

Thoughts on the Agricultural Practice of the Party's Governance Strategy for Xinjiang in the New Era: Based on the Medicinal Materials and Their Related Intellectual Property Resources

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Abstract This article outlines the medicinal resources of Xinjiang, examines 44 types of genuine medicinal materials and 51 types of characteristic medicinal materials, and investigates the intellectual property (IP) resources associated with them. It analyzes major challenges in the protection of these materials and their IP rights, and proposes a series of measures, including: collecting and evaluating medicinal resources; safeguarding the genetic resources of medicinal organisms; building a community for traditional Chinese medicine; establishing regional public brands for genuine medicinal materials; implementing a modern seed industry improvement program for medicinal organisms; fostering the development of new-quality productive forces; providing targeted assistance to Xinjiang's genuine medicinal material industry and traditional medicine sector; and enhancing the quality and effectiveness of paired medical and health aid to Xinjiang in the new era.

Key words Medicinal materials, Traditional medicine, Agricultural intellectual property, Traditional medicine culture, The Party's governance strategy for Xinjiang

0 Introduction

Traditional Chinese medicine (TCM) and ethnic minority medicines are treasures of Chinese civilization^[1–3] and serve as important bridges for exchanges, interactions, and integration among all ethnic groups^[4]. They also rank among the ten major categories of national-level intangible cultural heritage items. The TCM Culture Promotion Project is a key initiative during the 14th Five-Year Plan period, under the broader Project for Inheriting and Developing China's Excellent Traditional Culture.

The medical service center is one of the five major centers in the development of Xinjiang's core area of the Silk Road Economic Belt^[5]. To serve the Belt and Road Initiative and build a health service center, the *China – Xinjiang Silk Road Economic Belt Core Area Medical Service Center – Traditional Chinese and Ethnic Medicine Development Plan (2016–2020)* was issued at an early stage. Traditional medicines, including TCM, Uyghur medicine, Kazakh medicine, Mongolian medicine, Xibe medicine, Hui medicine, Manchu medicine, and Kirgiz medicine, constitute unique and vital medical and health resources in Xinjiang, having made outstanding contributions to the prosperity and continuity of the local population. Therefore, in 2024, Xinjiang approved the *Regulations on Traditional Chinese Medicine of Xinjiang Uygur Autonomous Region*, and issued the *Implementation Plan for Further Improving the Medical and Health Service System*, which proposed the coordinated advancement of distinctive ethnic medicines such as Uyghur, Kazakh, and Mongolian. In 2025, the Autonomous Region further released the *Implementation Plan for Promoting High-Quality Development of the Traditional Chinese Medicine Industry* (Xinjiang Government Office

Document No. 48[2025]).

The Party's governance strategy for Xinjiang in the new era has become a highly debated issue. The overarching goal of Xinjiang's ethnic affairs work is to implement this strategy in its entirety, with accuracy and comprehensiveness, so as to build a modern socialist Xinjiang that is united, harmonious, prosperous, culturally progressive, with a good quality of life for its people and a healthy ecology. In September 2025, the State Council Information Office released a white paper titled *Successful Practice of the Party's Governance Strategy for Xinjiang in the New Era*^[6]. The document notes that the "healthcare service system has been improved and optimized," and that "central government agencies, state-owned enterprises, and relevant provinces and cities have maintained comprehensive, targeted, and sustained assistance to Xinjiang, providing all-round counterpart support across various fields, including personnel and talent, industrial projects, science and technology, education, medical and health services, culture, and tourism."

Xinjiang Academy of Social Sciences has focused on major theoretical and practical issues of concern to cadres and people of all ethnic groups, and has published a research series on the Party's governance strategy for Xinjiang in the new era, including the following volumes: *Outline of the Party's Governance Strategy for Xinjiang in the New Era*, *The Overall Goal of Xinjiang Work and the Modernization of the Governance System and Governance Capacity*, *Strengthening Party Leadership and Consolidating Grassroots Foundations*, *Ideological Work and the Fight Against Extremism in Xinjiang*, *Research on Several Historical Issues of Xinjiang and Its Contemporary Significance*, *Building the Core Area of the Silk Road Economic Belt*, *Guiding Xinjiang's High – Quality Development with the New Development Philosophy*, and *Cultural Development and the Growth of Cultural Tourism Economy in Xinjiang*. These works elucidate the Party's innovative theories and creative practices^[7–14]. Among them, Liu Guofang *et al.* expound on the strategy from multiple dimensions, including its basic connotations, practical basis, ideological foundation, strategic orientation, successful practices,

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subject guarantees, and historical significance^[7].

