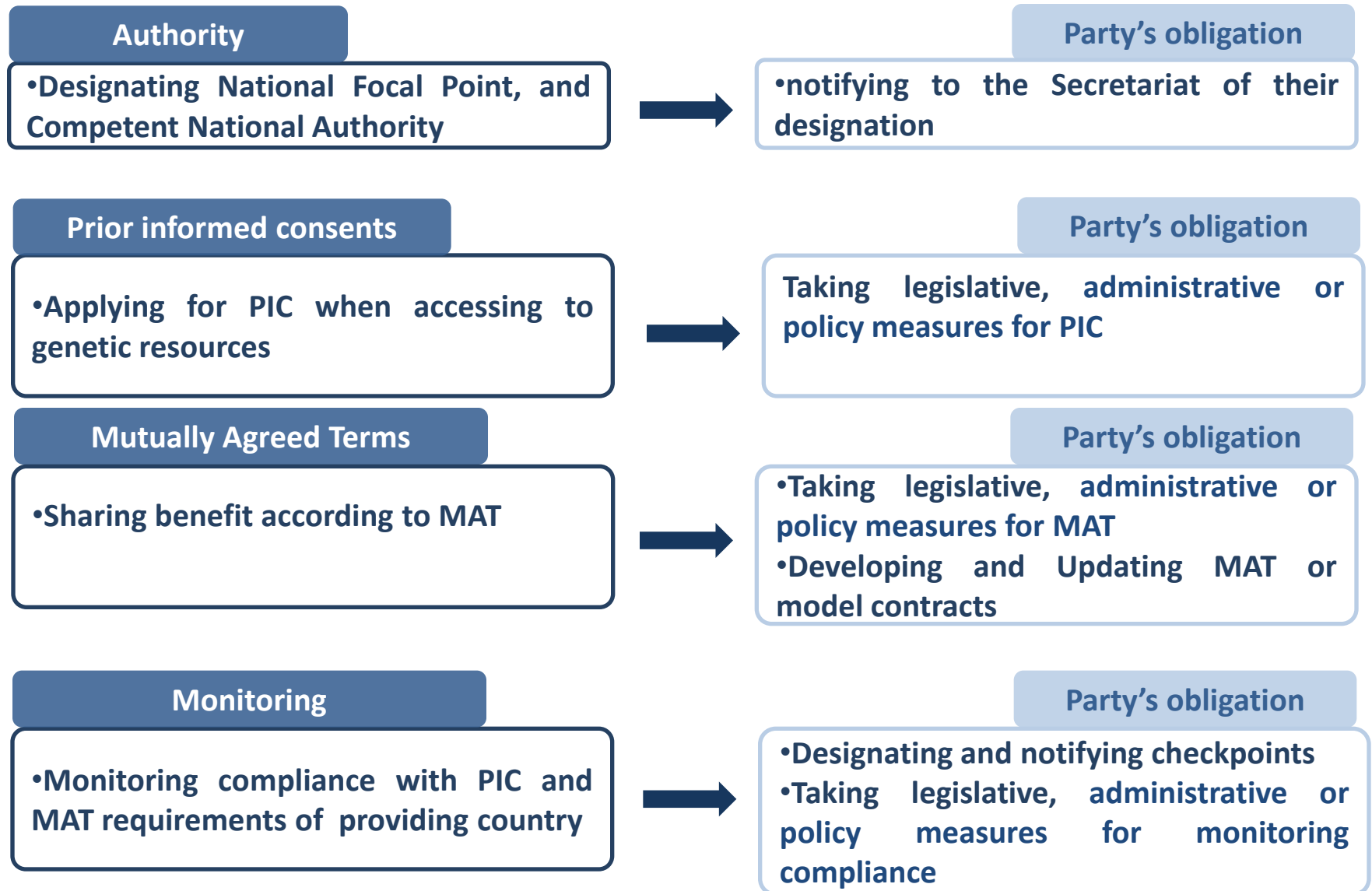
- **Compliance with domestic ABS measures required by the providing country**
 - Party shall **take appropriate, effective and proportionate measures** to have the genetic resources to be utilized as required by the domestic ABS legislation or regulatory requirements of the other Party (Article 15)
- **Monitoring the utilization of genetic resources**
 - Each Party shall designate one or more **checkpoints (Article 17)**
 - Have functions to collect relevant information at any stage of research, development, innovation, pre-commercialization or commercialization

1. Overview of the Nagoya Protocol

◆ Features of the Protocol

- **Balance between user and provider country**
- **Discretionary authority**
 - Each Party shall take appropriate, effective and proportionate legislative, administrative or policy measure
- **Masterpiece of ambiguity**
 - **Spatial scope:** Genetic resources in area beyond national jurisdiction (ex: the Antarctic)
 - **Subject matter scope:** Whether to include derivatives
 - **Temporal scope :** Genetic resources accessed prior to the Nagoya Protocol
 - **Relations with other international rules:** ITPGRFA, WIPO, WTO TRIPS and etc
 - **Procedural scope:** Commercialization, utilization of genetic resources

1. Overview of the Nagoya Protocol



1. Overview of the Nagoya Protocol

◆ Status of domestic ABS implementation in Korea

ABS requirements	Status of implementation
National Focal Point	Ministry of Environment, Ministry of Foreign Affairs
Competent National Authority/ Checkpoints	<i>Not designated</i>
Access to Korean genetic resources	<ul style="list-style-type: none">•Of which Korean biological resources (about 41,788 species)-Law on biodiversity conservation and its sustainable use (3,096 species)- Law on collection, management, and utilization of agro- biological resources (2,095 species)- Law on collection, management, and utilization of marine biological resources (all marine biological resources)
Benefit-sharing	<ul style="list-style-type: none">•Matters related to benefit-sharing shall be provided by another law-(Delegation clause) Article 19 of Law on biodiversity conservation and its sustainable uses
Monitoring	<i>Not established</i>

The need of domestic legislation for implementing the Nagoya Protocol

2. Overview of (draft) the Access to Genetic Resources and Benefit Sharing Act



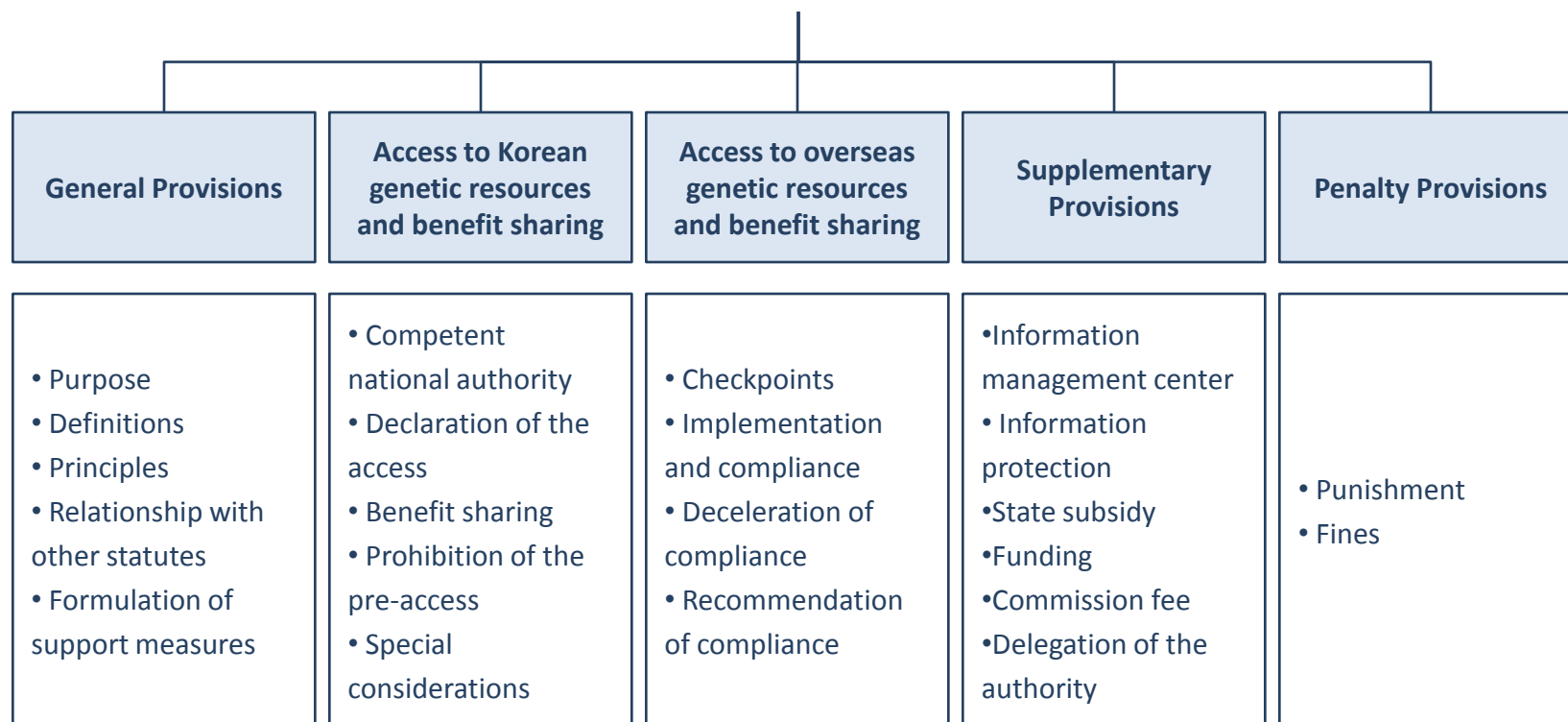
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Ministry of Environment

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Composition: 5 Chapters, 27 Articles

(draft) Access to Genetic Resources and Benefit Sharing Act



2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Purposes (Article 1)

- To implement the **Nagoya Protocol on ABS**
- To promote access to genetic resources and associated traditional knowledge and the fair and equitable **sharing of benefits** arising out from their utilization, contributing to **biodiversity conservation** and its **sustainable use**

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Scope (Article 4)

- **(Temporal scope)** Genetic resources accessed **after the Nagoya Protocol** entered into force
- **(Spatial scope)** Exception of genetic resources located **in area beyond national jurisdiction** such as the Antarctic
- **(Subject matters)** Exception of **human genetic resources** and **pathogens**
- **(Others)** Exception of genetic resources applied to other **international instruments** such as International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGFRA)

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Designation of National focal Point, Competent National Authority, Checkpoints (Article 8, Article12)

- **(National Focal Points)** Ministry of Environment, Ministry of Foreign Affairs
- **(Competent National Authorities)** Ministry of Science, ICT and Future Planning, Ministry of Environment, Ministry of Agriculture, Food and Rural Affairs, Ministry of Ocean and Fisheries
 - Discussing this issues with relevant government agencies (ongoing)
- **(Checkpoints)** Government agencies designated by the Presidential Decree

