Research Article

A Comparative Analysis of Ethnomedicinal Practices for Treating Gastrointestinal Disorders Used by Communities Living in Three National Parks (Korea)

Hyun Kim,1 Mi-Jang Song,2 Heldenbrand Brian,3 and Kyoungho Choi4

1 School of Alternative Medicine and Health Science, Jeonju University, 303 Cheonjam-ro, Wansan-gu, Jeonju 560-759, Republic of Korea
2 Department of Integrated Bioresource Science, Graduate School of Jeonju University, 303 Cheonjam-ro, Wansan-gu, Jeonju 560-759, Republic of Korea
3 School of Liberal Arts, Jeonju University, 303 Cheonjam-ro, Wansan-gu, Jeonju 560-759, Republic of Korea
4 Department of Basic Medical Science, Jeonju University, 303 Cheonjam-ro, Wansan-gu, Jeonju 560-759, Republic of Korea

Correspondence should be addressed to Hyun Kim; hyunk@jj.ac.kr

Received 3 March 2014; Accepted 16 May 2014; Published 17 August 2014

Academic Editor: Rainer W. Bussmann

Copyright © 2014 Hyun Kim et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The purpose of this study is to comparatively analyze the ethnomedicinal practices on gastrointestinal disorders within communities in Jirisan National Park, Gayasan National Park, and Hallasan National Park of Korea. Data was collected through participant observations and in-depth interviews with semistructured questionnaires. Methods for comparative analysis were accomplished using the informant consensus factor, fidelity level, and internetwork analysis. A total of 490 ethnomedicinal practices recorded from the communities were classified into 110 families, 176 genera, and 220 species that included plants, animals, fungi, and algae. The informant consensus factor values in the disorder categories were enteritis, and gastalgia (1.0), followed by indigestion (0.94), constipation (0.93), and abdominal pain and gastroenteric trouble (0.92). In terms of fidelity levels, 71 plant species showed fidelity levels of 100%. The internetwork analysis between disorders and all medicinal species are grouped in the center by the four categories of indigestion, diarrhea, abdominal pain, and gastroenteric trouble, respectively. Regarding the research method of this study, the comparative analysis methods will contribute to the availability of orally transmitted ethnomedicinal knowledge. Among the methods of analysis, the use of internetwork analysis as a tool for analysis in this study provides imperative internetwork maps between gastrointestinal disorders and medicinal species.

1. Introduction

After the agreement of the Nagoya Protocol, which has highlighted the importance of traditional knowledge of local communities, interest has grown stronger regarding ethnomedicinal knowledge in the world [1]. Ethnomedicinal knowledge plays an extremely vital role in the health care systems of developing countries and is utilized as an alternative for the treatment of disorders without side effects in developed countries [2]. Investigations regarding ethnomedicinal knowledge in local communities have often been conducted to the indigenous communities of Asia, Africa, and South America.

At present, studies on the ethnomedicinal practices of local communities to treat specific disorders have been accomplished, including liver disease [3, 4], birth-related diseases [5, 6], uremia [7], diabetes [8], psychiatric disorders [9], ophthalmology [10], skin disorders [11], stomach issues [11], veterinary medicine [12, 13], and other health conditions. However, research using INA on the ethnomedicinal practices to treat gastrointestinal disorders within local communities has yet to be accomplished.

Investigations for the ethnomedicinal practices of local communities to treat specific disorders in Korea have included respiratory diseases [14], digestive system disorders...
peninsula and its many islands, which lie between 33° 06’N to 36° 09’N latitude and 125° 58’E to 128° 18’E longitude (Figure 1). The total population in 2012 of the study area was 1,161,002. The area measures approximately 2,410,434 km² and includes five provinces, four cities, and eight counties in its administrative district [24]. The annual precipitation is around 1,200–2,300 mm in which the coastal area generally receives more rainfall than the inland regions. The annual average temperature of the inland regions is 15°C, while Jeju Island records 16.2°C [25]. The natural and social environments of the three national parks are summarized in Table 1.

2.2. Investigative Method. Field investigations were conducted from March 2009 to November 2012. Proper data was collected using participant observations and in-depth interviews, as the informants also became investigators themselves through attending informal meetings, open and group discussions, and overt observations with semistructured questionnaires [21, 26].

The content of the semistructured questionnaires was composed of diverse information regarding medicinal species used to treat gastrointestinal disorders, including local names, used parts, methods of preparation, manufacturing and administration, dosage, and the usable duration regarding each curable formula [21, 27, 28].

All specimens were collected during their flowering or fruiting seasons and were organized utilizing the normal specimen manufacturing method [20, 27]. The voucher specimens were deposited for preservation in the herbarium of Jeonju University. The precise identification of species mentioned by the informants was performed in accordance with Lee [29], Lee [30], Ahn [31], Lee [32], and Park [33]. Scientific names were confirmed by the National Knowledge and Information System for Biological Species of Korea [34].

2.3. Quantitative Analysis

2.3.1. Informant Consensus Factor (ICF). The ICF was used to analyze the agreement degree of the informants’ knowledge about each category of disorders [17, 18]. The ICF was calculated using the following formula:

\[
ICF = \frac{(n_{ur} - n)}{(n_{ur} - 1)},
\]

where \(n_{ur}\) is the number of use reports of informants for a particular gastrointestinal disorder and \(n\) is the number of species used by all informants for a particular gastrointestinal disorder.

2.3.2. Fidelity Level (FL). The FL was employed to determine the most important species used for treating certain gastrointestinal disorders by the local practitioners and the elderly people living in the study area [19–21]. The FL was calculated using the following formula:

\[
FL(\%) = \frac{N_p}{N} \times 100,\]

where \(N_p\) is the number of species used by all informants for a particular gastrointestinal disorder, and \(N\) is the total number of informants.
Table 1: Natural and social environments of three national parks.

| Environment                      | JNP                                      | GNP                                      | HNP                                      |
|----------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Location                         | 35°13’N–33°27’N                         | 35°45’N–35°49’N                         | 33°06’N–34°00’N                         |
|                                  | 127°27’E–127°49’E                       | 128°02’E–128°09’E                       | 126°08’E–126°58’E                       |
| Administrative district          | Three provinces, one city, and four counties | Two provinces, one city, and four counties | One province and two cities              |
| Population (no.)                 | 241,784                                  | 335,934                                  | 583,284                                  |
| Area                             | 485 km²                                  | 76.256 km²                               | 1,849.18 km²                            |
| Annual precipitation             | 1,200–1,600 mm                           | 1,200–1,600 mm                           | 1,584–2,393 mm                          |
| Annual average temperature       | 12°C–14°C                                | 11°C–13.2°C                              | 15.6–16.9°C                             |
| Geographical characteristics      | The center of the southern region of Korea | The southern region of Korea             | The largest volcanic island in Korea    |
| Climatic zone of vegetation      | Between a warm temperate zone and a subarctic zone | Between a warm temperature zone to an alpine or arctic zone |

*JNP: Jirisan National Park, GNP: Gayasan National Park, HNP: Hallasan National Park.

where $N_p$ is the number of informants that mentioned the specific species used to treat certain disorders and $N$ is the total number of the informants who utilized the species as medicine for treating any given disorder.

2.3.3. Internetwork Analysis (INA). Internetwork analysis does not focus on the independent characteristics of an individual within the community but considers the results of the interrelationship among each individual of a community. INA has been applied within communities for various ethnographical problems, including ethnogenesis [35] and obesity [36–38]. However, the INA had yet to be applied to ethnomedicinal knowledge, although it has been included in relation to its ethnographical properties.
Table 2: Ethnographical characteristics of three national parks.

| Characteristics | JNP          | GNP          | HNP          |
|----------------|--------------|--------------|--------------|
| Gender         |              |              |              |
| Male           | 67 (34.9%)   | 36 (15.6%)   | 31 (36.5%)   |
| Female         | 125 (65.1%)  | 195 (84.4%)  | 54 (63.5%)   |
| Average age    | 72.9 (44–95) | 76.8 (52–93) | 78.4 (43–94) |
| Educational attainment | |              |              |
| Never attended school | 138 (71.9%)  | 165 (71.4%)  | 62 (72.9%)   |
| Attended school | 54 (28.1%)   | 66 (28.6%)   | 23 (27.1%)   |
| Linguistics    |              |              |              |
| The pronunciation between the eastern and western communities on the Jirisan axis depicts dissimilar intonations. | | Numerous dialects different from the inland communities. | |
| The local communities in the eastern region of Jirisan widely used the seed powder of Zanthoxylum piperitum (L.) DC, and the leaves of the Isodon japonicus (Burm.) Hara, while local communities in the western region did not consume these foods. | | Quite diverse from foods of the inland communities in regard to the recipe and ingredients. | |
| Food           |              |              |              |
| Men usually support their families financially. | | Women traditionally support their families. | |

Our research has newly applied this method in order to attain more internetwork information from the treatment of ethnomedicinal practices on gastrointestinal disorders within communities in Korea. The results of the INA of disorders and medicinal species were analyzed using UCINET (Ver. 6.460) and NetDraw (Ver. 2.125) software programs [39, 40].

3. Results and Discussion

3.1. Ethnographic Characteristics of the Region. The ethnomedicinal practices for gastrointestinal disorders were recorded by 507 informants (133 men and 374 women) at 185 sites (Figure 1). The average age of the informants was 76 years, with a range in age from 43 to 95, with residents living more than 30 years in the study area. The ethnographical characteristics of the communities are summarized in Table 2.

3.2. Analysis of Ethnomedicinal Practices. 24 types of gastrointestinal disorders were treated by ethnomedicinal practices, which included abdominal pain, acute gastroenteritis, constipation, and other conditions (Table 3). The 24 types recorded in this study were similar to previous research, which classified 14 types of respiratory system diseases, 29 types of digestive system diseases, and 23 types of pain relief treatments [14, 16, 21]. Among them, 20 types of disorders were recorded in the communities living within JNP, followed by the 16 types of disorders within HNP, and the 11 types of disorders in GNP (Table 4).

A total of 490 ethnomedicinal practices recorded from the communities were classified into 110 families, 176 genera, and 220 species that included plants, animals, fungi, and alga (Table 4). Among these species, plants totaled 361 ethnomedicinal practices based on 142 species, while animals included 119 ethnomedicinal practices based on 71 species. Fungi recorded 9 ethnomedicinal practices based on six species while alga included one ethnomedicinal practice based on one species. These usage patterns were different from Korean traditional medicine, in which plants are used relatively much more than animals. Research confirms that communities have focused on the functional supplements from these ethnomedicinal practices rather than seeking after an actual cure for their gastrointestinal disorders.

The residents of these communities have applied the ethnomedicinal practices for gastroenteric trouble and indigestion more than any other disorder. Namely, the number of medicinal species and ethnomedicinal practices for gastroenteric trouble consisted of 94 species (42.7% of the total species) and 179 ethnomedicinal practices (36.5% of the total practices). Indigestion used 72 species (32.7% of the total species) and 131 ethnomedicinal practices (26.7% of the total practices) (Table 5).

As a result, the communities tended to use ethnomedicinal practices to care for their overall health instead of as a cure for a long-term condition.

For plants, 29 used parts were used in practice, while 14 used parts of animals and one used part of fungi and alga were used in treatment. Preparations of the plants consisted of 41 kinds, with 16 preparations for animals, six preparations for fungi, and one preparation for alga (Table 4). These usage patterns are similar to previous research for other diseases [14–16].