The 2024 World Conference on Traditional Medicine, under the theme "Diversity, Inheritance and Innovation: Traditional Medicine for All" officially issued the *Beijing Declaration of the 2024 World Conference on Traditional Medicine*. Chinese medicinal materials constitute the material foundation for the inheritance and development of the traditional medicine sector. On this basis, and in alignment with the spirit of the Conference, this article takes medicinal materials and their associated intellectual property as the analytical entry point to explore the practical pathways through which the Party's governance strategy for Xinjiang in the new era can be implemented within the agricultural sector.

1 Overview of medicinal resources

Xinjiang is endowed with abundant and diverse medicinal material resources. According to the *Grand Compendium of Chinese Medicinal Resources: Xinjiang Volume*^[15], which presents the findings of the *Fourth National Survey of Traditional Chinese Medicine Resources (2012–2024)*, there are 2 471 types of Chinese medicinal materials in the region, including Uyghur, Kazakh, Mongolian, Xibe, Hui, Manchu, and Kirgiz medicinal materials. Among these, 2 217 are medicinal plants, 211 are medicinal animals, and 43 are medicinal minerals. The Autonomous Region is home to the Ruoqiang County Ruoqiang Jujubes and the Xinjiang Production and Construction Corps' Alar City Alar Jujubes, both recognized as national-level characteristic agricultural product advantage zones. In addition, there are national-level characteristic agricultural product advantage counties for 1 type of goji berry, 20 types of licorice, 30 types of specialty jujubes, 9 types of pomegranates, 32 types of specialty apricots, and 15 types of specialty bee products. The Region also boasts national-level advantageous and characteristic agricultural industry clusters, such as the jujube industry cluster of the Xinjiang Production and Construction Corps.

In recent years, Xinjiang's medicinal material cultivation area has remained stable at approximately 266 667 ha, excluding medicinal and edible foods primarily consumed for dietary purposes, ranking fifth nationally. However, when including dual-use medicinal and edible foods such as specialty jujubes and pomegranates, it firmly ranks first in the country. A total of 86 types of Chinese medicinal materials are cultivated^[15], among which 35 are ethnic medicinal materials, including *Rosae Rugosae Flos*, *Foeniculi Fructus*, *Cumini Fructus*, *Cichorii Herba*, *Dracocephali Moldavicae Herba*, and others; and 41 are bulk Chinese medicinal materials, including *Isatidis Radix*, *Astragali Radix*, and *Scutellariae Radix*. Notably, the yields of *Carthami Flos*, *Glycyrrhizae Radix Et Rhizoma*, and *Cistanches Herba* account for 80%, 50%, and 50% of the national total, respectively.

Xinjiang Autonomous Region also raises red deer, sika deer, forest musk deer, cattle, horses, donkeys, camels, Xinjiang black bees, and silkworms, obtaining animal medicinal materials and health products including *Cervi Cornu*, *Cervi Cornu Colla*, *Cervi Cornu Pulvis*, *Cervi Cornu Pantotrichum*, *Moschus* from the scent sacs of mature male musk deer, *Bovis Calculus* from gallbladder, bile duct, or hepatic duct stones, *Equi Calculus* from gastrointestinal stones, *Asini Corii Colla* made from donkey hide, *Cameli Calculus* from gallbladder stones, *Mel*, *Propolis*, *Royal Jelly*, and *Bombyx Batryticatus*, which are dried silkworm larvae killed by *Beauveria bassiana* (Bals.) Vuillant.

In the *Catalog of Varieties for Fresh Cutting Processing of Chinese Medicinal Materials in Xinjiang Uyghur Autonomous Region*, the first batch (2022) includes 11 varieties: *Isatidis Radix*, *Glycyrrhizae Radix Et Rhizoma*, *Cistanches Herba*, *Paeoniae Radix Rubra*, *Cynomorii Herba*, *Astragali Radix*, *Salviae Miltiorrhizae Radix Et Rhizoma*, *Scutellariae Radix*, *Achyranthis Bidentatae Radix*, *Saposhnikoviae Radix*, and *Codonopsis Radix*; the second batch (2026) includes 17 varieties: *Isatidis Folium*, *Cervi Cornu Pantotrichum*, *Menthae Haplocalycis Herba*, *Trichosanthis Fructus*, *Trichosanthis Radix*, *Sophorae Flavescentis Radix*, *Belamcandae Rhizoma*, *Anemarrhenae Rhizoma*, *Angelicae Dahuricae Radix*, *Taraxaci Herba*, *Rehmanniae Radix*, *Dictamni Cortex*, *Rhei Radix Et Rhizoma*, *Phragmitis Rhizoma*, *Platycodonis Radix*, *Paeoniae Radix Alba*, and *Atractylodis Macrocephalae Rhizoma*.