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Access to Korean Genetic Resources (Article 9)

- A foreign institution or person who wants to access to Korean genetic resources or associated traditional knowledge, **shall declare the accession** to competent national authority
- Any person who fails to make such declaration or notification, **shall be punished by a fine not exceeding 2,000,000 won**

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Compliance (Article 14-16)

- Users of foreign genetic resources shall **comply with requirements** and regulations **provided by the provider country**
- To support compliance, the users of foreign genetic resources **shall declare their accession to checkpoints,**
 - When the provider country has such regulations or requirements to access their resources

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Enforcement date (Addenda Article 1)

- **(Enforcement date)** This Act shall enter into force **on the date when the Nagoya Protocol enters into force in Korea**
- **However**, to reduce burdens of stakeholders, Access declaration (Article 9), Benefit-sharing (Article 10), Compliance (Article 15-16) shall enter into force **after 2 year of the date of entry**

2. Overview of the Access to Genetic Resources and Benefit Sharing Act

◆ Forward plan

■ Submission of the legislation to the national assembly

- Consideration of the legislation by the cabinet meeting (June 2016)
- Submission of the legislation and ratification bill of the Nagoya Protocol (July 2016)

■ Establishment of Nagoya protocol Implementing Act and Rules

- Development of the implementing act and rules (2015)
- Preparation of the legislative process (2016)

■ Preparation of the ratification

- Ratification bill (Ministry of Environment and Ministry of Foreign Affairs) → Evaluation by the Ministry of Government Legislation → the Cabinet meeting → Approval of the President → Approval of the National Assembly (if necessary) → Deposition of the ratification bill

감사합니다

Thank You



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PROTECTION OF INTELLECTUAL PROPERTY RIGHT AND ABS SYSTEM IN KOREA

2016.7.13.
KIIP, HUH IN

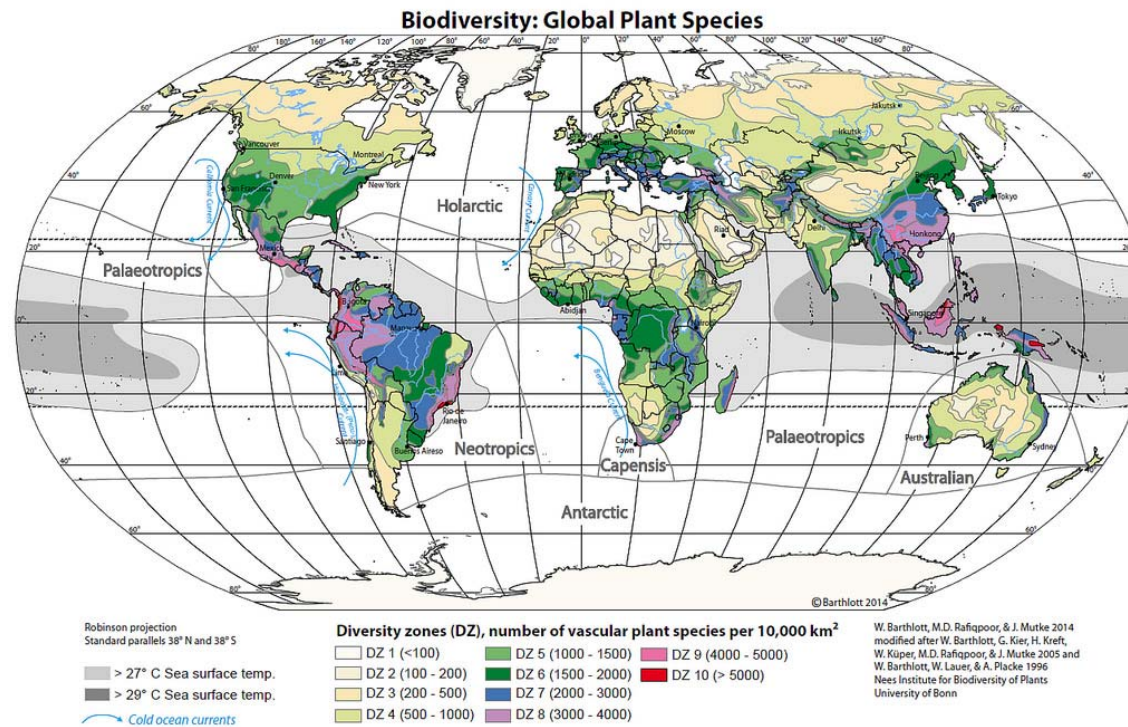
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1. WORLDWIDE PROTECTION OF INTELLECTUAL PROPERTY RIGHT

1. Worldwide Protection of Intellectual Property Right

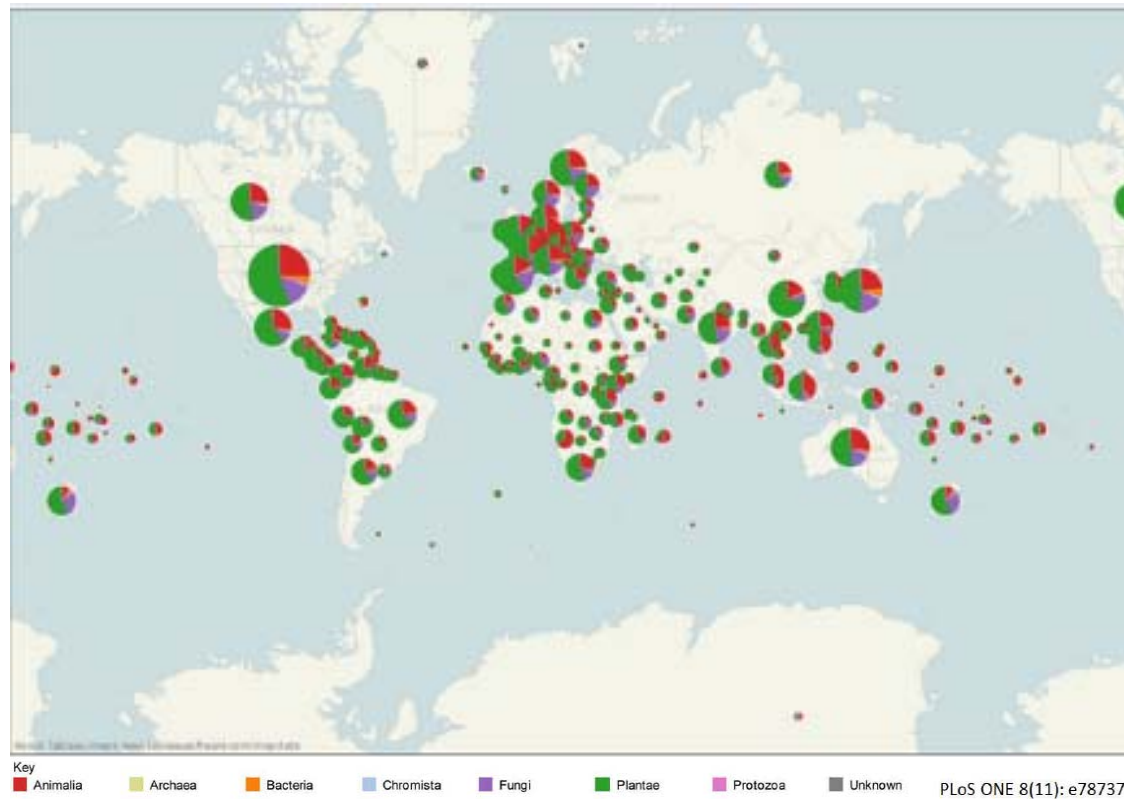
Biodiversity Distribution Map



Source: (© W. Barthlott, Lotus-Salvinia)

1. Worldwide Protection of Intellectual Property Right

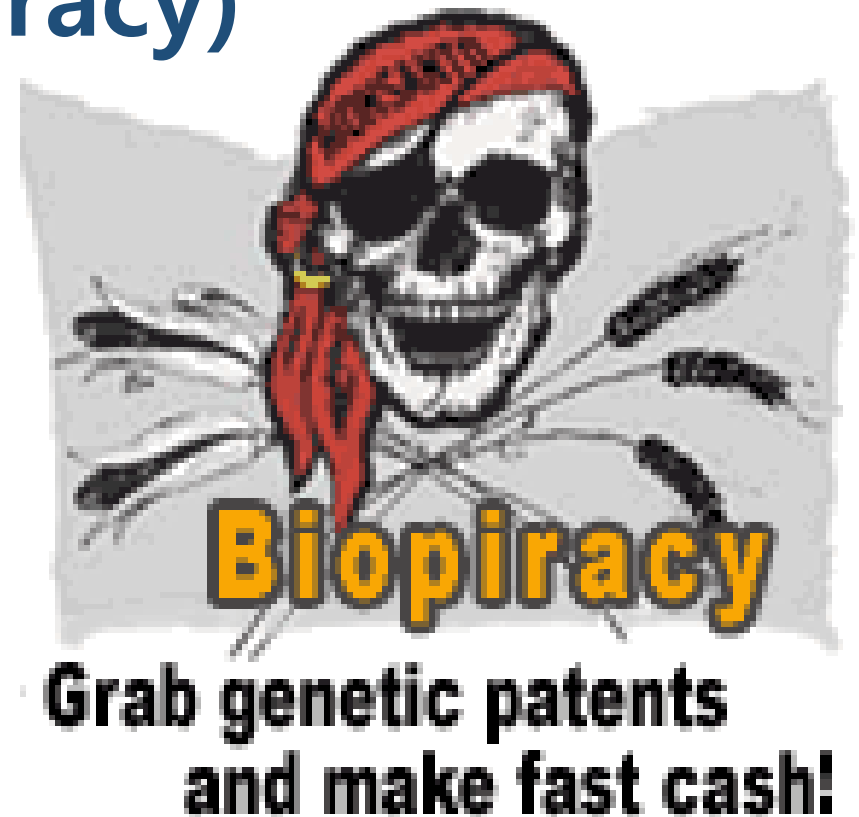
Distribution of Genetics in Patent Applications



1. Worldwide Protection of Intellectual Property Right

Misappropriation(Bio-piracy)

- A situation where indigenous knowledge of nature, originating with indigenous people, is used by others for profit, **without permission** from and with little or no **compensation** or **recognition** to the indigenous people themselves.