3.3. Quantitative Analysis

3.3.1. Informant Consensus Factor (ICF). The informant consensus factor ranges from 0 to 1, where the increasing values
Table 3: Ethnomedicinal practices for treating gastrointestinal disorders recorded in three national parks.

| Disorders | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL |
|----------|----------------|-------------|-----------------|---------------|-----------|-------------|-----------|-------------|----|
| Anguillidae | Animal | Anguilla japonica | Temminck and Schlegel | A6 | JNP | Baemjangeo | Whole part | Simmer | 50.00 |
| Apidae | Animal | Apis cerana Fabricius | | A7 | JNP | Jaeraekkulbeol | Honey | Raw | 3.45 |
| Bombycidae | Animal | Bombyx mori L. | | A12 | GNP, JNP | Nuenabang | Larva, Pupa | Decoction and panbroiled | 100.00 |
| Columbidae | Animal | Streptopelia orientalis | Latham | A60 | GNP | Methbidulgi | Meat | Simmer | 33.33 |
| Congridae | Animal | Conger myriaster Brevoort | Plecoglossus altivelis | A18 | HNP | Bungjangeo | Gallbladder | Raw | 100.00 |
| Osmeridae | Animal | Temminck and Schlegel | Lateolabrax japonicus | A45 | JNP | Euneo | Whole part | Simmer | 100.00 |
| Percichthyidae | Animal | Cuvier and Valenciennes | | A30 | HNP | Nongeo | Gallbladder | Dried, dissolution, powder, and raw | 85.71 |
| Phasianidae | Animal | Gallus gallus domesticus L. | | A25 | GNP, JNP | Dak | Whole part | Infusion | 23.38 |
| Suidae | Animal | Sus scrofa L. | | A62 | HNP | Dwaeji | Gallbladder | Raw and maceration | 40.00 |
| Gano dermataceae | Fungi | Ganoderma lucidum (Curtis) P. Karst | Lentinula edodes (Berk.) Sing. | F2 | GNP | Yeongji | Whole part | Boiling | 22.22 |
| Pleurotaceae | Fungi | Fomes fomentarius (L.) Fr. Actinidia arguta (Siebold and Zucc.) Planch. ex Miq. | | F1 | JNP | Malgupbeoseot | Whole part | Decoction | 33.33 |
| Actinidiaceae | Fungi | Rhus javanica L. | | P4 | GNP | Darae | Stem | Infusion | 66.67 |
| Anacardiaceae | Fungi | Rhus verniciflua Stokes | Aralia cordata var. continentalis (Kitag.) Y.C. Chu Eleutherococcus sessiliflorus (Rupr. and Maxim.) S.Y.Hu | P106 | JNP | Bungnamu | Gallnut | Decoction | 100.00 |
| Araliaceae | Fungi | | | P107 | JNP | Onnamu | Bark, stem | Infusion | II.43 |
| | | | | P14 | GNP | Dokhwal | Root | Infusion | 30.00 |
| | | | | P42 | JNP | Ogalpinamu | Stem | Decoction and infusion | 100.00 |
| Disorders          | Classification | Family name                  | Scientific name                  | Abbreviation | Region          | Korean name       | Used part                      | Preparation                    | FL   |
|--------------------|----------------|------------------------------|----------------------------------|--------------|-----------------|-------------------|-------------------------------|--------------------------------|------|
| Abdominal pain     |                |                              |                                  |              |                 |                   |                               |                                 |      |
|                    | Asteraceae     | Artemisia princeps Pamp.     | P17 GNP, HNP, JNP                | Ssuk         | Aerial part, leaf, whole part, Young leaf | Infusion, juice, and tea | 51.13                         |                                 |      |
|                    |                | Cirsium japonicum var. maackii (Maxim.) Matsum. | P28 GNP | Eonggeongkwi | Root | Juice | 40.00                         |                                 |      |
|                    |                | Zinnia violacea Cav.         | P14I JNP                        | Baegilhong   | Stem | Infusion | 100.00                        |                                 |      |
|                    |                | Raphanus sativus L. Platycodon | P102 JNP | Mu             | Root | Boiling and dried | 100.00                        |                                 |      |
|                    | Brassicaceae   | Cirsium japonicum var. maackii (Maxim.) Matsum. | P86 GNP | Doraji         | Root | Infusion | 100.00                        |                                 |      |
|                    | Campanulaceae  | Zinnia violacea Cav.         | P109 HNP                        | Pinaja       | Seed | Oil Fermentation and dissolution | 15.29                        |                                 |      |
|                    | Euphorbiaceae  | Zinnia violacea Cav.         | P122 JNP                        | Gosam        | Root | Maceration | 6.25                         |                                 |      |
|                    | Fabaceae       | Brassica rapa L.             | P47 GNP                         | Yongdam      | Root | A sweet drink made from fermented rice and infusion | 96.00                        |                                 |      |
|                    | Gentianaceae   | Gentiana scabra Bunge        | P48 JNP                         | Jwisonipul   | Whole part | Decoction | 100.00                        |                                 |      |
|                    | Geraniaceae    | Gentiana scabra Bunge        | P49 GNP, HNP                    | Jwisonipul   | Leaf, whole part | Decoction and infusion | 76.92                        |                                 |      |
|                    | Juglandaceae   | Leontopetalum japonicum Houtt. | P58 JNP | Garaenamu      | Fruit | Raw | 100.00                        |                                 |      |
|                    | Lamiaceae      | Mentha piperascens Holmes    | P61 GNP, HNP, JNP              | Ingmocho     | Aerial part | Decoction, infusion, juice, pill, and taffy | 88.71                        |                                 |      |
|                    |                | Perilla frutescens Hara      | P69 HNP                         | Bakha        | Leaf | Juice | 100.00                        |                                 |      |
|                    |                | Salvia plebeia R.Br.         | P77 GNP                         | Deulkkae     | Seed | Mixed in honey | 63.64                        |                                 |      |
|                    |                | Plant                        | P114 GNP                        | Baemchajeugi | Whole part | Infusion | 50.00                        |                                 |      |
|                    |                | Lardizabalaceae              | P8 GNP                          | Eureumdeonggul | Stem | Infusion | 85.71                        |                                 |      |
| Disorders       | Classification | Family name          | Scientific name | * Abbreviation | ** Region | Korean name          | Used part | Preparation                                      | FL      |
|----------------|----------------|----------------------|-----------------|---------------|-----------|----------------------|-----------|-------------------------------------------------|---------|
| Liliaceae      |                | Allium scorodoprasum| var. viviparum  | P11           | HNP       | Maneul               | Bulb      | Juice                                           | 42.86   |
| Meliaceae      |                | Melia azadarach     | L.              | P68           | HNP       | Meolguseulnamu       | Fruit     | Decoction, Brewing, Decoction, dissolution, dried, grain syrup, infusion, maceration, and raw | 47.37   |
| Papaveraceae   |                | Papaver somniferum  | L.              | P74           | GNP, JNP  | Yanggwibi            | Fruit, leaf, stem, whole part |                                                   | 82.54   |
| Meliaceae      |                | Phytolacca esculenta| VanHoutte        | P80           | GNP       | Jarigong             | Root      | Infusion                                        | 29.41   |
| Plantaginaceae |                | Plantago asiatica   | L.              | P84           | GNP       | Jilgeongi            | Root      | Juice                                           | 6.90    |
| Poaceae        |                | Hordeum vulgare     | var. hexastichon| P54           | GNP       | Bori                 | Malt, seed| Dissolution and steep                           | 5.52    |
| Poaceae        |                | Oryza sativa        | L.              | P72           | JNP       | Byeo                 | Seed      | Porridge                                        | 42.86   |
| Poaceae        |                | Oryza sativa var.   | terrestri Makino| P73           | HNP       | Sandu                | Seed      | Porridge                                        | 15.38   |
| Poaceae        |                | Triticum aestivum   | L.              | P129          | HNP       | Mil                  | Seed      | Pill                                            | 3.85    |
| Poaceae        |                | Zea mays L.         |                 | P139          | GNP       | Oksusu               | Style     | Infusion, Extraction, infusion, and raw A sweet drink made from fermented rice, grain syrup, and infusion | 100.00  |
| Punicaceae     |                | Punica granatum     | L.              | P99           | GNP, HNP  | Seongnyunamu         | Fruit     |                                                   | 50.00   |
| Ranunculaceae  |                | Pulsatilla koreana  | (Yabe ex Nakai) | P98           | GNP       | Halmikkot            | Root      |                                                   | 44.78   |
| Rosaceae       |                | Prunus davidiana    | (Carriere) Franch. | P93           | GNP       | Sanboksanamu         | Fruit     | Extraction                                      | 100.00  |
| Rosaceae       |                | Prunus mume         | Siebold and Zucc.| P94           | GNP, JNP  | Maesillamu           | Fruit     | Extraction                                      | 40.30   |
| Rosaceae       |                | Sanguisorba officinalis| L.             | P115          | HNP       | Oipul                | Root      | Decoction                                       | 22.22   |
| Rubiaceae      |                | Gardenia jasminoides| Ellis           | P45           | JNP       | Chijanamu            | Fruit     | Decoction                                       | 100.00  |
| Rutaceae       |                | Phellodendron amurense | Rupr.       | P79           | HNP       | Hwangbyeongnamu      | Bark      | Brewing and decoction                           | 7.69    |
| Schisandraceae |                | Schisandra chinensis| (Turcz.) Baill. | P117          | GNP       | Omija                | Stem      | Infusion                                        | 66.67   |
| Solanaceae     |                | Solanum nigrum      | L.              | P121          | GNP       | Kkamajung            | Aerial part| Infusion                                        | 11.76   |
| Disorders | Classification | Family name | Scientific name | Abbreviation | Region | Korean name | Used part | Preparation | FL  |
|----------|----------------|-------------|-----------------|--------------|--------|-------------|-----------|-------------|-----|
| Theaceae |                | Camellia japonica L. | *Abbreviation | P21 | HNP | Dongbaengnamu | Fruit | Oil | 40.00 |
| Vitaceae |                | Vitis coignetiae Pulliat ex Planch. | **Region | P135 | GNP | Meoru | Stem | Infusion | 100.00 |
| **Plant** | *Animal* | Paralichthyidae | *Paralichthys olivaceus* Temminck and Schlegel | A41 | HNP | Neopchi | Gallbladder | Dried | 100.00 |
|          |                | Percichthyidae | *Lateolabrax japonicus* Cuvier and Valenciennes | A30 | HNP | Nongeo | Gallbladder | Dried | 14.29 |
|          |                | Suidae | *Sus scrofa L.* | A62 | JNP | Dwaeji | Gallbladder | Raw | 20.00 |
|          |                | Cucurbitaceae | *Cucumis sativus L.* | P35 | JNP | Kong | Leaf | Fermentation and dissolution | 8.24 |
|          |                | Fabaceae | *Glycine max (L.) Merr.* | P50 | JNP | | Seed | | |
|          |                | Juglandaceae | *Juglans regia Dode* | P59 | JNP | Hodunamu | Nut | Roast | 100.00 |
|          |                | Liliaceae | *Allium scorodoprasum var. viviparum Regel Cocculus trilobus* (Thunb.) DC. | P11 | JNP | Maneul | Bulb | Roast | 35.71 |
|          | *Plant* | Menispermaeae | *Aconitum pseudolavee Nakai* | P34 | JNP | | | | |
|          |                | Plantaginaceae | *Plantago asiatica L.* | P84 | JNP | Jilgeongi | Root | Juice | 13.79 |
|          |                | Puniceae | *Punica granatum L.* | P99 | JNP | Seongnyunamu | Fruit | | 50.00 |
|          |                | Ranunculaceae | *Gryllotalpa orientalis Burmeister Tenodera angustipennis Saussure Tenodera aridifolia Stoll Vespa analis parallela Andre Vespa crabro flavofasciata Cameron Vespa similimiasimillima Smith* | A28 | JNP | Tanggalangjaki | Whole part | Powder | 83.33 |
|          |                | Mantidae | *Eusimulium sordida* (L.: Fr.) Fr. Fomes fomentarius | A64 | JNP | Samagwi | Egg sac | Decoction | 50.00 |
|          |                | Vespidae | *Vespa analis parallela Andre* | A65 | JNP | Wangsamagwi | Egg sac | Decoction | 50.00 |
|          |                | Fungi | *Fomes fomentarius* (L.; Fr.) Fr. | A67 | JNP | Jommalbeol | Hive, imago, larva | Brewing | 81.82 |
|          |                | Polyporaceae | *Ainsliaea acerifolia Sch.Bip.* | A68 | JNP | | | 87.10 |
|          |                | Asteraceae | *Ainsliaea acerifolia Sch.Bip.* | A70 | JNP | Teolbomalbeol | Hive, imago, larva | Brewing | 81.82 |