Xinjiang Uyghur Autonomous Region has established 12 genuine medicinal material bases, a 20-ha seed base, a breeding base for endangered medicinal materials covering over 300 hectares, 58 customized medicinal gardens, and a living conservation nursery for 700 species of medicinal plants. It also possesses 2 key research laboratories of the National Administration of Traditional Chinese Medicine, 4 grade-three laboratories, and 12 autonomous region-level key laboratories.

Xinjiang's Chinese medicinal materials wholesale markets mainly include entities such as the Hotan Uyghur Medicine Trading Center, the Yutian County Chinese Medicinal Materials Trading Market, the Guizhitang Chinese Medicinal Materials Wholesale Firm, the Tianshan Medicinal Materials Wholesale Company, and the Shihezi Chinese Medicinal Materials Trading Center, as well as the Xinjiang Chinese Medicinal Materials Trading Platform, which was officially launched in 2025.

Xinjiang is home to a wealth of genuine and characteristic medicinal materials, including *Saussurea Involucratae Herba* (Tianshan Snow Lotus), *Carthami Flos*, *Glycyrrhizae Radix Et Rhizoma*, *Cistanches Herba*, *Cynomorii Herba*, *Fritillariae Pallidiflorae Bulbus*, *Lycii Fructus*, *Lycii Ruthenici Fructus* (Black Goji Berry), *Arnebiae Radix*, *Apocyni Veneti Folium*, *Ferulae Resina* (Xinjiang Asafoetida), *Artemisiae Rupestris Herba* (One-stem Wormwood), *Ephedrae Herba*, *Isatidis Radix*, *Astragali Radix*, *Cumini Fructus*, *Foeniculi Fructus*, *Fomitopsis Officinalis* (Agarikon), *Snow Chrysanthemum*, products from red deer, and products from Xinjiang black bees—all of which are well-known throughout China. In 2026, seven departments including the Health Commission of Xinjiang Uyghur Autonomous Region jointly released the *Catalog of Genuine Medicinal Materials in Xinjiang Uyghur Autonomous Region (First Batch)* and the *Catalog of Characteristic Medicinal Materials in Xinjiang Uyghur Autonomous Region (First Batch)*.

2 Genuine medicinal materials

According to the *Catalog of Genuine Medicinal Materials in Xinjiang Uyghur Autonomous Region (First Batch)*, there are 44 types of genuine medicinal materials, including 43 plant medicinal materials and 1 animal medicinal material, involving 23 families, 41 genera, and 53 species of medicinal plants, as well as 1 family, 1 genus, and 1 species of medicinal animal. Among the medicinal plants, there are 36 species of herbs, 10 species of woody plants, and 7 species of subshrubs: *Hyssopus officinalis* L., *Hyssopus cuspidatus* Boriss., *Lavandula angustifolia* Mill., *Apocynum venetum* L., *Apocynum pictum* Schrenk, *Ephedra intermedia* Schrenk et C. A.

Mey. , and *Ephedra equisetina* Bge.

2.1 Asteraceae *Saussurea involucrata* (Kar. & Kir.) Sch.-Bip. , a perennial herb of the genus *Saussurea* in the family Asteraceae, has its dried aerial parts used as a traditional Uyghur medicinal material. Its main producing area is the Tianshan Mountains, particularly in Urumqi County, Dabancheng District, Hejing County, Jinghe County, Wenquan County, Yiwu County, Balikun County, Mulei County, Fukang City, Manas County, Tekes County, Gongliu County, and Zhaosu County. It has the effects of warming the kidney and invigorating yang, dispelling wind and eliminating dampness, and promoting meridian flow and blood circulation.

Carthami Flos is the dried flower of *Carthamus tinctorius* L. , an annual herb of the genus *Carthamus* in the family Asteraceae. It is cultivated in many areas of Xinjiang, especially in Yumin County, Tacheng City, Tuoli County, Yining County, Yining City, Tekes County, Qapqal County, Huocheng County, Jimsar County, Qitai County, and others. It has the effects of promoting blood circulation and regulating menstruation, removing blood stasis and alleviating pain.