1. Worldwide Protection of Intellectual Property Right

Requirements of Patent Registration



- Novelty
- Inventive Step
- Industrial applicability
- Description of the invention

1. Worldwide Protection of Intellectual Property Right

▶ IP Issues on Genetic Resources

- **Genetic resources or traditional knowledge in itself is **not** an intellectual property.**
 - Not a direct subject of protection by IP system(lack of novelty)
 - but derivative from genetic resources is already protected as an IP
cf. U.S disapproves patent of products of nature(genetic resources itself, derivatives etc.)
- **IP Issues on Genetic resources**
 - Protective defense
 - Disclosure requirements
 - Access and Benefit sharing(ABS)

1. Worldwide Protection of Intellectual Property Right

▶ International Regulations on GR/TK

CBD

Conservation, sustainable use, equitable benefit sharing

WIPO-IGC

Disclosure of origin of GR(30th), TK(31st)

WTO-TRIPs

International legal Instrument regulating GR, TK

FAO

International Treaty on Plant Genetics Resources for Food and agriculture

1. Worldwide Protection of Intellectual Property Right

▶ CBD vs. TRIPs

TRIPs	CBD
<ul style="list-style-type: none">• Hold that traditional principal for natural resources(common heritage of mankind)• Is more representative of the interest of the North(developed countries)• Contains no provision regarding ABS• Permits the patenting of inventions that include biological discoveries and genetic material in their natural state (article 27)	<ul style="list-style-type: none">• Claim light of national sovereign right to its resources• Represent the South(developing countries)• Fair and equitable benefit sharing between the providers and users of biological diversity• Claims concerns over the protection of patenting in article 27 of TRIPs

1. Worldwide Protection of Intellectual Property Right

▶ WIPO-IGC

- is one of the specialized agencies of the United Nations to promote the protection of intellectual property throughout the world
- has 188 member states (KOREA joined in 1979)
- In 1999: Under investigation on Patent Law Treaty(PLT) at SCP(Standing committee of patent law), **Columbia suggested that disclosure of origin and verification of legal access be mandatory.** But developed countries dissented.
- In 2001: Installation of IGC(Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore)
- In 2004: Regarding GR and Disclosure of origin in patent application, CBD required WIPO-IGC to examine **model regulations of disclosure of origin, practical ways of IP application, incentive systems, ways to regulate the treaty, issues about international certification.**
- Lately, IGC 30th session was held.

1. Worldwide Protection of Intellectual Property Right

▶ IGC(30th Session) Discussion

Focus: core elements of any **future legal Instrument**.

Brazil, India	EU, the United States
Mandatory Disclosure Requirements	
<ul style="list-style-type: none">• Trigger for disclosure(i.e when to include a label indicating country of origin) should be met whenever a claimed invention includes any uses of GR	<ul style="list-style-type: none">• Disagree with this position → it will add uncertainty to the existing patent system, complicating the implementation of any benefit sharing regime.• EU stressed that a labelling obligation only arises where an invention is directly based on a specific GR
Possible Defensive Mechanisms (to prevent misappropriation of GR and the erroneous granting of patents)	
<ul style="list-style-type: none">• stressed that any such database effectively places Indigenous TK into the public domain, transforming the nature of that knowledge	<ul style="list-style-type: none">• U.S pressed for a publicly accessible database of genetic resources

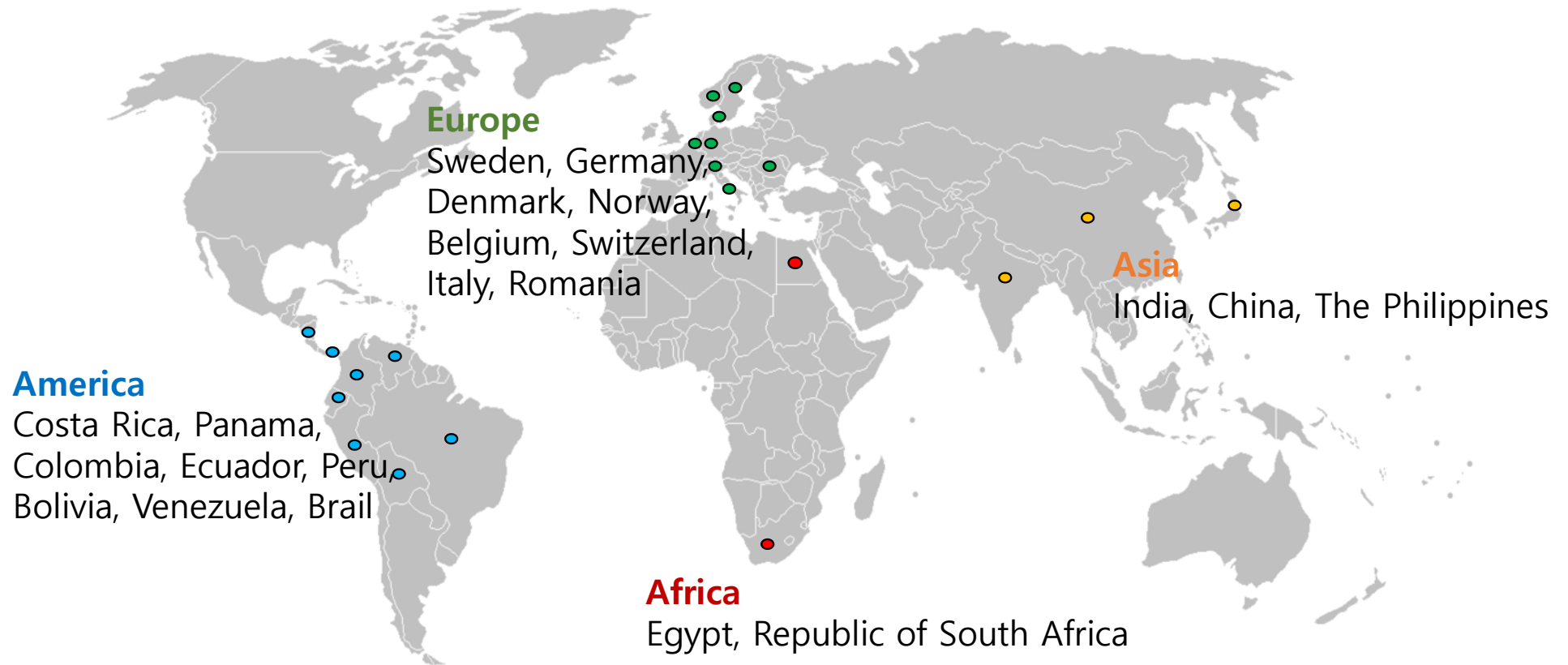
1. Worldwide Protection of Intellectual Property Right

► Disclosure of origin in patent application

Trigger for disclosure(India, China)	Position of Korea, USA and Japan
<ul style="list-style-type: none">• Evidence of fair and equitable sharing of benefits• Disapproval of patent without disclosure• Patent invalidation in case of perjury or deception	<ul style="list-style-type: none">• Disclosure of origin increases the burden on Patent office and applicant<ul style="list-style-type: none">→ lack of association between origin of genetic resources used for invention and patentability→ causes legal uncertainty• Disclosure of origin cannot guarantee benefit sharing• Benefit sharing is possible through contracts between the parties and the settlement of a disputes is available by a civil action

1. Worldwide Protection of Intellectual Property Right

▶ Countries which obliged disclosure of origin



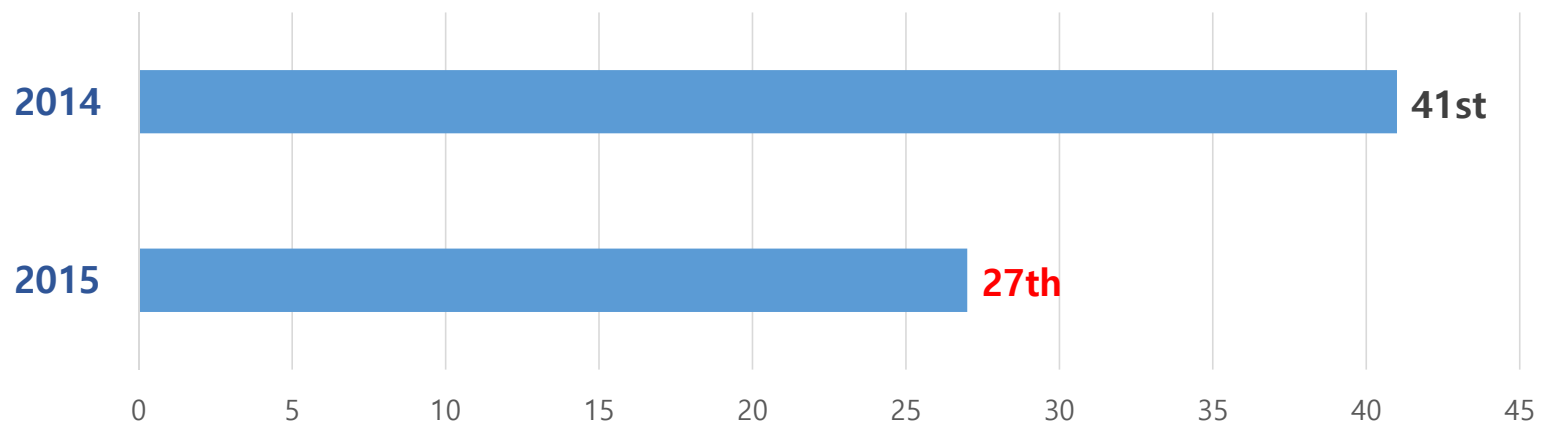
2. PROTECTION OF INTELLECTUAL PROPERTY RIGHT IN KOREA

2. Protection of Intellectual Property Right in Korea

▶ Status of protection of IPR in Korea

- According to 2015 World Competitiveness Ranking by IMD, KOREA's protection level of intellectual property is **27th**, which increased by 14 ranking than last year.