**Note:** FL stands for Frequency of Use.
| Disorders                      | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name                  | Used part | Preparation | FL  |
|-------------------------------|----------------|-------------|-----------------|---------------|---------|------------------------------|-----------|-------------|-----|
| Constipation                  |                | Boraginaceae| Lithospermum    | P63           | JNP     | Ji-ji                        | Root      | Powder      | 11.11|
|                               |                | Cactaceae   | Opuntia        | P71           | HNP     | Sonbadaksoni-njang           | Stem      | Raw         | 33.33|
|                               |                | Ebenaceae   | Glycyrrhiza     | P41           | JNP     | Gamnamu                      | Fruit     | Fermentation| 2.40|
|                               |                | Euphorbiaceae| Ricinus communis| P109          | GNP, HNP| Pimajah                       | Fruit, seed| Oil and panfried| 43.53|
|                               |                | Liliaceae   | Pelargonium     | P87           | JNP     | Dunggulle                    | Root      | Tea         | 40.00|
|                               |                | Plant       | Smilax china L. | P20           | JNP     | Cheongmiraedonggul           | Fruit     | Brewing     | 100.00|
|                               |                | Meliaceae   | Mucuna       | P68           | HNP     | Meolguseulnamu               | Root      | Decoction   | 21.05|
|                               |                | Phytolaccaceae| Phytolacca     | P80           | GNP     | Jarigong                     | Root      | Raw         | 35.29|
|                               |                | Rosaceae    | Prunus         | P95           | JNP     | Aegndonamu                   | Fruit     | Brewing     | 100.00|
|                               |                | Rutaceae    | Zanthoxylum    | P138          | GNP     | Sanchonamu                   | Fruit     | Oil         | 14.29|
|                               |                | Saururaceae | Saururus       | P116          | JNP     | Sambakekcho                  | Leaf      | Decoction   | 50.00|
|                               |                | Theaceae    | Rubus           | P21           | HNP     | Dongbaengnamu                | Fruit     | Oil         | 40.00|
| Deficiency of                |                | Apidae      | Apis melli$f$era| A8            | JNP     | Yangbongkukbeol               | Honey     | Raw         | 10.00|
| intestinal function          |                | Vespidae    | Vespula        | A67           | JNP     | Jommalbeol                   | Hive, larva| Decoction and infusion| 18.18|
|                               |                | Plant       | Anapodisma     | A5            | JNP     | Palgongsanmitgullerimtuggi   | Whole part| Panbroiled and powder| 100.00|
|                               |                | Acrididae   | Acrididae      | A9            | JNP     | Chameorsapsari               | Whole part| Panbroiled and powder| 100.00|
|                               |                | Acrididae   | Chorthippus    | A17           | JNP     | Suyeomchiraemtuggi           | Whole part| Panbroiled and powder| 100.00|
| Disorders | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL |
|-----------|----------------|-------------|----------------|--------------|---------|------------|-----------|------------|----|
| Diarrhea  |                |             | Locusta migratoria L. | A32 | JNP | Pulmuchi | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Megadacobothrus aethalinae Zubowsky | A34 | JNP | Cheongnalgaemettugi | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Mongolotettix japonicus Bolvar | A36 | JNP | Sapsari | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Ognevia longipennis Shiraki | A38 | JNP | Ginnalgaemidurimettugi | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Ognevia sergii Ikonnikovi Rehn and Rehni | A39 | JNP | Wonsanmitdeurimettugi | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Oxya japonica japonica Thunberg | A40 | JNP | Byeomettugi | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Patanga japonica Bolivar | A43 | JNP | Gaksimettugi | Whole part | Panbroiled and powder | 100.00 |
|           |                |             | Smirakiacris shirakii Bolivar | A58 | JNP | Deunggeomeunmettugi | Whole part | Panbroiled and powder | 100.00 |
| Animal    |                |             | Stethophyma magister Rehn | A59 | JNP | Kkeutgeomeunmettugi | Whole part | Panbroiled and powder | 100.00 |
|           | Gryllidae      |             | Ohmachi and Matsumura | A63 | JNP | Wanggwitturami | Whole part | Powder | 100.00 |
|           | Megascolecidae |             | Lumbricus rubellus Hoffmeister | A33 | JNP | Jireongi | Whole part | Simmer | 100.00 |
|           | Phasianidae    |             | Gallus gallus domesticus L. | A25 | GNP | Dak | Egg | Infusion | 6.49 |
|           | Pyrgomorphidae |             | Atractomorpha lata Motschulsky | A10 | JNP | Seomseogumettugi | Whole part | Panbroiled and powder | 100.00 |
|           | Ranidae        | Rana corcaea Okada | A48 | JNP | Hanguksangaeuguri | Whole part | Simmer | 100.00 |
|           | Ranidae        | Rana huanrenensis Fei, Ye, and Huang | A49 | JNP | Gyegoksangaeuguri | Whole part | Simmer | 100.00 |
|           | Ranidae        | Rana nigromaculata Okada | A50 | JNP | Chamgaeguri | Whole part | Simmer | 100.00 |
|           | Ranidae        | Rana temporaria dybowskii Shannon | A51 | JNP | Bukbangsangaeuguri | Whole part | Simmer | 100.00 |
|           | Suidae         | Sus scrofa L. | A62 | JNP | Dwaesi | Hide | Infusion | 10.00 |
|           | Tubificidae    | Limnodrilus gotoi Hatai | A31 | JNP | Siljireongi | Whole part | Simmer | 100.00 |
| Disorders | Classification | Family name | Scientific name | Abbreviation | Region | Korean name | Used part | Preparation | FL  |
|-----------|----------------|-------------|----------------|--------------|--------|-------------|-----------|-------------|-----|
| Vespidae  |                | *Vespa mandarinia* Cameron | *Ramaria botrytis* (Pers.) Ricken | P107 | GNP | Jangsumalbeol | Hive, imago, and larva | Decoction | 100.00 |
| Fungi     | Anacardiaceae  | *Rhus verniciflua* Stokes | *Pinellia ternata* (Thunb.) Breitenb. | P81 | JNP | Banha | Decoction | 50.00 |
|           | Araceae        | *Arum maculatum* | *Arum maculatum* | P17 | GNP, HNP, JNP | Ssuk | Aerial part, leaf, stem, root, and whole part | Decoction, extraction, infusion, juice, and moxibustion | 20.90 |
|           | Asteraceae     | *Artemisia princeps* Pamp. | *Taraxacum platycarpum* Dahlst. | P125 | JNP | Mindeulle | Whole part Juice | 14.29 |
|           | Dioscoreaceae  | *Dioscorea batatas* Decne. | *Diospyros kaki* Thunb. | P41 | GNP, HNP, JNP | Gamnamu | Fruit and peduncle | Decoction, dried persimmon, infusion, and raw | 30.40 |
|           | Geraniaceae    | *Geranium thunbergii* Siebold and Zucc. | *Leonurus japonicus* Houtt. | P49 | HNP | Iijlpul | Whole part Decoction | 15.38 |
|           | Lamiaceae      | *Allium fistulosum* L. | *Allium tuberosum* Rottler ex Spreng. | P9 | JNP | Pa | Aerial part Infusion | 3.23 |
|           | Papaveraceae   | *Papaver somniferum* L. | *Hibiscus hamabo* Siebold and Zucc. | P53 | HNP | Hwanggeun | Root Decoction | 100.00 |
|           | Plantaginaceae | *Plantago asiatica* L. | *Pennisetum orientale* Keng | P84 | HNP | Jilgeongi | Whole part | Decoction | 6.90 |
|           | Pinaceae       | *Pinus densiflora* Siebold and Zucc. | *Oryza sativa* var. terestis Makino | P73 | HNP | Sandu | Seed | Porridge | 76.92 |
|           | Poaceae        | *Triticum aestivum* L. | *Rumex acetosa* L. | P104 | HNP | Dachwang | Root | Decoction | 100.00 |
|           | Polygonaceae   | *Rumex acetosa* L. | *Rumex acetosa* L. | P113 | HNP | Suyeong | Root | Decoction | 100.00 |
| Disorders    | Classification | Family name               | Scientific name | * Abbreviation | ** Region | Korean name | Used part | Preparation | FL |
|-------------|----------------|---------------------------|-----------------|----------------|-----------|------------|-----------|-------------|----|
| Portulacaceae |                | *Portulaca oleracea* L.   |                 | P90            | GNP       | Soebireum  | Aerial part | Seasoned cooked vegetables, seasoned with condiments | 100.00 |
| Ranunculaceae |                | *Clematis trichotoma* Nakai | *Thalictrum aquilegifolium* var. sibiricum Regel and Tiling | P33            | JNP       | Halmimilmang | Root      | Decoction | 100.00 |
|             |                | *Thalictrum* aquilegifolium var. sibiricum Regel and Tiling |                 | P126           | JNP       | Kkwonguidari | Leaf and stem | Decoction | 50.00 |
| Rutaceae    |                | *Zanthoxylum schinifolium* Siebold and Zucc. | *Viola mandshurica* W. Becker | P138           | GNP       | Sanchonamu  | Fruit     | Oil        | 17.86 |
| Violaceae   |                | *Clematis trichotoma* Nakai | *Thalictrum aquilegifolium* var. sibiricum Regel and Tiling | P131           | JNP       | Jebikkot    | Whole part | Decoction | 100.00 |
| Animal      | Phasianidae    | *Gallus gallus* domesticus L. | *Artemisia princeps* Pamp. | A25            | GNP       | Dak         | Egg       | Infusion   | 5.19 |
|             | Asteraceae     | *Artemisia princeps* Pamp. | *Glycyrrhiza uralensis* Fisch. | P17            | GNP, HNP  | Ssuk        | Aerial part, leaf, and whole part | Infusion, juice, and moxibustion | 6.11 |
|             | Fabaceae       | *Pueraria lobata* (Willd.) Ohwi | *Rheum rhabarbarum* L. | P51            | JNP       | Gamcho      | Root      | Decoction and tea | 15.38 |
|             | Polygonaceae   | *Geranium thunbergii* Siebold and Zucc. | *Rheum rhabarbarum* L. | P104           | JNP       | Daehwang    | Root      | Decoction and tea | 100.00 |
|             | Rosaceae       | *Sanguisorba officinalis* L. | *Viola verecunda* A. Gray | P115           | GNP       | Oipul       | Whole part | Infusion   | 66.67 |
|             | Violaeeae      | *Zanthoxylum schinifolium* Siebold and Zucc. | *Viola mandshurica* W. Becker | P132           | GNP       | Kongjebikkot | Leaf     | Seasoned cooked vegetables | 100.00 |
| Enteritis   | Plant          | Ranunculaceae              | *Thalictrum aquilegifolium* var. sibiricum Regel and Tiling | P126           | JNP       | Kkwonguidari | Leaf, stem | Decoction | 50.00 |
| Enterotoxin | Plant          | Campanulaceae              | *Adenophora triphylla* var. japonica (Regel) H. Hara | P6             | HNP       | Jandae      | Root      | Warm up in a double boiler | 100.00 |
|             |                | Campanulaceae              | *Cucurbita moschata* Duchesne | P36            | HNP       | Hobak       | Fruit     | Warm up in a double boiler | 9.09 |
| Gastralgia  | Plant          | Asteraceae                 | *Artemisia princeps* Pamp. | P17            | HNP       | Ssuk        | Young leaf | Juice      | 1.61 |
| Formicidae  | Formicidae     | *Formica yessensis* Forel  |                 | A24            | JNP       | Bulgaemi    | Whole part | Decoction | 100.00 |
| Disorders          | Classification | Family name     | Scientific name                                      | * Abbreviation | ** Region | Korean name | Used part          | Preparation          | FL       |
|-------------------|----------------|-----------------|------------------------------------------------------|----------------|-----------|-------------|--------------------|----------------------|----------|
| Gastric cancer    | Fungi          | Tricholomataceae| *Tricholoma matsutake* (S. Ito. and Imai) Sing.     | F6             | JNP       | Songi       | Whole part        | Infusion             | 100.00   |
|                   |                | Asteraceae      | *Atractylodes ovata* (Thunb.) DC.                   | P19            | JNP       | Sapju       | Root               | Decoction            | 1.52     |
|                   |                | Fabaceae        | *Glycyrrhiza uralensis* Fisch.                      | P51            | JNP       | Gamcho      | Root               | Decoction and roast | 7.69     |
|                   |                | Poaceae         | *Hordeum vulgare var. hexastichon* (L.) Asch.      | P54            | JNP       | Bori        | Seed               | Decoction and roast | 0.69     |
|                   |                | Rutaceae        | *Citrus unshiu* S. Marcov.                          | P30            | JNP       | Gyul        | Pericarp           | Decoction            | 50.00    |
|                   |                | Ulmaceae        | *Ulmus davidiana var. japonica* (Rehder) Nakai     | P130           | HNP, JNP  | Neureumnamu | Rhizodermis and root bark | Decoction | 3.09     |