Cichorium glandulosum Boiss et Huet and *Cichorium intybus* L. , both perennial herbs of the genus *Cichorium* in the family Asteraceae, provide dried aerial parts or roots, or dried mature fruits (for *C. glandulosum*), and dried aerial parts or roots (for *C. intybus*), which are used as medicinal materials. They are cultivated in many areas of Xinjiang, especially in Ili Prefecture, Tacheng Prefecture, Altay Prefecture, Changji Prefecture, Hotan Prefecture, Kashgar Prefecture, Turpan City, and others. Both the aerial parts/roots and the fruits are commonly used Uyghur medicinal materials, and they share the effects of clearing liver and gallbladder, strengthening stomach and aiding digestion, and promoting diuresis and reducing edema.

Artemisia rupestris L. , a perennial herb of the genus *Artemisia* in the family Asteraceae, provides its dried whole plant as a medicinal material. It is mainly produced in Fukang City, Urumqi County, Fuyun County, Zhaosu County, Altay City, Hejing County, Dabancheng District, Mulei County, Jimsar County, Balikun County, Yizhou District, and others. It has the effects of clearing heat and detoxifying, promoting blood circulation and dispelling wind.

Matricaria chamomilla L. , an annual herb of the genus *Matricaria* in the family Asteraceae, provides its dried whole plant as a medicinal material. It is mainly produced in Huocheng County, Yining City, Qapqal County, Fukang City, Toksun County, and others. It has the effects of clearing heat and detoxifying, calming liver yang, dispelling wind and relieving itching, clearing liver and improving eyesight, and dispersing wind-heat.

Vernonia anthelmintica (L.) Willd, an annual herb of the genus *Vernonia* in the family Asteraceae, has its mature seeds used as a medicinal material. It is mainly produced in Aksu Prefecture, Changji Prefecture, and others. It is a commonly used Uyghur medicinal material, with the effects of expelling wind and activating blood, as well as killing parasites and detoxifying.

Helichrysum arenarium (L.) Moench, a perennial herb of the genus *Helichrysum* in the family Asteraceae, provides its dried whole plant as a medicinal material. It is mainly produced in Altay Prefecture, Tacheng Prefecture, and others. It has the effects of protecting the liver, promoting bile flow, detoxifying, promoting diuresis, reducing inflammation, and exerting antimicrobial activity.

2.2 Fabaceae *Glycyrrhiza uralensis* Fisch. , *Glycyrrhiza inflata*

Batal. , or *Glycyrrhiza glabra* L. , perennial herbs of the genus *Glycyrrhiza* in the family Fabaceae, provide their dried roots and rhizomes as medicinal materials. They are cultivated in many areas of Xinjiang, mainly produced in Bayingolin Prefecture, Ili Prefecture, Aksu Prefecture, Tacheng Prefecture, Changji Prefecture, Altay Prefecture, Kashgar Prefecture, Hotan Prefecture, and others. They have the effects of tonifying the spleen and replenishing qi, clearing heat and detoxifying, eliminating phlegm and stopping cough, and relieving spasm and alleviating pain.

Trigonella foenum-graecum L. , an annual herb of the genus *Trigonella* in the family Fabaceae, provides its dried mature seeds as a medicinal material. It is cultivated in many areas of Xinjiang, especially in Fukang City, Jimsar County, Qitai County, Urumqi County, and others. It has the effects of warming the kidney and invigorating yang, dispelling cold and alleviating pain.

Astragalus membranaceus (Fisch.) Bunge var. *mongolicus* (Bunge) P. K. Hsiao or *Astragalus membranaceus* (Fisch.) Bunge. , perennial herbs of the genus *Astragalus* in the family Fabaceae, provide their dried roots as medicinal materials. They are mainly produced in Ili Prefecture, Changji Prefecture, Altay Prefecture, Hotan Prefecture, Aksu Prefecture, and others. They have the effects of tonifying qi and raising yang, securing the exterior and stopping sweating, promoting diuresis and reducing edema, generating fluids and nourishing blood, promoting circulation and relieving impediment, expelling toxin and draining pus, and healing ulcers and promoting tissue regeneration.

2.3 Lamiaceae *Mentha haplocalyx* Briq. , a perennial herb of the genus *Mentha* in the family Lamiaceae, provides its dried aerial parts as a medicinal material. It is mainly produced in Ili Prefecture, Tacheng Prefecture, Altay Prefecture, Bortala Prefecture, Hotan Prefecture, Kashgar Prefecture, and others. It has the effects of dispersing wind-heat, clearing the head and improving eyesight, relieving sore throat and promoting eruption of rashes.