KOREA's protection level of intellectual property



2. Protection of Intellectual Property Right in Korea

▶ Reasons of improvement in protection of IPR

- 1. Improvement of system in protection of IPR**
- 2. government-initiated efforts to spread culture respecting for IP**
- 3. Holding a number of related conferences, seminars**

2. Protection of Intellectual Property Right in Korea

▶ Reasons of improvement in protection of IPR

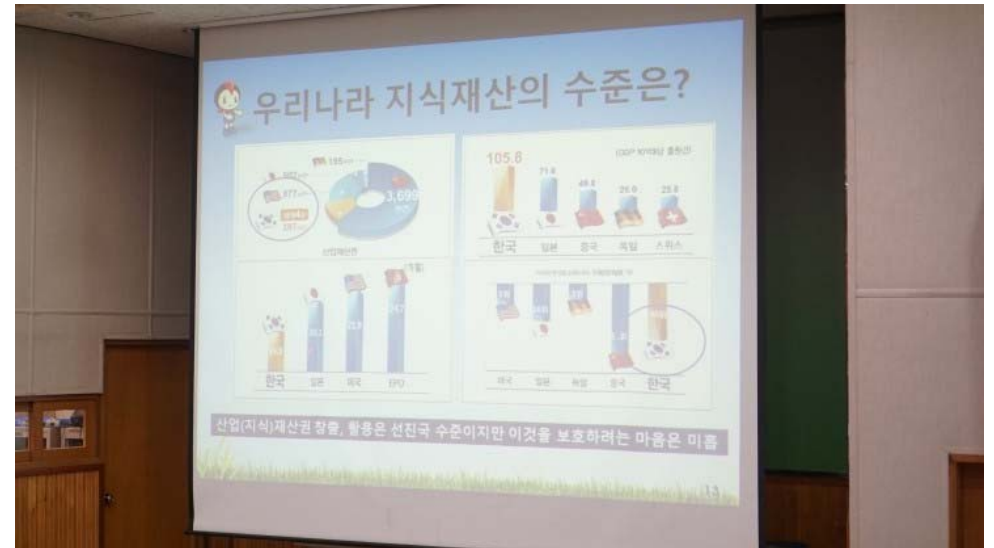
1. Improvement of system in protection of IPR

- Reduction of the length of patent prosecution**
- jurisdiction consolidation of patent case**
- Expansion of Patent Prosecution Highway(PPH)**

2. Protection of Intellectual Property Right in Korea

▶ Reasons of improvement in protection of IPR

2. government-initiated efforts to spread culture respecting for IP



Source: kipra

2. Protection of Intellectual Property Right in Korea

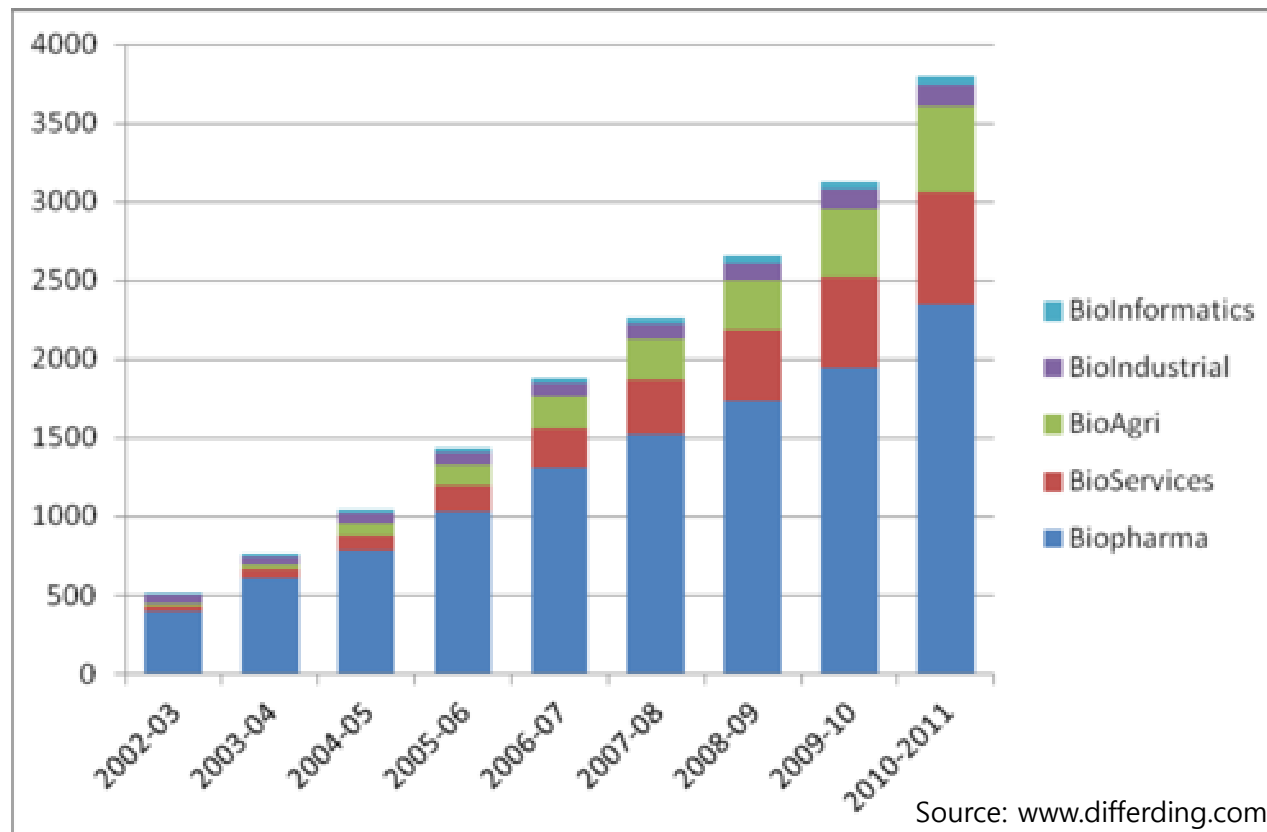
▶ Reasons of improvement in protection of IPR

3. Holding a number of related conferences, seminars



2. Protection of Intellectual Property Right regarding GR in Korea

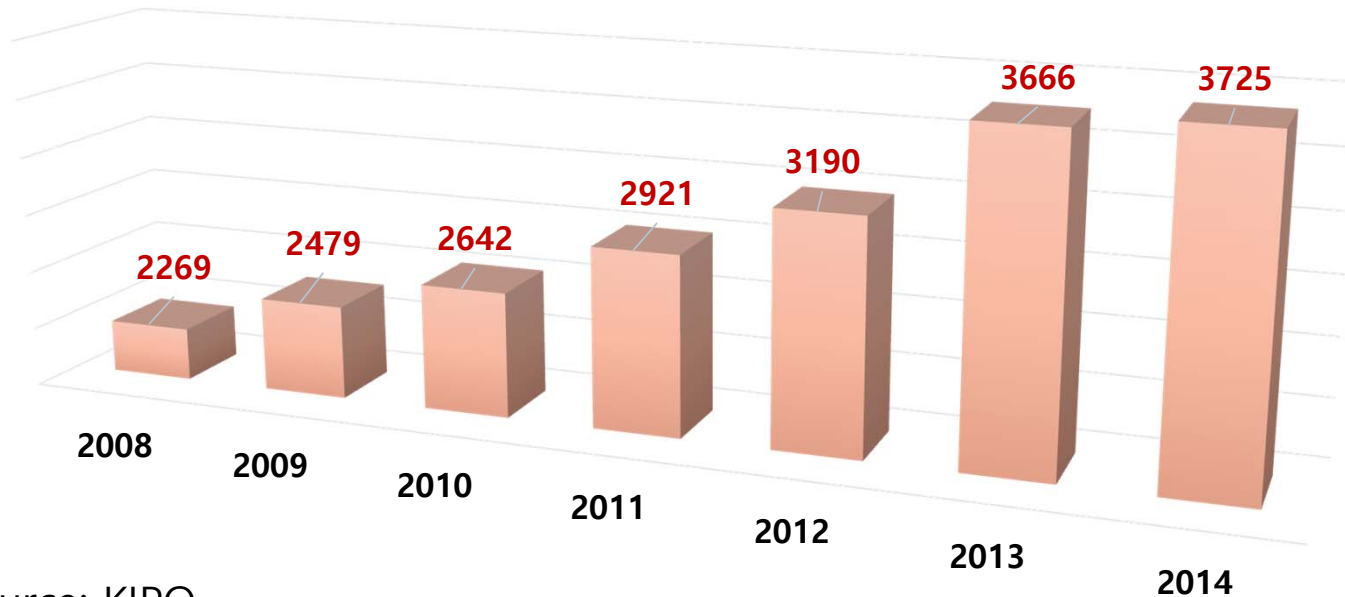
Biotechnology Market Value



2. Protection of Intellectual Property Right regarding GR in Korea

Changes in Patents of Biotechnology in Korea

The Number of Patents in Biotechnology



Source: KIPO

2. Protection of Intellectual Property Right regarding GR in Korea

▶ Problems of protecting IPR regarding GR in Korea

- 1. Lack of ability to research domestic genetic resources and exercise IPR**
- 2. Excavation of foreign genetic resources is focused on specific areas**
- 3. Lack of understanding of ABS and of experts in the companies related to genetic resources**

2. Protection of Intellectual Property Right regarding GR in Korea

► Problems of protecting IPR regarding GR in Korea

1. Lack of ability to research domestic genetic resources and exercise IPR



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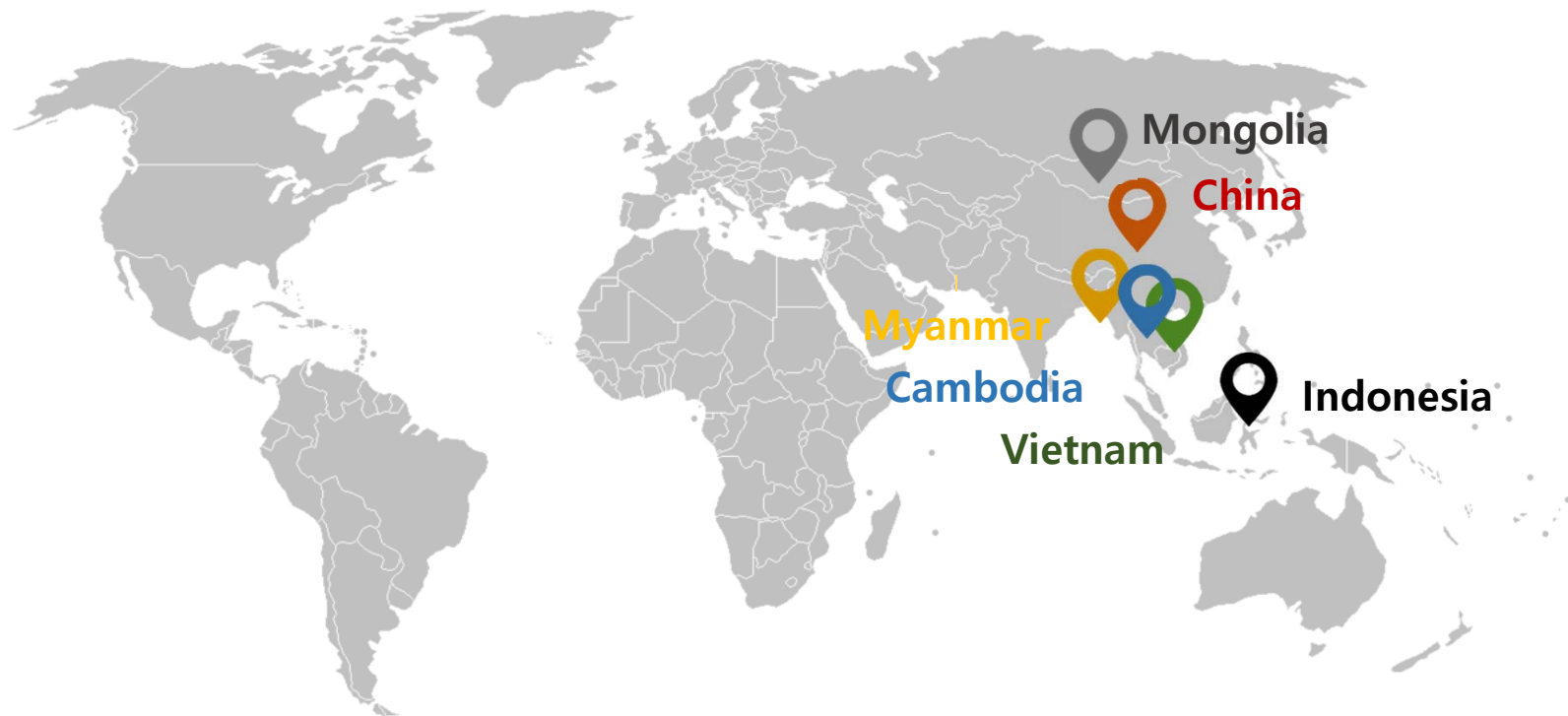