| Gastric ulcer     | Plant          | Asteraceae      | *Atractylodes ovata* (Thunb.) DC.                   | P19            | JNP       | Sapju       | Root               | Decoction            | 1.52     |
|                   |                | Poaceae         | *Hordeum vulgare var. hexastichon* (L.) Asch.      | P54            | GNP, JNP  | Bori        | Malt, seed         | A sweet drink made from fermented rice, powder, roast, and steam | 2.07     |
|                   |                | Ulmaceae        | *Ulmus davidiana var. japonica* (Rehder) Nakai     | P130           | GNP, JNP  | Neureumnamu | Bark              | A sweet drink made from fermented rice, decoction, infusion, and tea | 11.73    |
| Anacardiaceae     |                | *Rhus verniciflua* Stokes |                                | P107           | GNP       | Onnamu      | Bark               | Simmer               | 2.86     |
|                   | Asteraceae     | *Atractylodes ovata* (Thunb.) DC.                   | P19            | GNP       | Sapju       | Root               | A sweet drink made from fermented rice and powder | 6.06     |
| Disorders | Classification | Family name | Scientific name | **Abbreviation** | **Region** | Korean name | Used part | Preparation | FL |
|-----------|----------------|-------------|----------------|----------------|------------|-------------|-----------|-------------|----|
| **Gastritis** | Plant | Ranunculaceae | Rhododendron mucronulatum Turcz. var. mucronulatum | P105 | JNP | Jindallae | Flower | Panfried | 66.67 |
| | | Poaceae | Hordeum vulgare var. hexastichon (L.) Asch. | P54 | GNP | Bori | Malt, seed | A sweet drink made from fermented rice | 1.38 |
| | | Ranunculaceae | Clematis terniflora var. mandshurica (Rupr.) Ohwi | P32 | HNP | Euari | Root | Taffy | 57.14 |
| | | Rosaceae | Rosa multiflora Thunb. var. multiflora Citrus unshiu S. Marcov. | P111 | JNP | Jjillekkot | Flower, fruit | Decoction, panfried | 87.50 |
| | | Rutaceae | Zanthoxylum piperitum (L.) DC. | P137 | GNP | Chopinamu | Fruit | Oil | 57.15 |
| | | Ulmaceae | Ulmus davidiana var. japonica (Rehder) Nakai | P130 | GNP | Neureumnamu | Bark | A sweet drink made from fermented rice | 1.23 |
| | | Apidae | Apis cerana Fabricius | A7 | GNP | Jaeraekkulbeol | Honey | Dissolution and raw | 93.10 |
| | | | Apis mellifera L. | A8 | GNP, JNP | Yangbongkkulbeol | Hive, honey, larva, whole part | Panbroiled and powder | 90.00 |
| | | Blattellidae | Blattella germanica L. | A11 | JNP | Bakwi | Whole part | Simmer | 100.00 |
| | | Cervidae | Capreolus capreolus L. | A13 | JNP | Noru | Bone | Simmer | 100.00 |
| | | | Capreolus pygargus tianschanicus Satunin | A14 | HNP | Noru | Bone | Simmer | 100.00 |
| | | | Dinodon rufozonatumrufozonatum Cantor | A19 | JNP | Neunggureongi | Whole part | Simmer | 100.00 |
| | | Colubridae | Elaphidione Pallas | A20 | JNP | Nurukbaem | Whole part | Simmer | 100.00 |
| | | | Elaphedione Pallas | A21 | JNP | Mujachi | Whole part | Simmer | 100.00 |
| | | | Elapherufodorsata Cantor | A22 | JNP | Gureongi | Whole part | Simmer | 100.00 |
| | | | Gloydius ussuriensis Emelianov | A27 | JNP | Soesalmosa | Whole part | Simmer | 100.00 |
| | | | Rhabdophis tigrinus tigrinus Boie | A53 | JNP | Yuhyeolmogi | Whole part | Simmer | 100.00 |
| | | Columbidae | Streptopelia orientalis Latham | A60 | JNP | Metbidulgi | Whole part | Simmer | 66.67 |
| | | Cyprinidae | Carassius auratus L. | A15 | JNP | Bungeo | Whole part | Simmer | 100.00 |
| | | Erinaceidae | Erinaceus amurensis Schrenk | A23 | GNP | Goseumdochigi | Whole part | Infusion | 100.00 |
| Disorders | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL |
|----------|----------------|-------------|-----------------|---------------|----------|-------------|-----------|-------------|-----|
| Gryllotalpidae | Gryllotalpa orientalis Burmeister | Gryllotalpa orientalis | A28 | JNP | Tanggangaji | Whole part | Powder | 16.67 |
| Mytilidae | Mytilus coruscus Gould | Mytilus coruscus | A37 | HNP | Honghap | Whole part | Decoction | 100.00 |
| Phasianidae | Gloysus gallus domesticus L. Phasianus colchicus L. | Gallus gallus domesticus L. | A25 | GNP, HNP, JNP | Dak | Dung, whole part | Infusion, panbroiled, steep Simmer | 61.04 |
| Pleuroceridae | Semisulcospira coreana Von Martens | Semisulcospira coreana | A55 | JNP | Chamdaseulgi | Whole part | 90.91 |
| Phasianidae | Phasianus colchicus L. | Phasianus colchicus | A44 | JNP | Kkwong | Whole part | 100.00 |
| Pleuroceridae | Semisulcospira forticosta Von Martens | Semisulcospira forticosta | A56 | JNP | Jureumdaseulgi | Whole part | 91.67 |
| Sphingidae | Agrius convolvuli L. | Agrius convolvuli | A57 | JNP | Daseulgi | Whole part | 91.67 |
| Suidae | Sus scrofa L. | Sus scrofa | A61 | JNP | Dwaeji | Gallbladder | 30.00 |
| Vespidae | Vespula flaviceps lewisi Cameron | Vespula flaviceps lewisi | A71 | JNP | Tangbeol | Hive, larva | Brewing and decoction | 100.00 |
| Fungi | Ganoderma lucidum (Curtis) P. Karst. Acer pictum subsp. mono (Maxim.) Ohashi | Ganoderma lucidum | F2 | JNP | Yeongji | Whole part | Infusion | 11.11 |
| Aceraceae | Acer pictum Maxim. | Acer pictum | P1 | JNP | Goroso enamu | Sap | Raw | 100.00 |
| Actinidiaceae | Actinidia arguta (Siebold and Zucc.) Planch. ex Miq. | Actinidia arguta | P4 | JNP | Darae | Stem | Decoction | 33.33 |
| Fungi | Ganoderma lucidum (Curtis) P. Karst. Acer pictum subsp. mono (Maxim.) Ohashi | Actinidia polygama (Siebold and Zucc.) Planch. ex Miq. | P5 | JNP | Gaedarae | Stem | A sweet drink made from fermented rice | 100.00 |
| Disorders | Classification | Family name | Scientific name | *Abbreviation* | **Region** | Korean name | Used part | Preparation | FL  |
|-----------|----------------|-------------|-----------------|----------------|------------|-------------|-----------|-------------|-----|
| Anacardiaceae | Rhus verniciflua Stokes | Anacardiaceae | P107 | GNP, HNP, JNP | Onnamu | Bark, resin, stem, young leaf | Decoction, dissolution, extraction, infusion, raw, and simmer | 72.14 |
| Apocynaceae | Trachelospermum asiaticum (Siebold and Zucc.) Nakai var. asiaticum | Apocynaceae | P127 | JNP | Masakjul | Leaf, stem | Decoction | 100.00 |
| Araliaceae | Aralia cordata var. continentalis (Kitag.) Y.C.Chu | Araliaceae | P14 | GNP | Dokhwal | Root | Maceration, mixed in liquor | 60.00 |
| | | | | | | | A sweet drink made from fermented rice and brewing | 93.33 |
| | Kalopanax septemlobus (Thunb.) Koidz. | | P60 | GNP | Eumnamu | Stem | | 80.00 |
| | Artemisia capillaris Thunb. | | P16 | GNP | Sacheolssuk | Whole part | | 12.22 |
| | Artemisia princeps Pamp. | Asteraceae | P17 | GNP, HNP | Ssuk | Leaf, whole part | Decoction, infusion, juice, moxibustion, and powder | 68.94 |
| | Atractylodes ovata (Thunb.) D.C. | | P19 | GNP, JNP | Sapju | Root | Decoction and juice | 60.00 |
| | Cirsium japonicum var. maackii (Maxim.) Matsum. | | P28 | GNP, HNP | Eonggeongkwi | Root | Infusion, wrapped in leaves, seasoned cooked vegetables | 100.00 |
| | Petasites japonicus (Siebold and Zucc.) Maxim. | | P78 | GNP | Meowi | Leaf and stem | Decoction, infusion, and tea | 85.71 |
| | Taraxacum platycarpum Dahlst. | | P125 | HNP, JNP | Mindeulle | Aerial part and whole part | A sweet drink made from fermented rice and brewing | 100.00 |
| | Xanthium strumarium L. | | P136 | GNP | Dokkomari | Whole part | | 100.00 |
| Disorders     | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL  |
|--------------|----------------|-------------|-----------------|---------------|----------|-------------|-----------|-------------|-----|
| Gastroenteric trouble |                | Cactaceae   | Opuntia ficus-indica var. saboten Makino | P71           | HNP      | Sonbadakseonjinjang | Stem    | Raw         | 66.67 |
|               |                | Caprifoliaceae | Lonicera japonica Thunb. | P64           | HNP      | Indongdeonggul | Flower  | Decoction   | 33.33 |
|               |                | Celastraceae | Euonymus alatus (Thunb.) Siebold | P43           | GNP, JNP | Hwasallamu | Leaf and stem | Decoction, seasoned cooked vegetables | 40.54 |
|               |                | Celastraceae | Euonymus hamiltonianus Wall. var. hamiltonianus | P44           | JNP      | Chambitsallamu | Stem | Infusion | 100.00 |
|               |                | Crassulaceae | Sedum sarmentosum Bunge | P118          | GNP      | Dollamul | Whole part | Watery plain kimchi | 100.00 |
|               |                | Cucurbitaceae | Luffa acutangula Duchesne | P36           | GNP      | Hobak | Fruit | Infusion | 90.91 |
|               |                | Dioscoreaceae | Dioscorea batatas Decne. | P39           | GNP, JNP | Ma | Root | Decoction, maceration, oil, and raw | 90.00 |
|               |                | Dioscoreaceae | Dioscorea japonica Thunb. | P40           | GNP      | Chamma | Root | Raw | 100.00 |
|               |                | Ebenaceae | Diospyros kaki Thunb. Rhododendron mucronulatum Turcz. var. mucronulatum | P41           | GNP      | Gamnanmu | peduncle | Infusion | 8.00 |
|               |                | Ericaceae | Rhododendron mucronulatum Turcz. var. mucronulatum | P105          | JNP      | Jindallae | Flower | Extraction | 33.33 |
|               |                | Euphorbiaceae | Rhus chinensis L. Caragana sinica (Buchho) Rehder | P109          | JNP      | Pinaja | Seed | Oil | 0.83 |
|               |                | Fabaceae | Glycine max (L.) Merr. Glyceryzus uralensis Fisch. | P50           | GNP, JNP | Kong | Seed | Dissolution and fermentation | 37.65 |
|               |                | Fabaceae | Pueraria lobata (Willd.) Ohwi | P97           | GNP, HNP, JNP | Chik | Root | Decoction, boiled rice, brewing, decoction, infusion, juice, and maceration | 46.21 |
|               |                | Lamiaceae | Sophora flavescens Solander ex Aiton Leonurus japonicus Houtt. | P122          | GNP, HNP | Gosam | Fruit, root | Decoction, infusion, and raw | 68.75 |
|               |                | Lamiaceae | Pueraria lobata (Willd.) Ohwi | P61           | HNP      | Ingmocho | Aerial part | Decoction | 6.45 |
|               |                | Lamiaceae | Perilla frutescens var. japonica (Hassk.) Hara | P77           | GNP      | Deulkkae | Seed | Seasoned cooked vegetables | 36.36 |
| Disorders | Classification | Family name | Scientific name | Abbreviation | Region | Korean name | Used part | Preparation | FL |
|-----------|----------------|-------------|-----------------|--------------|--------|-------------|-----------|-------------|----|
| Lauraceae |                | Salvia plebeia R.Br. | P114 GNP, JNP | Baeamchajeugi | Leaf, whole part | Decoction and infusion | 50.00 |
|          |                | Machilus thunbergii Siebold and Zucc. | P66 HNP | Hubangnamu | Bark | Decoction | 75.00 |
|          |                | Allium scorodoprasum var. viviparum Regel Polygonatum odoratum var. pluriflorum (Miq.) Ohwi | P11 HNP | Maneul | Bulb | Decoction | 21.43 |
|          |                | Salviaplebeia | P114 GNP, JNP | Baeamchajeugi | Leaf, whole part | Decoction and infusion | 50.00 |
|          |                | Machilus thunbergii Siebold and Zucc. | P66 HNP | Hubangnamu | Bark | Decoction | 75.00 |
|          |                | Allium scorodoprasum var. viviparum Regel Polygonatum odoratum var. pluriflorum (Miq.) Ohwi | P11 HNP | Maneul | Bulb | Decoction | 21.43 |
| Liliaceae |                | Salvia plebeia R.Br. | P114 GNP, JNP | Baeamchajeugi | Leaf, whole part | Decoction and infusion | 50.00 |
|          |                | Machilus thunbergii Siebold and Zucc. | P66 HNP | Hubangnamu | Bark | Decoction | 75.00 |
|          |                | Allium scorodoprasum var. viviparum Regel Polygonatum odoratum var. pluriflorum (Miq.) Ohwi | P11 HNP | Maneul | Bulb | Decoction | 21.43 |
|          |                | Salviaplebeia | P114 GNP, JNP | Baeamchajeugi | Leaf, whole part | Decoction and infusion | 50.00 |
|          |                | Machilus thunbergii Siebold and Zucc. | P66 HNP | Hubangnamu | Bark | Decoction | 75.00 |
|          |                | Allium scorodoprasum var. viviparum Regel Polygonatum odoratum var. pluriflorum (Miq.) Ohwi | P11 HNP | Maneul | Bulb | Decoction | 21.43 |
| Meliaceae |                | Melia azedarach L. | P68 HNP | Meolguiseulnamu | Root bark | Taffy | 5.26 |
| Menispermaeae |                | Cocculus trilobus (Thunb.) DC. | P34 GNP | Daengdaengideonggul | Root, stem | Infusion and maceration | 78.05 |
|           |                | Morus bombycis Koidz. var. bombycis Ligustrum obtusifolium Siebold and Zucc. | P34 GNP | Daengdaengideonggul | Root, stem | Infusion and maceration | 78.05 |
| Moraceae  |                | Melia azedarach L. | P68 HNP | Meolguiseulnamu | Root bark | Taffy | 5.26 |
|           |                | Cocculus trilobus (Thunb.) DC. | P34 GNP | Daengdaengideonggul | Root, stem | Infusion and maceration | 78.05 |