Dracocephalum moldavica L. , an annual herb of the genus *Dracocephalum* in the family Lamiaceae, provides its dried aerial parts or mature fruits as medicinal materials. It is mainly produced in Hotan Prefecture, Kashgar Prefecture, Changji Prefecture, Turpan City, and others. The aerial parts have the effects of clearing heat and detoxifying, relieving cough and asthma, and promoting blood circulation and removing stasis. The fruits have the effects of strengthening the spleen and stimulating appetite, removing fishy odor and cutting grease, and promoting digestion and resolving food stagnation.

Hyssopus cuspidatus Boriss. or *Hyssopus officinalis* L. , subshrubs of the genus *Hyssopus* in the family Lamiaceae, provide their dried whole plants as medicinal materials. They are mainly produced in Altay Prefecture, Tacheng Prefecture, Ili Prefecture, Changji Prefecture, and others. They have the effects of clearing heat and relieving the exterior, resolving phlegm and relieving cough.

Lavandula angustifolia Mill. , a subshrub of the genus *Lavandula* in the family Lamiaceae, provides its dried aerial parts as a medicinal material. It is mainly produced in Huocheng County, Qapqal County, Yining County, Nilka County, Gongliu County, Yining City, and others. It has the effects of calming the mind and tranquilizing, reducing inflammation and killing bacteria, promoting wound healing, relieving pain, and regulating skin condition.

2.4 Apiaceae *Ferula Resina* is the resin obtained from *Ferula*

sinkiangensis K. M. Shen or *Ferula fukanensis* K. M. Shen, perennial herbs of the genus *Ferula* in the family Apiaceae. It is mainly produced in Yining County, Nilka County, Gongliu County, Fukang City, Jimsar County, Shihezi City, Manas County, and others. It has the effects of promoting digestion, dispersing accumulation, killing parasites, and relieving pain.

Foeniculi Fructus is the dried mature fruit of *Foeniculum vulgare* Mill., a perennial herb of the genus *Foeniculum* in the family Apiaceae; the dried root bark of the same plant is also used as a medicinal material. They are cultivated in many areas of Xinjiang, mainly produced in Kashgar Prefecture, Hotan Prefecture, Bayingolin Prefecture, Ili Prefecture, Tacheng Prefecture, Altay Prefecture, and others. The fruit has the effects of dispelling cold and relieving pain, regulating qi and harmonizing the stomach. The root bark has the effects of promoting digestion, relieving gastrointestinal flatulence, dispelling cold and alleviating pain.

Cumini Fructus is the dried mature fruit of *Cuminum cyminum* L., an annual herb of the genus *Cuminum* in the family Apiaceae. It is mainly produced in Turpan City, Hotan Prefecture, Kashgar Prefecture, Aksu Prefecture, Bayingolin Prefecture, and others. It has the effects of promoting digestion, exerting antibacterial and anti-inflammatory actions, and improving anemia.

2.5 Liliaceae Fritillariae Pallidiflorae Bulbus is the dried bulb of *Fritillaria walujewii* Regel or *Fritillaria pallidiflora* Schrenk, perennial herbs of the genus *Fritillaria* in the family Liliaceae. It is mainly produced in the Tianshan Mountains, especially in Gongliu County, Tekes County, Yining County, Xinyuan County, Qapqal County, Huocheng County, Zhaosu County, Urumqi County, Wenquan County, Fukang City, Jimsar County, Wusu City, Shawan City, Mulei County, Qitai County, Manas County, and others. It is a commonly used Uyghur medicinal material, with the effects of moistening the lung and resolving phlegm, relieving cough and asthma, and dispersing nodules and reducing swelling.

Allii Sativi Bulbus is the bulb of *Allium sativum* L., a perennial herb of the genus *Allium* in the family Liliaceae. It is mainly produced in Jimsar County, Akqi County, Qiemo County, Zhaosu County, and others. It has the effects of detoxifying and reducing swelling, killing parasites, and relieving diarrhea.

2.6 Brassicaceae Isatidis Radix is the dried root of *Isatis indigotica* Fort., a biennial herb of the genus *Isatis* in the family Brassicaceae. Isatidis Folium is the dried leaf of the same plant. They are cultivated in many areas of Xinjiang, especially in Hotan Prefecture, Kashgar Prefecture, Ili Prefecture, Hami City, Changji Prefecture, Altay Prefecture, and others. The root has the effects of clearing heat and detoxifying, cooling blood and relieving sore throat. The leaf has the effects of clearing heat and detoxifying, cooling blood and eliminating macules.

Brassica rapa L., a biennial herb of the genus *Brassica* in the family Brassicaceae, provides its seeds as a medicinal material. It is mainly produced in Aksu Prefecture, Hotan Prefecture, and others. It has the effects of nourishing the liver and improving eyesight, promoting qi flow and diuresis, and clearing heat and detoxifying.