Abies Koreana Wilson

2. Protection of Intellectual Property Right regarding GR in Korea

▶ Problems of protecting IPR regarding GR in Korea

2. Excavation of foreign genetic resources is focused on specific areas

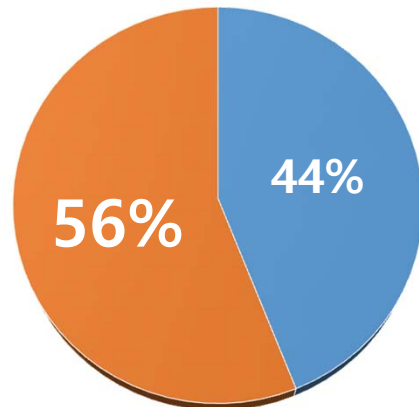


2. Protection of Intellectual Property Right regarding GR in Korea

▶ Problems of protecting IPR regarding GR in Korea

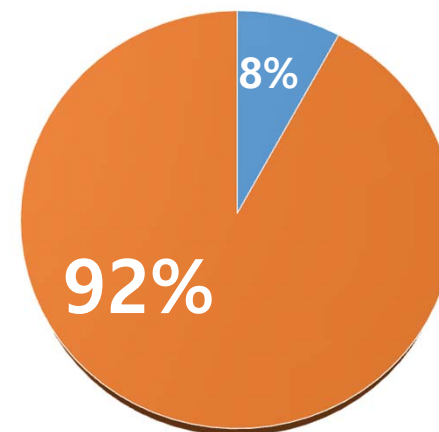
3. Lack of understanding of ABS and of experts in the companies related to genetic resources

Do you know about the Nagoya protocol
in some degree?



■ YES ■ NO

Are you preparing for the Nagoya protocol?



■ YES ■ NO

2. Protection of Intellectual Property Right regarding GR in Korea

▶ Methods to improve protection IPR regarding GR in Korea

- Constructing DB by collecting information about domestic genetic resources**
- Enlarge research areas into Africa, South America beyond Southeast Asia**
- Government's efforts to raise awareness of companies about ABS and train related experts**

3. ABS SYSTEM IN KOREA

3. ABS System in Korea

▶ Acts concerning Genetic Resources



- **The Ministry of environment**

- Act on the conservation & use of biodiversity(2012)
- Wildlife protection & management act



- **Ministry of Science, ICT & Future Planning**

- Act on the acquisition, management and utilization of biological research resources(2009)



- **Ministry of Oceans & Fisheries**

- Act on the Preservation, Management and Use of the Agro-Fishery Bio resources

3. ABS System in Korea

▶ Problems of ABS system in Korea

- **The acts focus on preservation of genetic resources or habitats and national ABS legislation does not exist.**
 - The acts regarding GR in Korea are usually made up as a providing country
 - So, not sufficiently prepared as a user country
- **Lack of regulations and procedures required by ABS**
 - No checkpoints has been designated yet
 - No national, formal position about disclosure of origin

3. ABS System in Korea

▶ Task ahead

- 1. need for the national ABS legislation preferentially**
- 2. Strengthen joint research with foreign institutions of providing countries**
- 3. Promotional and educational assistance on ABS system**

3. ABS System in Korea

▶ Problems of ABS system in Korea

1. Need for the national ABS legislation preferentially

- In the directions of protecting domestic biological genetic resources and at the same time, not imposing heavy strain on pharmaceutical, biotechnological, cosmetics industry
- Institutionalize specifically regulations related to IP including disclosure of origin
- Strengthen content from the point of user country

3. ABS System in Korea

▶ Problems of ABS system in Korea

2. Strengthen joint research with foreign institutions of providing countries

- Cooperation with local community in providing country applies to all public research institutes, companies and researchers**
- Need for construction of a system supporting joint research with providing countries**

3. ABS System in Korea

▶ Problems of ABS system in Korea

3. Promotional and educational assistance on ABS system

- ABS consulting through ABS helpdesk**
- Education researchers and companies about ABS procedures**
- Promotion to raise awareness about ABS**

Thank You

Biodiversity and the Issues of ABS in Jeju

2016.7.13

JTP 제주테크노파크
JEJU TECHNOPARK

Jeju Biodiversity Research Institute

Chang Sook Kim

Biodiversity and the Issues of ABS in Jeju

(JTP, Jeju Biodiversity Research Institute, Chang Sook Kim)

Jeju Special Self-governing Province consists of Hallasan, coastal and middle mountainous areas and wetlands and it is well known as a repository of resources where over 8,000 species inhabit at their northern and southern distributional limits.

Based on the Convention on Biological Diversity(CBD), Jeju Special Self-governing Province has established and operated the Jeju Biodiversity Research Institute(JBRI) in order to build up a research foundation for conservation and sustainable use of Jeju biological resources. We would like to explain the current status of biological resources information and database establishment and industrialization of biological materials.

Among terrestrial and marine biological resources, 16,000 pieces of useful resources from over 2,100 species (934 kinds of terrestrial plants, 344 types of insects, 622 kinds of microbes) have been collected and voucher specimens are made to establish a database. Among them, extracts have been taken from 1,600 pieces in 560 species, founding grounds of industrial uses.

In addition, the institute has been running ecosystem restoration projects through researches on proliferation and conservation of endangered insects including giant water bugs, stag beetles, and scarab beetles.

Five hundred fifty-seven kinds of species are found to have the potential to be utilized as functional materials among which 30 natural resources that could be used in cosmetic products or health functional foods have been selected.

For example, the institute has found that *Litsea japonica* Juss fruit extract is good for treating osteoarthritis and has led it to be authorized product-specific ingredient for health functional foods. Furthermore, JBRI has found more biological resources that have antioxidant, anti-inflammatory, anti-obesity, anti-bacterial or blood lipid regulating effects. It has registered 88 patents and transferred sixteen technologies to businesses.

Jeju Special Self-governing Province has nourished Health & Beauty Bio-Industry, which includes the cosmetic industry, the health functional foods industry, and the seed industry, as a regional special industry based on its clean environment and its rich biological resources with over 8,000 species. In 2013, 372 businesses were in operation with employing 4,597 workers and earning 964.3 billion won of sales in the industry in a broad sense.

In particular, the Jeju cosmetic industry has shown a sharp growth recently and Jeju is promoting the industry strategically under the vision statement: to develop Jeju as a natural cosmetic industrial hub utilizing clean resources.

There are some ABS related issues in Jeju.

The first is to set up an integral management system for Jeju biological resources to secure biological sovereignty. It is not only discovering endemic biological resources but also surveying related traditional knowledge, and furthermore, managing them in a comprehensive manner. Therefore, the issue of establishing an institution which is responsible for the integral Jeju biological resources management system has come to the fore.

The second is how to share the benefits from Jeju biological resource utilization. It is about whether Jeju can ask a company, which is based in Seoul, to share its benefits when it made a considerable amount of profit from Jeju biological resources. For instance, Amorepacific Corporation has made a donation to the Gotjawal Trust of Jeju when it launched Aritaum, its new cosmetic brand, in which Jeju camellia is used as an ingredient. It is not clear if the donation could be interpreted as a part of ABS activities.

The third is to provide an international and domestic ABS trend to strengthen businesses in the region and to expand the biological resource database, especially focusing on its specificity and usefulness.

The fourth is to raise public awareness of ABS. It is about encouraging public awareness by various activities which include creating and operating a regional biodiversity committee. Administrative authorities as well as businesses still lack ABS information and specific means to implement ABS. It is necessary to educate people and share ABS information.

The fifth is to improve the biological resource export control system. Recently an overseas company requested the transfer of some of Jeju's biological resources, but the request was rejected. This shows that Jeju does not have a sufficient basis in biological resource export regulation. Currently, the province is controlling regional resources based on several ordinances such as the Ordinance for the Conservation of Resources of Jeju Special Self-governing Province, and it is preparing enactment for the Preservation and Utilization of Biodiversity of Jeju Special Self-governing Province in regard to ABS.

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2. A Case Study on the Industrialization of Biological Resources in Jeju
3. The Issues of ABS in Jeju

Jeju Special Self-governing Province

Jeju, UNESCO's triple-crown winner in the fields of nature and science



United Nations
Educational, Scientific and
Cultural Organization

생물권보전지역 Biosphere Reserve (2002)

세계자연유산 World Natural Heritage (2007)

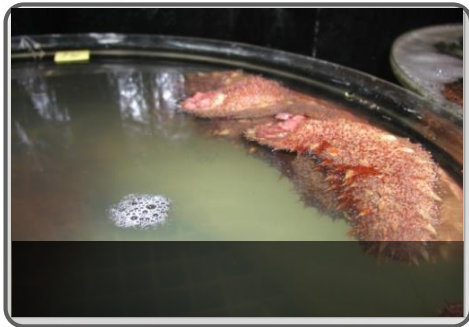
세계지질공원 Global Geopark (2010)

세계 7대 자연경관지 선정, The Selection of New Seven Wonders of Nature (2011)

Repositories of Biological and Genetic Resources (more than 8,000 species of biological resources)