|           |                | Morus bombycis Koidz. var. bombycis Ligustrum obtusifolium Siebold and Zucc. | P34 GNP | Daengdaengideonggul | Root, stem | Infusion and maceration | 78.05 |
| Oleaceae  |                | Melia azedarach L. | P68 HNP | Meolguiseulnamu | Root bark | Taffy | 5.26 |
|           |                | Cocculus trilobus (Thunb.) DC. | P34 GNP | Daengdaengideonggul | Root, stem | Infusion and maceration | 78.05 |
|           |                | Morus bombycis Koidz. var. bombycis Ligustrum obtusifolium Siebold and Zucc. | P34 GNP | Daengdaengideonggul | Root, stem | Infusion and maceration | 78.05 |
| Orchidaceae |               | Gastrodia elata Blume | P46 JNP | Cheonma | Tuber | Porridge | 100.00 |
| Papaveraceae |               | Papaver somniferum L. | P62 JNP | Jwittongnamu | Fruit | Decoction | 100.00 |
| Pinaceae  |                | Pinus koraiensis Siebold and Zucc. | P62 JNP | Jwittongnamu | Fruit | Decoction | 100.00 |
| Plantaginaceae |            | Plantago asiatica L. | P46 JNP | Cheonma | Tuber | Porridge | 100.00 |
|           |                | Pinus koraiensis Siebold and Zucc. | P62 JNP | Jwittongnamu | Fruit | Decoction | 100.00 |
| Poaceae   |                | Plantago asiatica L. | P46 JNP | Cheonma | Tuber | Porridge | 100.00 |
|           |                | Pinus koraiensis Siebold and Zucc. | P62 JNP | Jwittongnamu | Fruit | Decoction | 100.00 |
|           |                | Hordeum vulgare var. hexastichon (L.) Asch. | P54 GNP, JNP | Jilgjeongi | Leaf, petiole, whole part | Decoction | 72.41 |
| Ranunculaceae |           | Triticum aestivum L. | P54 GNP, JNP | Bori | Malt, seed | A sweet drink made from fermented rice, pill, and taffy | 33.79 |
|           |                | Aconitum ciliare DC. Clematis florida Thunb. Clematis terniflora var. mandshurica (Rupr.) Ohwi | P54 GNP, JNP | Bori | Malt, seed | A sweet drink made from fermented rice and brewing | 33.79 |
|           |                | Aconitum ciliare DC. Clematis florida Thunb. Clematis terniflora var. mandshurica (Rupr.) Ohwi | P54 GNP, JNP | Bori | Malt, seed | A sweet drink made from fermented rice and brewing | 33.79 |
|           |                | Triticum aestivum L. | P54 GNP, JNP | Bori | Malt, seed | A sweet drink made from fermented rice, pill, and taffy | 33.79 |
|           |                | Aconitum ciliare DC. Clematis florida Thunb. Clematis terniflora var. mandshurica (Rupr.) Ohwi | P54 GNP, JNP | Bori | Malt, seed | A sweet drink made from fermented rice and brewing | 33.79 |
| Disorders | Classification | Family name | Scientific name | * Abbreviation | **Region | Korean name | Used part | Preparation | FL  |
|----------|----------------|-------------|----------------|---------------|----------|-------------|-----------|-------------|-----|
| Gastroptosis | Plant | Gentianaceae | Gentiana scabra Bunge | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Asteraceae | Atractylodes ovata (Thunb.) D.C. | P19 | JNP | Sapju | Root | Decocion | 0.76 |
| | | Ulmaceae | Ulmus davidiana var. japonica (Rehder) Nakai | P130 | GNP, JNP, HNP | Neureumnamu | Bark, leaf, endodermis, rhizodermis, root, stem | Decocion and tea | 71.60 |
| | | Zingiberaceae | Zingiber officinale Roscoe | P38 | JNP | Ulgeum | Root | Tea | 100.00 |
| | | Schisandraceae | Schisandra chinensis (Turcz.) Baill. | P117 | HNP | Omija | Fruit, root, stem | Brewing | 33.33 |
| | | Saururaceae | Houttuynia cordata Thunb. | P55 | HNP | Yangmomil | Whole part | Decocion | 100.00 |
| | | Rosaceae | Rosa davurica Pall. | P110 | JNP | Saengyeolgwinamu | Fruit | Brewing | 100.00 |
| | | | Sanguisorba officinalis L. | P115 | HNP | Oipul | Root | Decocion | 11.11 |
| | | Rosaceae | Prunus mume Siebold and Zucc. | P94 | JNP | Maesillamu | Fruit | Extraction | 2.99 |
| | | Rhamnaceae | Ziziphus jujuba var. inermis (Bunge) Rehder | P142 | GNP, HNP | Daechunamu | Fruit | Infusion, simmer | 100.00 |
| | | Rhamnaceae | Pulsatilla koreana (Yabe ex Nakai) Nakai ex Nakai | P98 | GNP, JNP | Halmikkot | Root | A sweet drink made from fermented rice, grain syrup, and infusion | 41.79 |
| | | Rauvolfiaceae | Rauvolfia serpentina (Baill.) Breyer-Brandwijk | P106 | HNP | Jangilam | Root | Decocion | 100.00 |
| | | Gentianaceae | Gentiana scabra Bunge | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| | | Gentianaceae | Gentiana scabra | P47 | JNP | Yongdam | Root | Tea | 4.00 |
| Disorders | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL |
|-----------|---------------|-------------|----------------|--------------|----------|-------------|-----------|-------------|----|
| Poaceae   | Plant         | Hordeum vulgare var. hexastichon (L.) Asch. | P54 | JNP | Bori | Seed | Powder, roast, and steam | 0.69 |
| Heartburn | Plant         | Asteraceae  | Atractylodes ovata (Thunb.) DC. | P19 | GNP | Sapju | Root | Powder | 2.27 |
|           |               | Celastraceae| Euonymus alatus (Thunb.) Siebold | P43 | GNP | Hwasallamu | Leaf, stem | Decoction and seasoned cooked vegetables | 29.73 |
|           |               | Rosaceae   | Potentilla chinensis Ser. Prunus mume Siebold and Zucc. Ulmus davidiana var. japonica (Rehder) Nakai | P91 | GNP | Ttaljikko | Root | Infusion and raw | 50.00 |
|           |               | Ulmaceae   | Anguilla japonica Temminck and Schlegel Cetonia pilfera Motschulsky Protasta brevitas sis sedensis Kolbe Protasta mandschariensis Schurhoff Rosa rugosa Thunb. var. rugosa | A6 | JNP | Baemjangeo | Whole part | Simmer | 50.00 |
|           |               | Rosaceae   | Pinellia ternata (Thunb.) Breitenb. Melia azedarach L. | P112 | JNP | Haedanghwa | Leaf, root | Decoction | 100.00 |
|           |               | Theaceae   | Camellia japonica L. | P21 | JNP | Donghaengnamu | Fruit | Decoction | 20.00 |
|           |               | Araceae    | Pinellia ternata (Thunb.) Breitenb. | P81 | JNP | Banha | Corm | Decoction | 50.00 |
|           |               | Meliaceae  | Melia azedarach L. | P68 | HNP | Meolguseulnamu | Fruit, leaf, root bark | Decoction, taffy | 26.32 |
|           |               | Gelidiaceae| Gelidium amansii J. V. Lamour. Misgurnus mizolepis Günther Theragra chalcogramma Pallas Tenodera angustipennis Saussure Tenodera sinensis Saussure | A1 | HNP | Umutgasari | Thallus | Decoction | 100.00 |
|           |               | Cobitidae  | Misgurnus mizolepis Günther | A35 | GNP | Mikkuraji | Whole part | Raw | 100.00 |
|           |               | Gadidae    | Theragra chalcogramma Pallas Tenodera angustipennis Saussure Tenodera sinensis Saussure | A66 | JNP | Myeongtae | Whole part | Decoction | 100.00 |
|           |               | Mantidae   | Tenodera angustipennis Saussure Tenodera sinensis Saussure | A64 | JNP | Samagwi | Whole part | Powder | 50.00 |
|           |               |            |              | A65 | GNP, JNP | Wangsamagwi | Whole part | Infusion, powder | 50.00 |
| Disorders | Classification | Family name | Scientific name | **Abbreviation** | **Region** | Korean name | Used part | Preparation | FL |
|----------|---------------|-------------|----------------|----------------|------------|-------------|-----------|------------|----|
| Octopodidae | Pleuroceridae | Octopus dofleini | Paroctopus dofleini | A42 | JNP | Muneo | Whole part | Simmer | 100.00 |
| | | Semisulcospira coreana | Semisulcospira coreana | A55 | JNP | Chamdaseulgi | Whole part | Simmer | 9.09 |
| | | Semisulcospira forticosta | Semisulcospira forticosta | A56 | JNP | Jureundaesulgi | Whole part | Simmer | 8.33 |
| | | Semisulcospira libertina | Semisulcospira libertina | A57 | JNP | Daseulgi | Whole part | Simmer | 8.33 |
| Sergestidae | Fungi | Acetes japonicus | Acetes japonicus | A1 | GNP | Jeotsaeu | Whole part | Fermentation | 100.00 |
| | Polyporaceae | Ganoderma lucidum | Ganoderma lucidum (Curtis) P. Karst. | F2 | GNP | Yeongji | Whole part | Infusion | 66.67 |
| | | Fomes fomentarius | Fomes fomentarius (L.; Fr.) Fr. | F1 | JNP | Malgupbeoseot | Whole part | Decoction | 33.33 |
| | Thelephoraceae | Sarcodon aspratus | Sarcodon aspratus (Berk.) S. Ito | F5 | JNP | Neungi | Whole part | Decoction, seasoned cooked vegetables, soup | 100.00 |
| | Amaranthaceae | Amaranthus mangostanus | Amaranthus mangostanus L. | P13 | JNP | Bireum | Leaf | Dried persimmon, infusion | 100.00 |
| | Anacardiaceae | Rhus verniciflua Stokes | Rhus verniciflua Stokes | P107 | GNP, JNP | Onnamu | Stem | Infusion | 10.71 |
| | Araliaceae | Y. C. Chu | Aralia cordata var. continentalis (Kitag.) | P14 | JNP | Dokhwal | Root | Decoction, tea | 10.00 |
| | | Aralia elata (Miq.) | Aralia elata (Miq.) | P15 | JNP | Dureumnamu | Root | Infusion | 100.00 |
| | | Kalepanax septemlobus (Thunb.) Koidz. | Kalepanax septemlobus (Thunb.) Koidz. | P60 | GNP | Eumnamu | Stem | Infusion | 6.67 |
| | Aristolochiaceae | Asarum sieboldii Miq. | Asarum sieboldii Miq. | P18 | JNP | Jokdoripul | Root | Infusion, pill | 100.00 |
| | | Pteridium aquilinum var. latiusculum (Desv.) Underw. ex Hell. | Pteridium aquilinum var. latiusculum (Desv.) Underw. ex Hell. | P96 | JNP | Gosari | Root | Decoction, infusion | 100.00 |
| | Aspleniaceae | Artemisia capillaris | Artemisia capillaris | P16 | GNP | Sachœlssuk | Leaf, stem | Decoction | 20.00 |
| | | Artemisia princeps | Artemisia princeps Pamp. | P17 | GNP, JNP | Suuk | Leaf, root, whole part | Juice | 7.72 |
| Disorders | Classification | Family name | Scientific name | Abbreviation | Region | Korean name | Used part | Preparation | FL  |
|-----------|----------------|-------------|-----------------|--------------|--------|-------------|-----------|-------------|-----|
| Indigestion | Balsaminaceae | *Atractylodes ovata (Thunb.) DC.* | | P19 | GNP, JNP | Sapju | Root | Brewing, decoction, infusion, panbroiled, pill, powder | 18.18 |
| Indigestion | Helianthus annuus L. | *Inula helenium L. Impatiens balsamina L.* | | P52 | JNP | Haebaragi | Flower | Decoction | 100.00 |
| Indigestion | Betulaceae | *Betula costata Trautv.* | | P20 | GNP | Geojesunamu | Sap | Decoction | 100.00 |
| Indigestion | Bignoniaceae | *Catalpa ovata G. Don Lithospermum erythrorhizon Siebold and Zucc.* | | P63 | GNP | Jichi | Root | Panbroiled, steep | 88.89 |
| Indigestion | Caprifoliaceae | *Lonicera japonica Thunb.* | | P64 | JNP | Indongdeonggul | Stem | Infusion | 66.67 |
| Indigestion | Cyperaceae | *Carex curta Gooden.* | | P24 | JNP | Sansacho | Fruit | Decoction | 100.00 |
| Indigestion | Dioscoreaceae | *Dioscorea batatas Decne.* | | P39 | JNP | Ma | Root | Decoction | 3.33 |
| Indigestion | Ebenaceae | *Diospyros kaki Thunb.* | | P41 | GNP, JNP | Gamnamu | Fruit, peduncle | Dried persimmon, infusion, raw | 59.20 |
| Indigestion | Euphorbiaceae | *Ricinus communis L. Glycine max (L.) Merr.* | | P109 | GNP, JNP | Pimaja | Fruit, seed | Oil, panfried, fermentation, dissolution | 45.55 |
| Fabaceae | *Pueraaria lobata (Willd.) Ohwi Rhynchosia volubilis Lour.* | | P97 | GNP | Chik | Root | Decoction | 27.27 |
| Fabaceae | *Sophora flavescens Solander ex Aiton* | | P122 | JNP | Gosam | Root | Decoction | 25.00 |
| Fagaceae | *Castanea crenata Siebold and Zucc.* | | P25 | GNP, JNP | Bamnamu | Bark, nut | Infusion, tea | 100.00 |
| Fagaceae | *Lemurus japonicus Houtt.* | | P61 | JNP | Ingmochi | Aerial part | Juice | 1.61 |
| Lamiaceae | *Perilla frutescens var. acuta Kudo* | | P76 | JNP | Soyeop | Leaf | Decoction | 100.00 |
| Disorders | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL |
|-----------|----------------|-------------|----------------|---------------|---------|------------|-----------|-------------|----|
| Plant     | Lardizabalaceae| Akebia quinata (Houtt.) Decne. | P8 | JNP | Eureumdeonggul | Stem | Infusion | 14.29 |
| Lauraceae | Machilus thunbergii Siebold and Zucc. | P66 | JNP | Hubangnamu | Bark | Decoction | 25.00 |
| Liliaceae | Allium microdictyon Prokh. | P10 | JNP | Sanmaneul | Root | Decoction | 50.00 |
|           | Polygonatum odoratum var. pluriflorum (Miq.) Ohwi | P87 | JNP | Dunggulle | Root | Tea | 20.00 |
| Loranthaceae | Viscum album var. coloratum (Kom.) Ohwi | P133 | JNP | Gyeousari | Whole part | A sweet drink made from fermented rice | 100.00 |
| Menispermaceae | Cocculus trilobus (Thunb.) DC. | P34 | GNP | Daengdaengideonggul | Root | Juice | 9.76 |
| Moraceae | Cudrania tricuspidata (Carr.) Bureau ex Lavalle | P37 | JNP | Kujiipongnamu | Root | Decoction | 100.00 |
| Phytolaccaceae | Phytolacca esculenta VanHoutte | P80 | GNP, JNP | Jarigong | Root | A sweet drink made from fermented rice, infusion | 35.29 |
| Poaceae | Hordeum vulgare var. hexastichon (L.) Asch. | P54 | GNP, HNP, JNP | Bori | Malt, seed | | 55.86 |
|           | Oryza sativa L. | P72 | GNP | Byeo | Stem | Infusion | 57.14 |
|           | Setaria italica (L.) P. Beauv. | P119 | HNP | Jo | Seed | A sweet drink made from fermented rice | 100.00 |
|           | Triticum aestivum L. | P129 | GNP | Mil | Seed | Brewing, clear soup with flour dumplings, extraction | 38.46 |
Table 3: Continued.