2.7 Campanulaceae Codonopsis Radix is the dried root of *Codonopsis pilosula* (Franch.) Nannf, a perennial herbaceous vine of the genus *Codonopsis* in the family Campanulaceae. It is mainly produced in Habahe County, Heshuo County, Gongliu County, Urumqi County, Hejing County, and others. It has the effects of strengthening the spleen and benefiting the lung, nourishing blood

and generating fluids.

2.8 Ranunculaceae Nigellae Semen is the dried mature seed of *Nigella glandulifera* Freyn & Sint., an annual herb of the genus *Nigella* in the family Ranunculaceae. It is mainly produced in Hotan Prefecture, Aksu Prefecture, Kashgar Prefecture, Ili Prefecture, and others. It is a commonly used Uyghur medicinal material, with the effects of generating dryness and heat, promoting hair growth and blackening, strengthening sinews and muscles, and promoting menstruation and lactation.

2.9 Boraginaceae Arnebiae Radix is the dried root of *Arnebia euchroma* (Royle) Johnst., a perennial herb of the genus *Arnebia* in the family Boraginaceae. It is mainly produced in the Tianshan Mountains, including Hejing County, Urumqi County, Dabancheng District, Jinghe County, Wenquan County, Tekes County, Gongliu County, Zhaosu County, and others. It has the effects of cooling blood, promoting blood circulation, and relieving toxicity and promoting eruption of rashes.

2.10 Violaceae *Viola kunawarensis* Royle Illustr., a perennial dwarf herb of the genus *Viola* in the family Violaceae, provides its dried whole plant or flowers as medicinal materials. It is mainly produced in Qitai County, Fukang City, Urumqi County, Shawan City, Zhaosu County, Heshuo County, Hejing County, Wuqia County, Tashkurgan County, Qira County, and others. The whole plant has the effects of dispelling wind and clearing heat, detoxifying and reducing swelling. The flowers have the effects of dispersing wind and clearing heat, detoxifying, and reducing swelling.

2.11 Malvaceae *Alcea rosea* L., a biennial or perennial herb of the genus *Alcea* in the family Malvaceae, provides its dried flowers or dried mature fruits as medicinal materials. It is widely cultivated in various parts of Xinjiang. The flowers have the effects of harmonizing blood and stopping bleeding, detoxifying and dispersing nodules. The fruits have the effects of promoting diuresis and relieving strangury, detoxifying and expelling pus, and moistening the intestines.

2.12 Clusiaceae Hyperici Perforati Herba is the dried aerial part of *Hypericum perforatum* L., a perennial herb of the genus *Hypericum* in the family Hypericaceae. It is mainly produced in Ili Prefecture, Tacheng Prefecture, Bayingolin Prefecture, and others. It has the effects of soothing the liver and relieving depression, clearing heat and draining dampness, and reducing swelling and promoting lactation.

2.13 Nymphaeaceae *Nymphaea candida* J. Presl & C. Presl, a perennial aquatic herb of the genus *Nymphaea* in the family Nymphaeaceae, provides its dried flower buds as a medicinal material. It is mainly produced in Burqin County, Yining County, Gongliu County, Zhaosu County, Qapqal County, Bohu County, and others. It has the effects of clearing heat and detoxifying, calming the mind and promoting sleep, and beautifying the skin.

2.14 Orobanchaceae Cistanches Herba is the fleshy stem with scale leaves of *Cistanche deserticola* Y. C. Ma or *Cistanche tubulosa* (Schrenk) Wight, perennial parasitic herbaceous plants of the genus *Cistanche* in the family Orobanchaceae. It is mainly produced at the edges of the Taklimakan Desert and the Gurbantunggüt Desert, particularly in Hotan Prefecture, Kashgar Prefecture, Aksu Prefecture, Turpan City, Bayingolin Prefecture, Changji Prefecture, and others. It has the effects of tonifying kidney yang, replenishing essence and blood, and moistening the intestines to relieve constipation. *Cistanche deserticola* is often parasitic on the roots of plants of

the genus *Haloxylon* Bunge, while *Cistanche tubulosa* is often parasitic on the roots of plants of the genus *Tamarix* L.

2.15 Cynomoriaceae *Cynomorii Herba* is the fleshy stem of *Cynomorium sogaricum* Rupr., a perennial parasitic succulent herb of the genus *Cynomorium* in the family *Cynomoriaceae*. It is parasitic on the roots of plants of the genus *Nitraria* L. It is mainly produced in Jinghe County, Ruqiang County, Burqin County, Habahe County, Yumin County, Emin County, Tacheng City, Hoboksar County, Yining County, Yutian County, Minfeng County, and others. It has the effects of tonifying kidney yang, replenishing essence and blood, and moistening the intestines to relieve constipation.