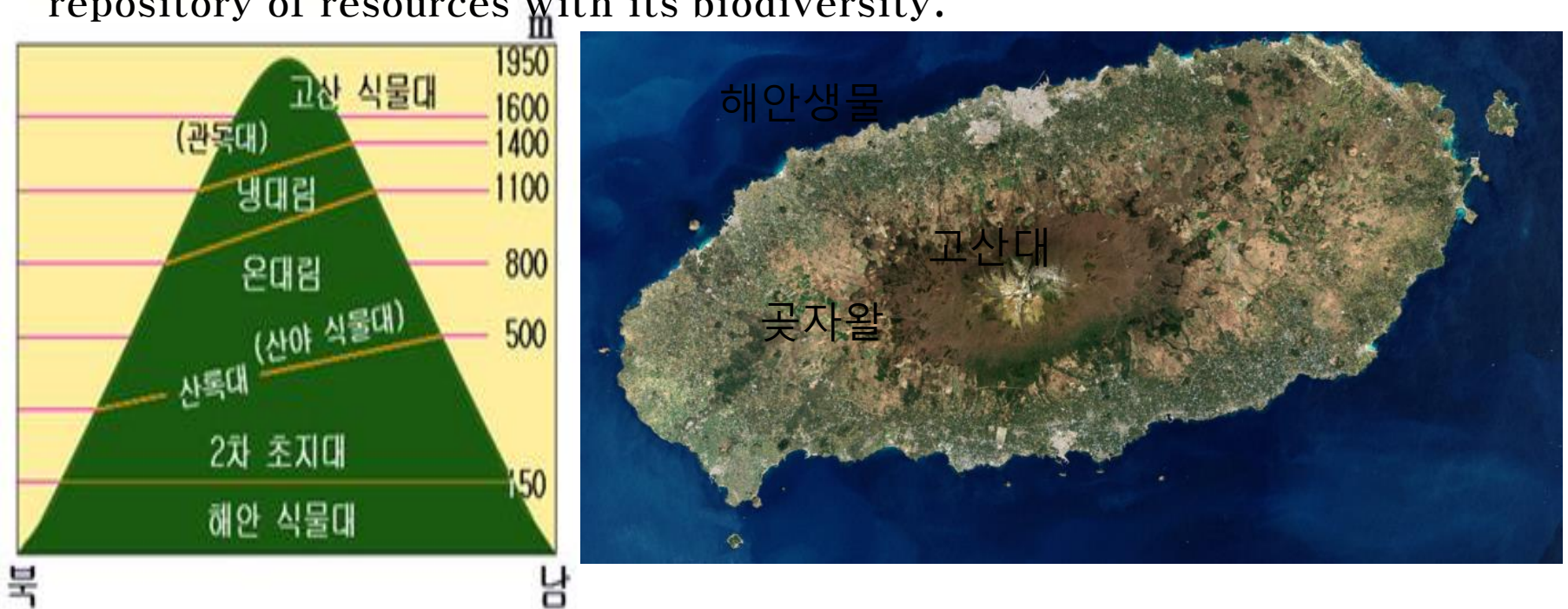


I. The Conservation Status of Biological Resources in Jeju



1. Geographical Features of Jeju Special Self-governing Province

As Jeju Special Self-governing Province consists of Hallasan, wetlands, coastal and middle mountainous areas, it is a region where the northern and southern distributional limits of species are overlapped and a repository of resources with its biodiversity.

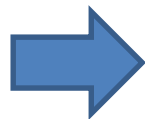


Repositories of Biological and Genetic Resources (more than 8,000 species of biological resources)

2. The Management Status of Biological Resources in Jeju

The list of institutes possessing biological resources

institute	Possessing biological resources
Folklore & Natural History Museum of Jeju Special Self-governing Province	Plant, mammal, bird, reptile, insect, algae, fish etc
Jeju National University	plant, microorganism, reptile, algae
Warm Temperate & Subtropical Forest Research Center of Korea Forest Research Institute	plant
Jeju Regional Office of the National Plant Quarantine Service	insect
Research Institute for Mt. Halla, Jeju Special Self-governing Province	Plant, insect
Jeju Institute of Maritime and Fisheries, Jeju Special Self-governing Province	Fish, shellfish
Jeju Fisheries Research Institute of the National Institute of Fisheries Science	Fish
Jeju Biodiversity Research Institute of Jeju Techno Park	Algae, plant, insect, extracts of biological resources



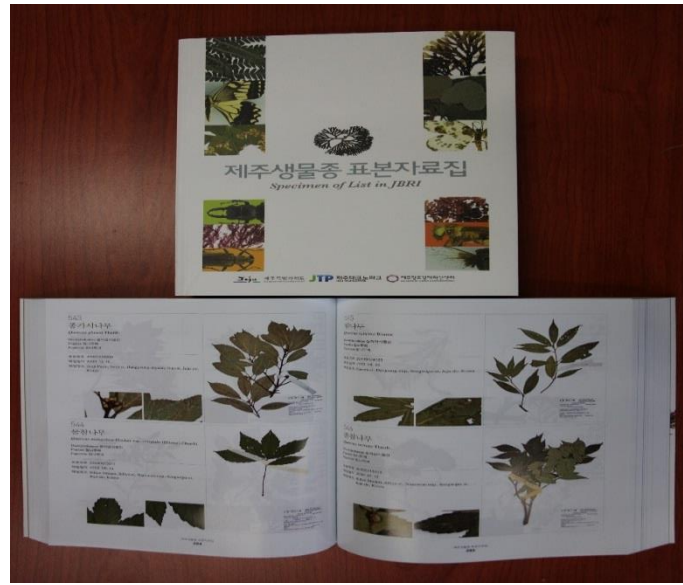
- Lack of storage facilities for biological resources
- Small collection of biological resources specimens
- No integrated management system on biological resources

Biodiversity management agencies – conservation and promotion of biological resources

Publication: A Collection of Research Theses, Manual of Useful Plants in Jeju Island, Useful Plant Resources of Jeju Gotjawal, Insects of Jeju, The specimens of Jeju biospecies

Education & Training: operating 'Jeju biodiversity' program
 – educating more than 1500 kindergarten, elementary, middle, and high school students annually

⇒ Improving the value of biodiversity and enhancing community awareness



Ministry of Environment has been operating "Ex-Situ Conservation Institution".

"Ex-Situ Conservation Institution"

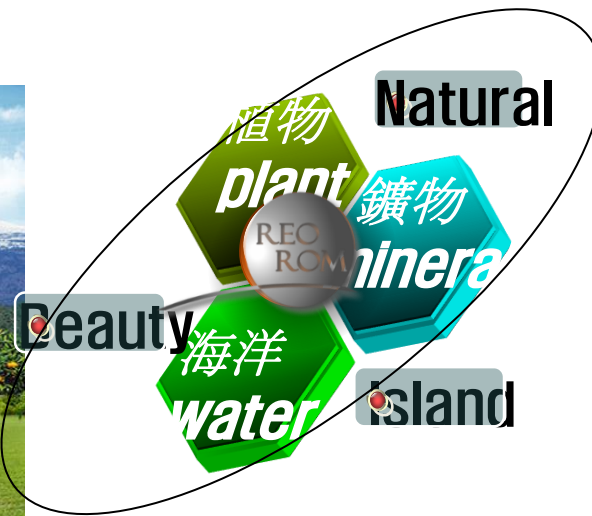
- ❖ The Opening of Insect Eco-Center
- ❖ Controlled propagation and restoration of endangered insects
- ❖ Ministry of Environment has been designating Ex-Situ Conservation Institution for the endangered and protected wild species.

- *Copris tripartitus waterhous*, *Lethocerus deyrollei*, *Prosopocoilus astacoides blanchardi*

⇒ Raising community awareness about the ecological restoration and the value of biodiversity



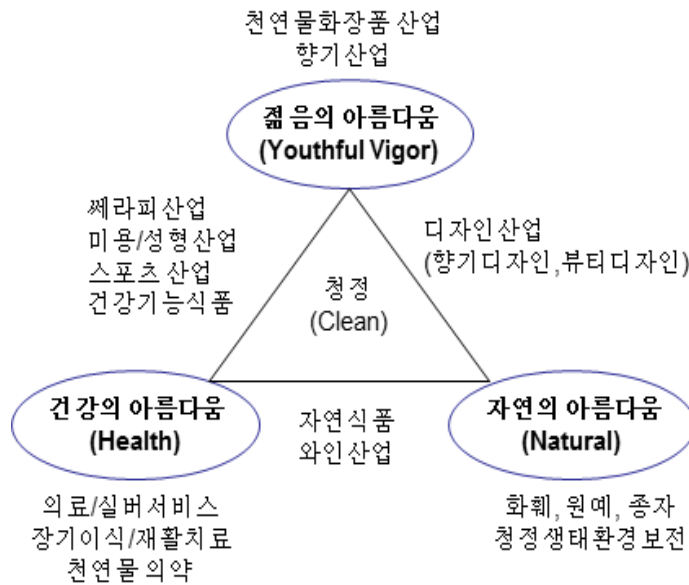
II. A Case Study on the Industrialization of Biological Resources in Jeju



1. Present status of Jeju Health & Beauty Bio-industry

The criteria for selecting Health & Beauty Bio-industry are set up : feasibility of industrialization using Jeju biological resources, connectivity with primary or tertiary industries, suitability for Jeju's clean image, and growth potential. Health & Beauty Bio-industry was named to cover the cosmetic industry, the health functional foods industry, and the seeds industry.

In 2013, 372 businesses were in operation with employing 4,597 workers and earning 964.3 billion won of sales in Health & Beauty Bio-industry in a broad sense.



<Fig> Concept of

Jeju Health & Beauty Bio-industry



Especially, the cosmetic industry has been growing rapidly in recent years. The number of cosmetic companies registered at Ministry of Food and Drug Safety has increased from 8 in 2004 to 87 in 2015. The sales volume of cosmetic companies based in Jeju has reached 260 billion won. Jeju is promoting the industry strategically under the vision statement: to develop Jeju as a natural cosmetic industrial hub utilizing clean resources.

2. Major biological resources for bioproducts

구분		자원
식물	육상식물	감귤, 고사리, 국화, 녹차, 금귤, 당유자, 동백, 마늘, 메밀, 백년초, 살구, 섬오가피, 양파, 오미자, 유자, 유채, 이슬초, 감, 띠, 취나물, 파인애플, 포도, 화분, 한라봉, 한란, 허브류, 흑오미자. 울금, 석창포, 알로에, 월동무, 조릿대, 표고버섯, 구아바, 당근 등
	해상식물	모자반, 미역, 톳, 우뚝가사리, 감태 등
동물	육상동물	꿩, 말,
	해상동물	갈치, 꽃멸치, 오분자기, 자리, 한치, 소라, 게 등
미생물(곤충포함)		동충하초, 상황버섯, 영지버섯 등
기타		화산송이, 용암해수 등

Biological resources in R&D projects

구분		자원	종
식물	육상식물	메밀, 꾸지뽕나무, 보리, 녹차, 갈대, 개다래, 고사리, 동백열매, 들깨, 비파, 나무딸기, 시로미, 두릅, 병풀, 호장, 썸바귀, 복분자, 개망초, 좁은잎천선과, 복수초, 석창포, 허브류 등	300여종
	해상식물	모자반, 미역, 툇, 우뚝가사리, 감태 등	44종
미생물		<i>Streptomyces, Actinomycetes</i> 등	

The natural resources of Jeju have come into the spotlight for cosmetic ingredients recently. Over 470 types of Jeju natural ingredients were included in ICID list according to a survey in 2014. These are classic cosmetic ingredients from Jeju: *crinum lily* with anti-inflammatory and anti-allergic effect; *camellia oil* with moisturizing and anti-inflammatory effect; *cactus fruit* extract with moisturizing effect; *canola honey* with nourishment effect; *guava extract* with anti-oxidative and anti-inflammatory effect; *citrus tenuissima* with slimming effect; *ecklonia cava* with whitening, moisturizing, and anti-inflammatory effect; *mallotus japonicus* with anti-oxidative effect; *crowberry* with anti-aging effect; and *wild mulberry tree* with whitening effect.