| Disorders | Classification | Family name | Scientific name | *Abbreviation | **Region | Korean name | Used part | Preparation | FL  |
|-----------|----------------|-------------|-----------------|---------------|----------|-------------|-----------|-------------|-----|
| Ranunculaceae | | | Aconitum ciliare DC. | P2 | JNP | Notjeotgarangnamul | Root | Decoction, infusion, pill | 85.71 |
| | | | Pulsatilla koreana (Yabe ex Nakai) Nakai ex Nakai | P98 | JNP | Halmikkot | Root | Grain syrup | 5.97 |
| | | | Malus sieboldii (Regel) Rehder | P67 | JNP | Ageubanamu | Fruit | Decoction, infusion | 100.00 |
| | | | Prunus armeniaca var. ansi Maxim. | P92 | GNP, JNP | Salgunamu | Seed | Maceration, raw | 100.00 |
| | | | Ranunculaceae | | | | | | |
| | | | Pulsatillakoreana | | | | | | |
| | | | Malus sieboldii | | | | | | |
| | | | Prunus armeniaca var. ansu Maxim. | | | | | | |
| Rosaceae | | | Prunus mume Siebold and Zucc. | P94 | GNP, HNP, JNP | Maesillamu | Fruit | Brewing, dissolution, extraction | 49.25 |
| | | | Pyrus pyrifolia (Burm. f.) Nakai | P100 | JNP | Dolbaenamu | Fruit | Brewing | 100.00 |
| | | | Pyrus pyrifolia var. culta (Makino) Nakai | P101 | GNP | Baenamu | Fruit | Infusion | 100.00 |
| | | | Rosa multiflora Thunb. var. multiflora | P111 | JNP | Jjilekkot | Fruit | Decoction | 12.50 |
| | | | Spiraea prunifolia f. simpliciflora Nakai | P124 | GNP | Jopamnamu | Root, stem | Infusion | 100.00 |
| | | | Citrus unshiu S. Marcov. | P30 | JNP | Gyul | Pericarp | Decoction | 25.00 |
| Rutaceae | | | Phellodendron amurense Rupr. | P79 | GNP | Hwangbyeongnamu | Bark, endodermis | Infusion, steep | 76.92 |
| | | | Poncirus trifoliata Raf. | P88 | HNP, JNP | Taengjanamu | Fruit | Decoction, simmer | 66.67 |
| | | | Zanthoxylum piperitum (L.) DC. | P137 | HNP, JNP | Chopinamu | Fruit | Decoction, oil | 42.86 |
| | | | Zanthoxylum schinifolium Siebold and Zucc. | P138 | GNP, JNP | Sanchonamu | Fruit, seed | Oil | 25.00 |
| | | | Paulownia coreana Uyeki | P75 | GNP | Odongnamu | Stem | Infusion | 100.00 |
| Scrophulariaceae | | | Solanum nigrum L. | P121 | GNP, JNP | Kkamajung | Aerial part, fruit, leaf, root, whole part | Dried, infusion, juice | 88.24 |
| | | | Camellia sinensis L. | P22 | JNP | Chanamnu | Leaf | Decoction | 100.00 |
| | | | Celtis sinensis Pers. | P27 | HNP | Paengnamu | Fruit | Dried, powder | 100.00 |
| Ulmaceae | | | Ulmus davidiana var. japonica (Rehder) Nakai | P130 | GNP | Neureumnamu | Bark | A sweet drink made from fermented rice, infusion | 8.64 |
| Disorders          | Classification | Family name | Scientific name | * Abbreviation | **Region | Korean name          | Used part | Preparation          | FL   |
|-------------------|----------------|-------------|-----------------|----------------|----------|----------------------|-----------|----------------------|------|
| Intestinal disease | Plant          | Asteraceae  | Cirsium japonicum var. spinossimum Kitam. Sorbus commixta Hedl. | P29            | HNP      | Gasieonggeongkwi     | Root      | Decoction             | 100.00 |
|                   | Rosaceae       |             | Sorbus commixta Hedl. | P123           | JNP      | Magamok              | Fruit     | Brewing              | 100.00 |
| Stomach cramp     | Animal         | Phasianidae | Gallus gallus domesticus L. Pulsatilla koreana (Yabex Nakai) Nakai ex Nakai | A25            | JNP      | Dak                  | Whole part | Simmer              | 1.30  |
|                   | Plant          | Ranunculaceae | Pulsatilla koreana (Yabex Nakai) Nakai ex Nakai | P98            | HNP      | Halmikkot            | Leaf      | Rubbing              | 7.46  |
| Stomach problem   | Animal         | Phasianidae | Gallus gallus domesticus L. Atractylodes ovata (Thunb.) DC. | A25            | JNP      | Dak                  | Whole part | Simmer              | 1.30  |
|                   | Asteraceae     |             | Atractylodes ovata (Thunb.) DC. | P19            | GNP      | Sapju                | Root      | Powder               | 2.27  |
|                   | Celastraceae   |             | Euonymus alatus (Thunb.) Siebold | P43            | GNP      | Hwasallamu           | Leaf, stem | Decoction, seasoned cooked vegetables | 29.73 |
|                   | Poaceae        |             | Oryza sativa var. terrestis Makino Potentilla chinensis Ser. Prunus mume Siebold and Zucc. Ulmus davidiana var. japonica (Rehder) Nakai | P73            | HNP      | Sandu                | Seed      | Porridge             | 7.69  |
|                   | Plant          | Rosaceae    | Prunus mume Siebold and Zucc. Ulmus davidiana var. japonica (Rehder) Nakai | P91            | GNP      | Ttaljikkot           | Root      | Infusion, raw        | 50.00 |
|                   | Ulmaceae       |             | Ulmus davidiana var. japonica (Rehder) Nakai | P130           | GNP      | Neureumnamu          | Bark      | Tea                  | 1.85  |
| Stomachic         | Liliaceae      |             | Allium microdictyon Prokh. | P10            | JNP      | Sanmaneul            | Root      | Decoction             | 50.00 |
| Vomiting          | Animal         | Apidae      | Apis cerana Fabricius Vitex rotundifolia L.f. | A7             | GNP      | Jaraekkulbeol        | Honey     | Dissolution, raw     | 3.45  |
|                   | Plant          | Verbenaceae | Vitex rotundifolia L.f. | P134           | HNP      | Sunbiginamu          | Fruit     | Decoction             | 100.00 |