2.16 Apocynaceae *Apocyni Veneti Folium* is the dried leaf of *Apocynum venetum* L. or *Apocynum pictum* Schrenk, subshrub fiber plants of the genus *Apocynum* in the family *Apocynaceae*. It is mainly produced in Altay City, Jimunai County, Jinghe County, Yining County, Yuli County, Shaya County, Minfeng County, Luopu County, Yutian County, and others. It has the effects of calming the liver and tranquilizing the mind, clearing heat and promoting diuresis.

2.17 Ephedraceae *Ephedrae Herba* is the dried herbaceous stem of *Ephedra intermedia* Schrenk et C. A. Mey. or *Ephedra equisetina* Bge., subshrubs of the genus *Ephedra* in the family *Ephedraceae*. *Ephedrae Radix Et Rhizoma* is the dried root and rhizome of *E. intermedia* Schrenk et C. A. Mey. They are mainly produced in Urumqi City, Hami City, Altay Prefecture, Tacheng Prefecture, Bortala Prefecture, Bayingolin Prefecture, Ili Prefecture, and others. The stem has the effects of inducing sweating and relieving the exterior, ventilating the lung and relieving asthma, and promoting diuresis and reducing edema. The root and rhizome have the effects of stopping sweating, relieving asthma, and promoting diuresis.

2.18 Rosaceae *Rosa damascena* Mill., a deciduous shrub of the genus *Rosa* in the family *Rosaceae*, provides its processed dried petals and flower buds as a medicinal material. It is mainly produced in Hotan Prefecture, Kashgar Prefecture, and others. It has the effects of promoting qi flow and relieving depression, harmonizing blood, and alleviating pain.

Armeniaca Semen Amarum is the dried mature seed of *Prunus armeniaca* L., a deciduous tree of the genus *Prunus* in the family *Rosaceae*. It is mainly produced in Ili Prefecture, Bortala Prefecture, Kashgar Prefecture, Hotan Prefecture, and others. It has the effects of descending qi, relieving cough and asthma, and moistening the intestines to relieve constipation.

Prunus domestica L., a deciduous shrub of the genus *Prunus* in the family *Rosaceae*, provides its dried nearly mature fruits as a medicinal material. It is mainly produced in Jiashi County, Shache County, Yuepuhu County, Yengisar County, Yining City, Huocheng County, Pishan County, and others. It has the effects of moistening dryness and lubricating the intestines, and descending qi and promoting diuresis.

Cydonia oblonga Mill., a deciduous shrub of the genus *Cydonia* in the family *Rosaceae*, provides its dried mature fruits or seeds as medicinal materials. It is mainly produced in Hotan Prefecture, Kashgar Prefecture, Kizilsu Prefecture, Aksu Prefecture, Bayingolin Prefecture, and others. The fruit has the effects of dispelling dampness and relieving summer heat, and relaxing sinews and promoting circulation. The seeds have the effects of moistening the throat and relieving cough, protecting mucous membranes, and aiding digestion.

2.19 Solanaceae *Physalis Calyx Seu Fructus* is the dried calyx or the calyx with fruit of *Physalis alkekengi* L. var. *francheti* (Mast.) Makino, a perennial herb of the genus *Physalis* in the family *Solanaceae*. It is mainly produced in Changji Prefecture, Hotan Prefecture, Kashgar Prefecture, and others. It has the effects of clearing heat and detoxifying, relieving sore throat and resolving phlegm, and promoting diuresis and treating stranguria.

Lycii Fructus is the dried mature fruit of *Lycium barbarum* L., a shrub of the genus *Lycium* in the family *Solanaceae*. It is mainly produced in Bortala Prefecture, Bayingolin Prefecture, Ili Prefecture, Altay Prefecture, and others. It has the effects of nourishing the liver and kidney, and improving eyesight.

2.20 Rhamnaceae *Ziziphi Jujubae Fructus* is the dried mature fruit of *Ziziphus jujuba* Mill., a small deciduous tree of the genus *Ziziphus* in the family *Rhamnaceae*. It is mainly produced in Hotan Prefecture, Kashgar Prefecture, Aksu Prefecture, Bayingolin Prefecture, Hami City, and others. It has the effects of tonifying qi and blood, strengthening the spleen and benefiting the stomach, and nourishing the heart and tranquilizing the mind.