3. Prime examples of Jeju biological resources utilization

① Medicinal resources such as *acorus gramineus solander*

There are many medicinal plants in Jeju such as *cynanchum wilfordii*, white balloon-flower, *acorus gramineus solander*, *scutellaria*, *angelica gigas*, *aralia cordata*, *achyranthes*, *chrysanthemum indicum*, and *fallopia multiflora*. A wide range of products have been developed using these plants. Various cosmetics that make use of *acorus gramineus solander* including air fresheners; facial masks; pore strips; and relax gels, Jeju liquors that use *cynanchum wilfordii* or *acanthopanax*, and health foods that use *achyranthes* or tumeric are produced.

Jeju Boncho, a Jeju local co-brand has been launched to promote products that use medicinal herbs from Jeju. More than 40 products from twenty companies are using the brand. Sales volume of those products is estimated at about 25 billion won in 2015.



② Special crops such as *litsea japonica* fruit

Many research projects have been conducted to study the functions of various special crops such as humulus, litsea, shiny xylosma, neolitsea sericea, sasa borealis, and Asian coastal wormwood.

There are products containing these crops as ingredients.



섬오갈피



제주조릿대



경단구슬모자반



백수오



제주석창포



감태



알로에



참다래



우뭇가사리



백도라지



손바닥선인장



울금



쇠무릎



환삼덩굴



참식나무



참그물바탕말



동백열매



비자나무



까마귀쪽나무



산유자



곰솔



문주란



황칠나무



넓미역

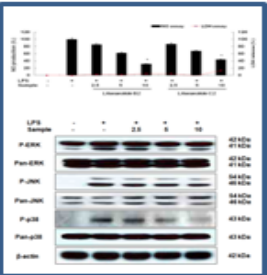
In 2015, litsea became the first authorized product-specific ingredient among Jeju terrestrial plants for functional health foods, which is to help osteoarthritis patients, establishing the basis for functional health foods production. Jeju Biodiversity Research Institute carried out various tests including a functionality test, a safety test, and a clinical practice test, proved anti-inflammatory effects, and determined the marker compound, which is Hamabiwalactone B, to have litsea authorized as a product-specific ingredient. Technologies that allow utilizing litsea have been transferred to businesses, and products using the plant is expected to be on the market later in 2016.



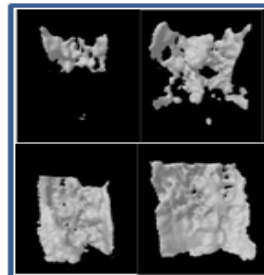
- 소재선정(6개월)
- 기능성 및 안전성 문헌조사
- 기능성 평가 스크리닝
- 기능성 탐색(3개월)
- 생리활성 평가(in vitro)
- 기능성 검증 및 농도 확인
- 효능규명 기전연구

성분명	함량(%)
Hamabiwalactone B	11.7 ~ 17.5
Lipid	1.0
Carbohydrate	1.0
Protein	1.0
Water	1.0
Others	1.0

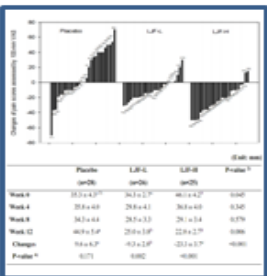
- 원료표준화(1년)
- 지표성분 설정(Hamabiwalactone B)
- 원재료 표준화: 11.6~17.5mg/g
- 원료제조공정 확립
- 지표성분 분석법 개발 및 기준규격설정



- 효능규명(3개월)
- 항염증 효능 규명
- 유효성분 효능 규명
- 기전연구
- 염증 억제 효능 작용기전 연구
- NF-κB, MAPK signal pathway



- 안전성 시험(8개월)
- 단회독성시험
- 유전독성시험
- 비임상효력시험(6개월)
- 급성, 만성관절염 항염증 효능
- 골관절염완화 효력시험
- 진통억제 효력시험



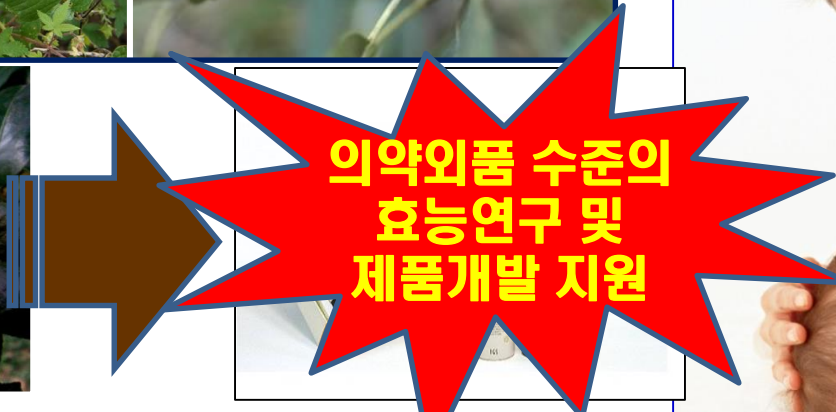
- 인체적용시험(1년4개월)
- 인체를 대상으로 기능성 검증
- 분당차병원 정형외과에서 시험
- 연골의 기질분해효소(MMP) 및 염증 유발 인자 억제를 통한 골관절염 개선 효능 확인
- 통증 개선 효능 확인
- 기술단계 분석(3개월)
- 시험자료 수집 및 분석



- 개별인정원료 신청 및 인정(10개월)
- 식품의약품안전처에 관절건강 개선 기능성으로 개별인정 원료 인정 신청
- 관절건강 개선에 도움을 줄 수 있음(생리활성 2등급)
- 개별인정형 원료 인정 획득
- 인정번호: 제2015-22호

Development cases of cosmetic products using special crops

- *Humulus japonicas* S., *Quercus acuta* thumb, *Camellia japonica*



An advertisement for Atosarang products. It features a photograph of a smiling woman in a white top gently holding a baby in a yellow outfit. The text "www.atosarang.com" is in the top left, and the "ATO SARANG" logo is in the top right. Below the photo, there is Korean text: "아름다운 제주의 자연, 아이사랑의 엄마 마음, 그리고 끝없는 연구의 열정을 담았습니다" (We have included the beautiful nature of Jeju, the mother's heart of Aisarang, and the endless passion of research). At the bottom, there are images of three products: Atosarang Mist (100mL), Atosarang Serum (80g), and Atosarang Soap (100g). The text "천연 보습, 무방부제, 무색소 천연 고보습 화장품" (Natural moisturizing, preservative-free, colorless natural high-moisture cosmetics) is written across the products. The IGS (주)아이지에스 logo is in the bottom right, with contact information: "제조원: (주)꽃대, 판매원: (주)아이지에스". At the very bottom, it says "ANG"은 (주)제주하이테크산업진흥원 제주생물종다양성연구소와 (주)IGS가 공동 개발한 제품입니다.



Development cases of cosmetic products using special crops

- nutmeg tree, camellia, green tea and more.

노스테 - 피부질환용



산다화 - 미백, 주름개선



다운비 - 기능성 한방화장품



스템셀로 - 즐기세포 화장품



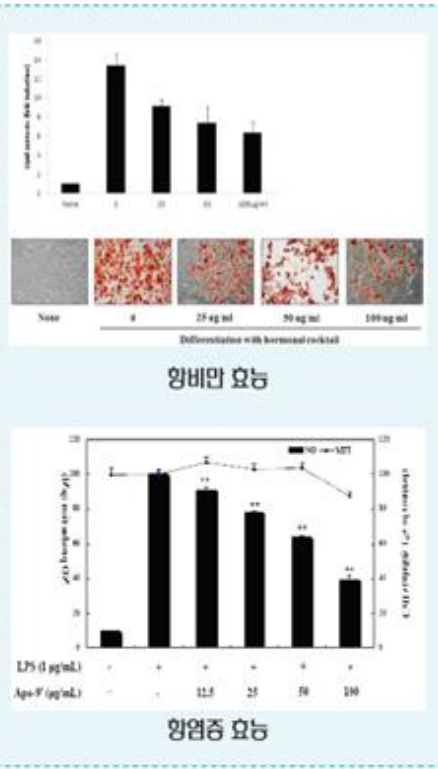
③ Marine plant resources

Over 700 marine plants are known to inhabit the sea around Jeju. Many algae, such as seaweed fusiforme, gulfweed, and ecklonia cava, are used in traditional foods. Also, these plants hold the limelight in the aquaculture industry. Especially, as functional materials have been found in sargassum muticum, ecklonia cava, they are not only widely used in many food products and cosmetics, but are also popular components in the tourism industry.



There has been a growing interest in sargassum muticum with its antiobesity effect; sargassum micracanthum, undaria peterseniana, dictyota dichotoma, enteromorpha prolifera, and ulva pertusa with its anti-inflammatory effect. Ecklonia Cava, which helps the ecosystem in Jeju's sea, is gaining in a huge popularity for containing a material called seanol. Seanol, which is a compound word of sea and polyphenol, a kind of chemical has anti-oxidative effect, is sea polyphenol extracted from ecklonia cava endemic to the clean sea surrounding Jeju Island. In addition, red sea cucumber, a specialty of Jeju, has come into the spotlight as it was found to have skin cell proliferation, moisturizing, and anti-inflammatory effects.