* A: animal, P: plant, F: fungi, and AL: alga.
** Region: JNP: Jirisan National Park, GNP: Gayasan National Park, and HNP: Hallasan National Park.
 Among the species with a FL of 100%, even without considering species that were mentioned in GNP, and 23 species in HNP. Of 100% in JNP totaled 52 species, followed by 40 species in GNP, and 23 species in HNP. The FL values in this study varied from 1.0% to 100%. Generally, a FL of 100% for a specific species indicates that all of the use-reports mentioned the same species for a specific treatment [41]. This study determined 71 species of plants with a FL of 100%, even without considering species that were mentioned more than two times (Table 3). Among them, plants with a FL of 100% in JNP totaled 52 species, followed by 40 species in GNP, and 23 species in HNP.

3.3.2. Fidelity Level (FL). The FL is useful for identifying the informants’ most preferred species in use for treating certain gastrointestinal disorders. This information reveals that the informants had a tendency to rely on one specific species for treating one specific disorder rather than for several different disorders. The FL values in this study varied from 1.0% to 100%.

Generally, a FL of 100% for a specific species indicates that all of the use-reports mentioned the same species for a specific treatment [41].

This study determined 71 species of plants with a FL of 100%, even without considering species that were mentioned more than two times (Table 3). Among them, plants with a FL of 100% in JNP totaled 52 species, followed by 40 species in GNP, and 23 species in HNP.

indicate a higher rate of informant consensus among the category of disorders.

The category with the highest degree of consensus from the informants were enteritis and gastralgia (1.0), followed by indigestion (0.94), constipation (0.93), abdominal pain and gastroenteric trouble (0.92), and gastric ulcers (0.91). The lowest degree of consensus was for gastroptosis, enterotoxin, hema feces, and other disorders (Table 6). These results denote that ethnomedicinal practices have been applied more often to minor health issues related to gastrointestinal disorders.

Generally, people suffering from serious gastrointestinal disorders have been treated in the hospital using conventional medicine or Korean traditional medicine. However, ethnomedical practices have been used to cure minor disorders.

Comparative consideration to results of the ICF among the three national parks and the agreement of consensus (ICF value, 1.00) from the informants in HNP obtained eight disorders, which include dysentery, gastralgia, gastric cancer, gastritis, hookworm, stomach cramps, stomach problems, and vomiting, while JNP and GNP depicted only enteritis and constipation, respectively.

These results confirm that the people of HNP have nearly the same ethnomedicinal knowledge for the treatment of gastrointestinal disorders because the communities have been isolated from other communities for many years.

3.3.3. INA between Gastrointestinal Disorders and Medicinal Species. INA has originally analyzed social phenomenon and trends through the internetwork of components [42]. Our research has attempted to analyze the interrelationship between gastrointestinal disorders and the medicinal species recorded in the communities.

Considering Figure 2 about the internetwork between disorders and the medicinal species within all communities of this study, all medicinal species are grouped in the center for indigestion, diarrhea, abdominal pain, and gastroenteric trouble (Figure 2(a)), respectively. This distribution pattern is similar to the results of JNP and GNP. However, in case of HNP, indigestion is separated from the main disorders groups. This difference caused that the communities of HNP have been separated from the land communities for a long period of time.

In regard to the INA distribution map for JNP, the locations for the disorders of hema feces, intestinal disease, and hematemesis were fairly distinct from the four main disorders groups. Also, the cure for enteritis, hookworm, intestinal disease, stomach cramp, and stomachic is applied for only one medicinal species (Figure 2(b)).

In the case of GNP, gastritis, gastric ulcers, heartburn, and stomach problems were located as a distinct group separated from the four main disorder groups. Because this group consisted of minor stomach ailments having similar inclination, Zanthoxylum piperitum (L.) DC., Potentilla chinensis Ser., Euonymus alatus (Thunb.) Siebold, Atractylodes ovate (Thunb.) DC., and Ulmus davidiana var. japonica (Rehder) Nakai worked as possible cures as they possessed a high possibility in containing the same components for treatment (Figure 2(c)).

Within HNP, indigestion, intestinal disease, vomiting, stomach cramps, and enterotoxin were individually distinct from the three main disorder groups. This distribution pattern suggests that the application width of medicinal species to treat each disorder is limited for treating each disorder relative to the other communities (Figure 2(d)).
Figure 2: Continued.
Figure 2: Internetwork analysis (INA) of three national parks ((a) total, (b) JNP, (c) GNP, and (d) HNP). *Abbreviation form of each is explained in Table 3: A (animal), P (plant), F (fungi), AL (algae), □ (species), and ○ (disorders).
Table 5: Number of times mentioned by informants and medicinal species for treating each disorder.

| Diseases                  | JNP               | GNP               | HNP               | Total              |
|---------------------------|-------------------|-------------------|-------------------|--------------------|
|                           | Number of times   | Number of times   | Number of times   | Number of times    |
|                           | mentioned         | mentioned         | mentioned         | mentioned          |
|                           | (species)         | (species)         | (species)         | (species)          |
| Abdominal pain            | 161 (21)          | 516 (32)          | 82 (16)           | 759 (59)           |
| Acute gastroenteritis     | 41 (8)            | 6 (3)             | 47 (11)           | 134 (21)           |
| Constipation              | 115 (15)          | 142 (3)           | 36 (4)            | 293 (20)           |
| Deficiency of intestinal  | 19 (5)            | 39 (9)            | 51 (8)            | 109 (14)           |
| function                  |                   |                   |                   |                    |
| Diarrhea                  | 111 (36)          | 87 (8)            | 39 (9)            | 237 (48)           |
| Dysentery                 | 6 (4)             | 42 (4)            | 3 (1)             | 51 (8)             |
| Enteritis                 | 2 (1)             | 2 (1)             | 2 (1)             | 6 (3)              |
| Enterotoxin               |                   |                   |                   |                    |
| Gastralgia                | 5 (1)             | 5 (1)             | 5 (1)             | 15 (2)             |
| Gastric cancer            | 14 (12)           | 20 (2)            | 4 (1)             | 36 (9)             |
| Gastric ulcer             | 3 (3)             | 20 (5)            | 4 (1)             | 36 (9)             |
| Gastritis                 | 12 (3)            | 20 (5)            | 4 (1)             | 36 (9)             |
| Gastroenteric trouble     | 238 (54)          | 755 (35)          | 118 (30)          | 1,111 (94)         |
| Gastritis                 | 3 (3)             | 28 (5)            | 3 (3)             | 60 (8)             |
| Heartburn                 |                   |                   |                   |                    |
| Hema feces                | 6 (5)             | 6 (5)             | 6 (5)             | 18 (3)             |
| Hematemesis               | 1 (1)             | 1 (1)             | 1 (1)             | 3 (2)              |
| Hookworm                  | 1 (1)             | 5 (1)             | 6 (2)             | 12 (2)             |
| Indigestion               | 302 (52)          | 829 (31)          | 21 (7)            | 1,152 (72)         |
| Intestinal ailment        | 2 (1)             | 1 (1)             | 3 (2)             |                    |
| Stomach cramp             | 1 (1)             | 5 (1)             | 6 (2)             |                    |
| Stomach problem           | 6 (4)             | 28 (5)            | 2 (1)             | 31 (7)             |
| Stomachic                 | 1 (1)             | 1 (1)             | 1 (1)             |                    |
| Vomiting                  | 1 (1)             | 1 (1)             | 4 (1)             | 5 (2)              |
| Total                     | 1,040 (166)       | 2,468 (76)        | 336 (58)          | 3,844 (220)        |

4. Conclusion

This research is the first study in the world to analyze and compare the ethnomedicinal practices of communities for treating gastrointestinal disorders. As the research method of this study, comparative quantitative analysis will contribute to the availability of orally transmitted ethnomedicinal knowledge. Additionally, the results of this study are confirmed due to the results obtained through investigation by 507 informants within the 185 research sites.

From this research, the recording of 490 ethnomedicinal practices being applied to the use of 220 medicinal species to treat 24 gastrointestinal disorders was extremely valuable. Particularly, the present usage of various medicinal species displays evidence as to which ethnomedicinal practices are continuously transmitted within the communities. However, this present situation is not sustainable because the communities of these study areas consist of an aging society. It has become necessary for appropriate measures to be taken to conserve these ethnomedicinal practices.

Our research suggests that treatment for gastroenteric trouble and indigestion among the gastrointestinal disorders uses ethnomedicinal practices more than any other type of treatment, as the communities used 75.5% of all medicinal species for treating these two diseases, 63.3% of the total number of all ethnomedicinal practices, and mentioned by 58.9% of all informants. Also, these two disorders contained the highest numbers of medicinal species within a FL of 100%. Through further study, the ethnomedicinal practices for these conditions possess a much higher potential in being used in the development of new practices.

According to the number of medicinal species applied to ethnomedicinal practices and the number of disorders treated by these ethnomedicinal practices, the numbers of JNP were much higher than the other two national parks. It is inferred that the region of JNP was the original center of Korean traditional medicine.

On the other hand, the communities of HNP depict a higher degree of agreement in the consensus to ethnomedicinal practices. This data explains that the communities of
Table 6: Informant consensus factor (ICF) of the communities of three national parks.

| Disorders                      | JNP   | GNP   | HNP   | Total |
|-------------------------------|-------|-------|-------|-------|
| Abdominal pain                | 0.88  | 0.94  | 0.81  | 0.92  |
| Acute gastroenteritis         | 0.83  | −     | 0.60  | 0.78  |
| Constipation                  | 0.88  | 0.99  | 0.91  | 0.93  |
| Deficiency of intestinal function | 0.78  | −     | −     | 0.78  |
| Diarrhea                      | 0.68  | 0.92  | 0.79  | 0.80  |
| Dysentery                     | 0.40  | 0.93  | 1.00  | 0.86  |
| Enteritis                     | 1.00  | −     | −     | 1.00  |
| Enterotoxin                   | −     | −     | +     | +     |
| Gastralgia                    | −     | −     | 1.00  | 1.00  |
| Gastric cancer                | +     | 0.95  | 1.00  | +     |
| Gastric ulcer                 | +     | −     | −     | 0.91  |
| Gastritis                     | 0.82  | 0.79  | 1.00  | 0.77  |
| Gastroenteric trouble         | 0.78  | 0.95  | 0.75  | 0.92  |
| Gastroperic trouble           | +     | −     | −     | +     |
| Heartburn                     | −     | 0.85  | −     | 0.85  |
| Hema feces                    | +     | −     | −     | +     |
| Hematemesis                   | +     | −     | −     | +     |
| Hookworm                      | +     | −     | 1.00  | 0.80  |
| Indigestion                   | 0.83  | 0.96  | 0.70  | 0.94  |
| Intestinal ailment            | 1.00  | −     | +     | 0.50  |
| Stomach cramp                 | +     | −     | 1.00  | 0.80  |
| Stomach problem               | 0.40  | 0.85  | 1.00  | 0.80  |
| Stomachic                     | +     | −     | −     | +     |
| Vomiting                      | −     | +     | 1.00  | 0.75  |

−: Ailments were not mentioned in each national park.
+: Below 0.40.

HNP, as island people, were limited in their movement to other regions and strictly collected large amounts of independent ethnomedicinal knowledge, only sharing within their own communities, which was distinct from the inland communities.

These trends were confirmed by the results of the INA as the internetwork maps of JNP and GNP were similar, while the map of HNP was moderately different. These results are reflected by the three-dimensional patterns of the ethnomedicinal knowledge held within the communities of each national park.

More specifically, the use of INA as a tool of quantitative analysis in this study provides valuable internetwork maps between gastrointestinal disorders and medicinal species. These maps are important data to understand the specific interrelationships between disease and ethnomedicinal practices in the intra- and intercommunities.

The authors believe that INA is a useful new tool for providing various interpretations to ethnomedicinal knowledge in the intra- and intercommunities. This study provides confidence in that the useful value of INA will extend beyond the existing understanding of ethnomedicinal knowledge for the future research of ethnomedicinal knowledge.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Acknowledgments

The authors are very grateful to all informants of the study area for sharing their oral traditional knowledge during the fieldwork surveys.

References

[1] T. Bubela and E. R. Gold, Genetic Resources and Traditional Knowledge, Edward Elgar, Northampton, Mass, USA, 2012.
[2] P. M. Unikrishnan and M. S. Suneetha, Biodiversity, Traditional Knowledge and Community Health: Strengthening Linkages, Xpress Pte, Singapore, 2012.
[3] J. Sharma, S. Gairola, R. D. Gaur, and R. M. Painuli, “The treatment of jaundice with medicinal plants in indigenous communities of the Sub-Himalayan region of Uttarakhand, India,” Journal of Ethnopharmacology, vol. 143, no. 1, pp. 262–291, 2012.
[4] S. Shyamal, P. G. Latha, V. J. Shine, S. R. Suja, S. Rajasekharan, and T. Ganga Devi, “Hepatoprotective effects of Pittosporum neelgherrense Wight & Arn., a popular Indian ethnomedicine,” *Journal of Ethnopharmacology*, vol. 107, no. 1, pp. 151–155, 2006.

[5] B. A. Anderson, E. N. Anderson, T. Franklin, and A. D. de Cen, “Pathways of decision making among Yucatan Mayan traditional birth attendants,” *Journal of Midwifery and Women’s Health*, vol. 49, no. 4, pp. 312–319, 2004.

[6] S. E. Wilkinson and L. C. Callister, “Giving birth: the voices of Ghanaian women,” *Health Care for Women International*, vol. 31, no. 3, pp. 201–220, 2010.

[7] F. M. Khameh, “An ethnomedicine study among women in Uremia (North-West Iran),” *Collegium Antropologicum*, vol. 36, no. 2, pp. 491–497, 2012.

[8] F. U. Afifi-Yazar, V. Kasabri, and R. Abu-Dahab, “Medicinal plants from jordan in the treatment of diabetes: traditional uses vs in vitro and in vivo evaluations—part 2,” *Planta Medica*, vol. 77, no. 11, pp. 1210–1220, 2011.

[9] H. Fabrega Jr., “An ethnomedical perspective of Anglo-American psychiatry,” *The American Journal of Psychiatry*, vol. 146, no. 5, pp. 588–596, 1989.

[10] M. Inhorn Millar and S. D. Lane, “Ethno-ophthalmology in the Egyptian delta: an historical systems approach to ethnomedicine in the Middle East,” *Social Science and Medicine*, vol. 26, no. 6, pp. 651–657, 1988.

[11] C. Lans, “Comparison of plants used for skin and stomach problems in Trinidad and Tobago with Asian ethnomedicine,” *Journal of Ethnobiology and Ethnomedicine*, vol. 3, article 3, 12 pages, 2007.

[12] K. A. Jernigan, “Barking up the same tree: a comparison of ethnomedicine and canine ethnoveterinary medicine among the Aguaruna,” *Journal of Ethnobiology and Ethnomedicine*, vol. 5, article 33, 2009.

[13] G. J. Martinez and M. C. Luján, “Medicinal plants used for traditional veterinary in the Sierras de Córdoba (Argentina): an ethnobotanical comparison with human medicinal uses,” *Journal of Ethnobiology and Ethnomedicine*, vol. 7, no. 1, article 23, 2011.

[14] H. Kim and M. Song, “Traditional plant-based therapies for digestive system diseases investigated in north Jeolla province, Korea,” *Journal of Alternative and Complementary Medicine*, vol. 18, no. 3, pp. 287–293, 2012.

[15] H. Kim and M. Song, “Oral traditional knowledge for the treatment of digestive system diseases investigated in north Jeolla province, Korea,” *Journal of Medicinal Plant Research*, vol. 5, no. 24, pp. 5730–5740, 2011.

[16] H. Kim and M.-J. Song, “Oral traditional plant-based therapeutic applications for pain relief recorded in North Jeolla province, Korea,” *Indian Journal of Traditional Knowledge*, vol. 12, no. 4, pp. 573–584, 2013.

[17] M. Heinrich, A. Ankl, B. Frei, C. Weimann, and O. Sticher, “Medicinal plants in Mexico: healers’ consensus and cultural importance,” *Social Science and Medicine*, vol. 47, no. 11, pp. 1859–1871, 1998.

[18] M. Heinrich, S. Edwards, D. E. Moerman, and M. Leonti, “Ethnopharmacological field studies: a critical assessment of their conceptual basis and methods,” *Journal of Ethnopharmacology*, vol. 124, no. 1, pp. 1–17, 2009.

[19] M. N. Alexiades, *Selected guidelines for ethnobotanical research: a Field Manual*, vol. 10 of Advances in Economic Botany, The New York Botanical Garden, Bronx, NY, USA, 1996.

[20] H. Kim and M.-J. Song, *Ethnobotany*, World Science, Seoul, Republic of Korea, 2008.

[21] H. Kim and M. Song, “Analysis and recordings of orally transmitted knowledge about medicinal plants in the southern mountainous region of Korea,” *Journal of Ethnopharmacology*, vol. 134, no. 3, pp. 676–696, 2011.

[22] M. Song, H. Kim, B. Heldenbrand, J. Leon, and S. Lee, “Ethnopharmacological survey of medicinal plants in Jeju Island, Korea,” *Journal of Ethnobiology and Ethnomedicine*, vol. 9, no. 1, article 48, 12 pages, 2013.

[23] H. Kim and M. Song, “Ethnozoological study of medicinal animals on Jeju Island, Korea,” *Journal of Ethnopharmacology*, vol. 146, no. 1, pp. 75–82, 2013.

[24] Ministry of Security and Public Administration, 2013, http://www.mospa.go.kr.

[25] “Korea Meteorological Administration,” 2013, http://www.kma.go.kr.

[26] H. Kim and M.-I. Song, *Benefit-Sharing and Industrialization for Traditional Knowledge of Biological Genetic Resources: Prevention of Nagoya Protocol*, World science, Seoul, Republic of Korea, 2011.

[27] G. J. Martin, *Ethnobotany: A Methods Manual*, Champman & Hall, London, UK, 1995.

[28] M. Song and H. Kim, “Ethnomedicinal application of plants in the western plain region of North Jeolla Province in Korea,” *Journal of Ethnopharmacology*, vol. 137, no. 1, pp. 167–175, 2011.

[29] T. B. Lee, *Illustrated Flora of Korea*, Hyangmunsa, Seoul, Republic of Korea, 1979.

[30] J. Y. Lee, *Coloured Korean Mushroom*, vol. 1, Academy Publishing, Seoul, South Korea, 1993.

[31] D. G. Ahn, *Illustrated Book of Korean Medicinal Herbs*, Kyohak Publishing, Seoul, Republic of Korea, 2002.

[32] Y. N. Lee, *Flora of Korea*, Kyohak Publishing, Seoul, Republic of Korea, 2002.

[33] J. H. Park, *Korean Folk Medicine with Color Pictures*, Shinil Books, Seoul, South Korea, 2005.

[34] "National Knowledge and Information System for Biological Species (NKISBS)," 2013, http://www.nature.go.kr/.

[35] R. W. Douglas and U. Johansen, *Network Analysis and Ethnographic Problems: Process Models of a Turkish Nomad Clan*, Lexington Books, Idaho Falls, Idaho, USA, 2006.

[36] N. A. Christakis and J. H. Fowler, “The spread of obesity in a large social network over 32 years,” *The New England Journal of Medicine*, vol. 357, no. 4, pp. 370–379, 2007.

[37] N. A. Christakis and J. H. Fowler, “Social contagion theory: examining dynamic social networks and human behavior,” *Statistics in Medicine*, vol. 32, no. 4, pp. 556–577, 2013.

[38] N. A. Christakis and J. H. Fowler, “Rejoiner to commentaries on Social contagion theory,” *Statistics in Medicine*, vol. 32, no. 4, pp. 597–599, 2013.

[39] S. P. Borgatti, *NetDraw Software for Network Visualization*, Analytic Technologies, Lexington, Ky, USA, 2002.

[40] S. P. Borgatti, M. G. Everett, and L. C. Freeman, *UCINET for Windows: Software for Social Network Analysis*, Analytic Technologies, Harvard, Mass, USA, 2002.

[41] K. Srithi, H. Balslev, P. Wangpakapattanawong, P. Srisanga, and C. Trisomthi, “Medicinal plant knowledge and its erosion among the Mien (Yao) in northern Thailand,” *Journal of Ethnopharmacology*, vol. 123, no. 2, pp. 335–342, 2009.

[42] Y. H. Kim, *Social Inter-Network Analysis*, Parkyongs, Seoul, Republic of Korea, 2013.