③-1. *Sargassum muticum* Fensholt (경단구슬모자반)



식용가능여부 가능(전초)

연구이용부위 전초

연구대상물질 에탄올 추출물, 분획물

유효물질 apo-9'-fucoxanthinone

특허

- 지방간 개선용 조성물 (등록 10-1486312)
- 고지혈증 개선용 조성물 (등록 10-1486317)
- 알러지성 질환의 개선제 조성물 (등록 10-1302739)

논문

- 항염증 효능 (Turk. J. Biol., 2010, 34:25-34) (DARU, 2013, 21(1):62)
- 피부 보호 (Int. J. Mol. Sci., 2011, 12:8146-8160)
- 항산화, 항균 효능 (J. Korean Soc. Food Sci. Nutr., 2007, 36(6):663-669)

소재정보

- 과 명: 모자반과(Sargassaceae)
- 성 상: 갈조류 (크기 1m)
- 분 포: 한국, 중국, 일본, 대서양 연안, 북미 태평양 연안
- 서 식: 조간대 하부~조하대
- 생 식: 초봄~초가을

활용방안

기술이전

&

산업화 추진



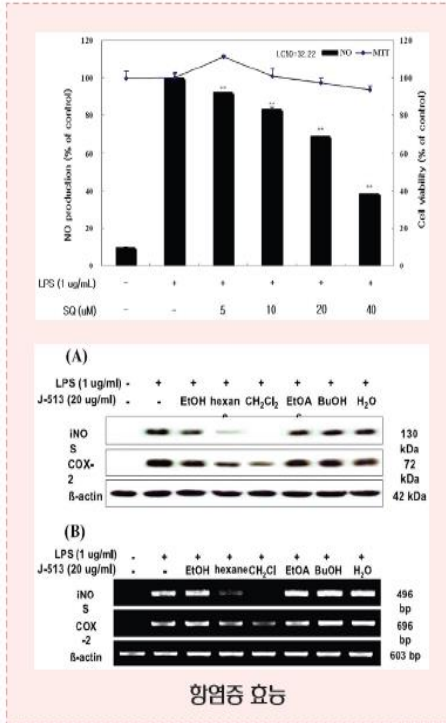
비만 및 피부 개선 관련 제품 개발 가능

파급효과

- 기능성 식품 및 화장품 모두 활용 가능
- 기술이전(HELIOS) → 피부외용제 개발 : 2015 대한민국 HIT500 선정
- 기술이전에 따른 기술사용료 : 매출액의 3% 확보 예상

③-2. *Sargassum micracanthum* Endlicher (잔가시모자반)

5. 잔가시모자반 *Sargassum micracanthum* (Kützing) Endlicher



식용가능여부 가능(열매)

연구이용부위 열매

연구대상물질 에탄올 추출물, 분획물

유효물질 Sargaquinoic acid, Sargachromenol, Isoketochoabrolic acid

특허

- 항염증성 조성물 (등록 10-1213948)
- 피부자극 개선 및 완화용 조성물 (등록 10-1015702)

논문

- 항염증 효능 (EurAsia J. BioSci., 2009, 3:130-143)
(The scientific world journal, 2013, 2013:1-6)
- 항산화 효능 (Int. J. pharmacol., 2010, 6(2):147-151)

소재정보

- 과명: 모자반과(Sargassaceae)
- 성상: 갈조류 (크기 30~50cm)
- 분포: 북태평양 서안, 한국의 전 해안
- 서식: 조간대 하부
- 생식: 5~7월

활용방안

기술이전

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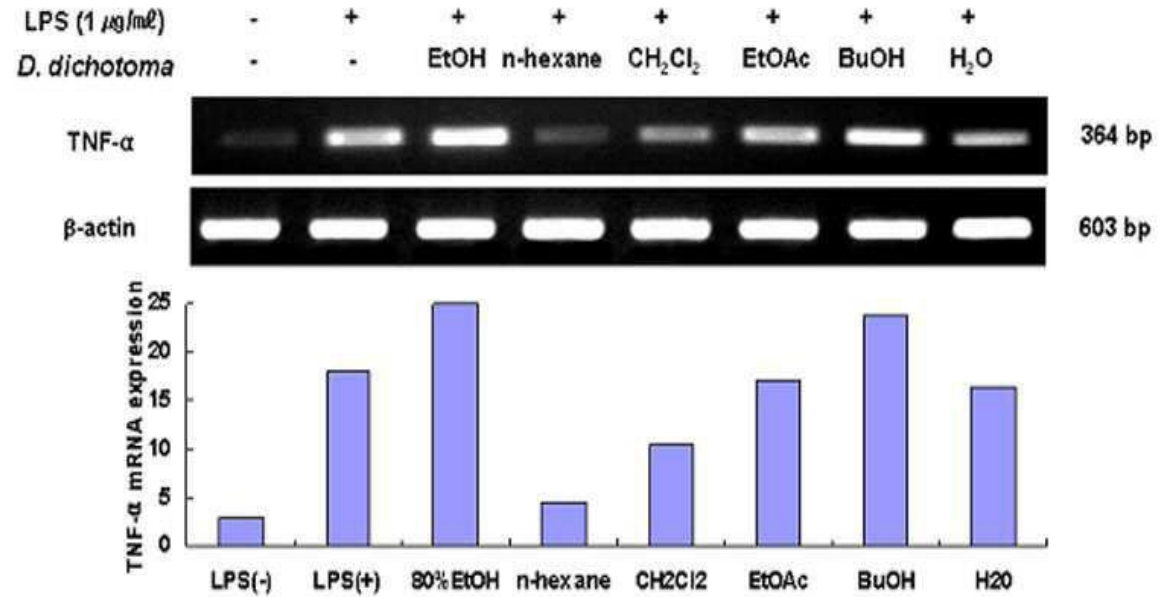
산업화 추진

피부 자극 관련 기능성 화장품 개발 가능

파급효과

- 항산화 분야의 건강기능식품 후보 소재로 도출
- 기능성 화장품 및 스파용품 모두 활용 가능
→ 제주 특화 해양생물 자원의 부가가치 창출

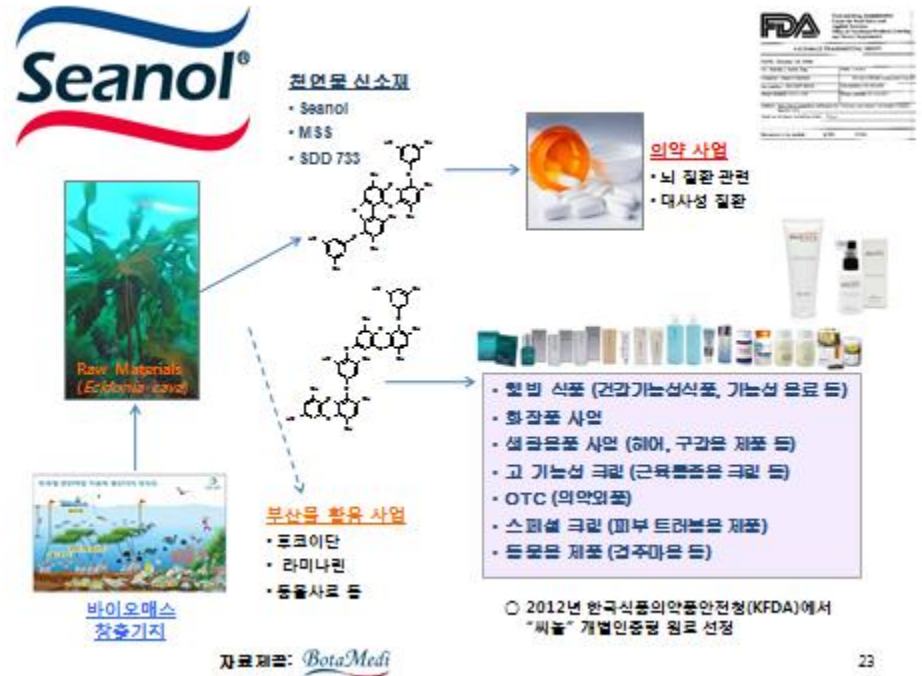
③-3. *Dictyota dichotoma* extract with anti-inflammatory effect (참그물바탕말)



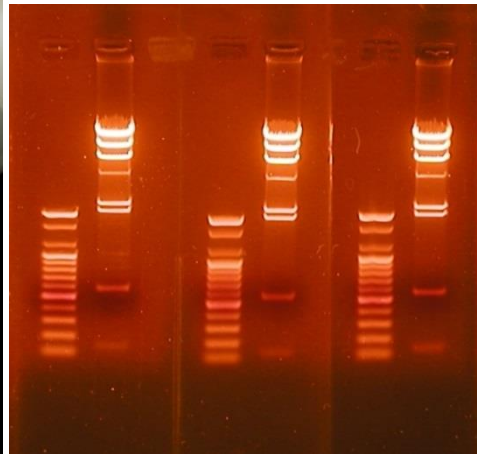
③-4. Functional products using *ecklonia Cava*



감태 (*Ecklonia cava*)



③-5. *Gelidium amansii*



아가로즈



한천

③-6. Functional products using red sea cucumber

- recognition of the superiority of the red sea cucumber - high in collagen content, skin condition improvement effect



- * additives in cosmetic products
- * remedial agent for wrinkle and acne
- * various healthy food products
- * health functional food supplements

청정 제주 바다를 담아
제주 홍해삼



Major R&D Project in JBRI

주요자원		효능 연구
큰조롱 (백수오)		혈중지질개선 (동물실험 완료)
섬오갈피		간기능 개선 (인체적용시험 中)
까마귀쪽나무		골관절염 개선 (건기식 원료 등록 완료)
좁은잎천선과		골관절염 개선 (동물실험 완료)
새복수초		간암 치료 (동물실험 완료)
경단구슬모자반		체지방 감소 (인체적용시험 中)
기타 생물자원		항비만, 미백, 항산화, 항암, 항염 등 (생리활성 D/B 구축 中)



III. Strategies for managing biological resources in Jeju

Access and Benefit-sharing(ABS) issues in Jeju



ABS issues in Jeju – the aspect of strategies for managing biological resources

1) Establishing the integrated management system for biological resources (terrestrial and aquatic animals and plants, microorganisms) in Jeju

- creating a list of biological resources that inhabit Jeju
- collecting biological resources and establishing a database
- collecting traditional knowledge about biological resources and securing an utilization system (database establishment)

2) Seeking ways and means to hold sovereignty over the indigenous biological resources of Jeju

- Encourage companies, which utilize Jeju biological resources as biomaterial, to contribute to the local community by sharing their profits.

ex) A case of donation that Amorepacific Corporation made to a local organization when it released a new cosmetic brand using Jeju indigenous materials

3) Raising awareness about ABS implementation

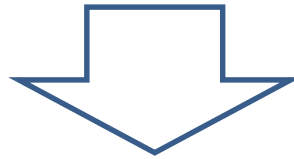
- Main agents such as biotech companies and government authorities are lacking the information on ABS implementation.
- It is necessary to provide them with training and information on ABS.

4) Improvement of legal and institutional framework for Jeju biological resources

- promoting the enactment of ordinances for ABS implementation in Jeju
- (tentative name) Jeju Special Self-governing Province Ordinances on Conservation and Utilization of Biodiversity

Corresponding strategies for the Nagoya Protocol (ABS)

- Building the integrated database of scientific information (traditional knowledge) about biological resources
- Setting up the local control tower to respond to ABS
- Promoting the enactment of ordinances for responding to ABS in Jeju



Raising awareness about the value of Jeju's biodiversity



감사합니다

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E-mail: cskim@jejutp.or.kr