Ziziphi Spinosae Semen is the dried mature seed of *Ziziphus jujuba* Mill. var. *spinosa* (Bunge) Hu ex H. F. Chou, a deciduous shrub or small tree of the genus *Ziziphus* in the family *Rhamnaceae*. It is mainly produced in Hotan Prefecture, Kashgar Prefecture, Aksu Prefecture, Bayingolin Prefecture, and others. It has the effects of nourishing the heart and tonifying the liver, calming the mind and tranquilizing the spirit, arresting sweating, and promoting fluid production.

2.21 Elaeagnaceae *Hippophae Fructus* is the dried mature fruit of *Hippophae rhamnoides* L., a deciduous shrub or small tree of the genus *Hippophae* in the family *Elaeagnaceae*. It is widely cultivated in various parts of Xinjiang, especially in Altay Prefecture, Tacheng Prefecture, Ili Prefecture, Changji Prefecture, Kizilsu Prefecture, and others. It has the effects of strengthening the spleen and aiding digestion, relieving cough and eliminating phlegm, and promoting blood circulation and removing blood stasis.

2.22 Moraceae *Mori Fructus* is the dried fruit spike of *Morus alba* L., a deciduous tree of the genus *Morus* in the family *Moraceae*. It is widely cultivated in various parts of Xinjiang. It has the effects of nourishing blood and yin, promoting fluid production and moistening dryness, improving eyesight and promoting black hair.

2.23 Punicaceae *Granati Pericarpium* is the dried fruit peel of *Punica granatum* L., a deciduous shrub or small tree of the genus *Punica* in the family *Punicaceae*. The dried mature fruit and the dried flower petals of the same plant are also used as medicinal materials. They are mainly produced in Hotan Prefecture, Kashgar Prefecture, and others. The fruit peel has the effects of astringing and stopping diarrhea, arresting bleeding, and expelling intestinal parasites. The fruit has the effect of promoting fluid production and quenching thirst. The flower petals have the effects of astringing and stopping bleeding, and clearing heat and draining dampness.

2.24 Cervidae *Cervus elaphus* Linnaeus, a large deer of the genus *Cervus* in the family *Cervidae*, provides four types of medicinal materials: *Cervi Cornu*, which is the ossified antler or the base of the antler shed in spring after the previous year's antler cutting; *Cervi Cornu Colla*, which is the solid glue made by decocting and concentrating the antler in water; *Cervi Cornu Pulvis*, which is the antler residue after the removal of gelatin; and *Cervi Cornu Pantotrichum*, which is the immature, non ossified antler covered with

dense hair of the male deer. They are mainly farmed in Bayingolin Prefecture, Bortala Prefecture, Ili Prefecture, Aksu Prefecture, and others. Cervi Cornu has the effects of warming kidney yang, strengthening sinews and bones, and promoting blood circulation and reducing swelling. Cervi Cornu Colla has the effects of nourishing blood and replenishing essence. Cervi Cornu Pulvis has the effects of warming and tonifying kidney yang, consolidating essence and reducing urination, and astringing and stopping bleeding. Cervi Cornu Pantotrichum has the effects of tonifying kidney yang, benefiting essence and blood, and strengthening sinews and bones.

3 Characteristic medicinal materials

According to the *Catalog of Characteristic Medicinal Materials in Xinjiang Uygur Autonomous Region (First Batch)*, there are 51 types of characteristic medicinal materials, including 49 plant medicinal materials and 2 animal medicinal materials, involving 27 families, 47 genera, and 50 species of medicinal plants, as well as 2 families, 2 genera, and 2 species of medicinal animals. Among the medicinal plants, there are 37 species of herbs, 8 species of woody plants, and 5 species of subshrubs: *Alhagi sparsifolia* Shap., *Sophora flavescens* Ait., *Sophora alopecuroides* L., *Ziziphora clinopodioides* Lam., and *Capparis spinosa* L.

3.1 Asteraceae *Artemisia Absinthii* Herba is the dried aerial part of *Artemisia absinthium* L., a perennial herb of the genus *Artemisia* in the family Asteraceae. It is mainly produced in Manas County, Tacheng City, Emin County, Yumin County, Tuoli County, Huocheng County, Gongliu County, Xinyuan County, Fukang City, and others. It has the effects of clearing heat and draining dampness, expelling ascarids, and strengthening the stomach.

Farfarae Flos is the dried flower bud of *Tussilago farfara* L., a perennial herb of the genus *Tussilago* in the family Asteraceae. It is mainly produced in Xinyuan County, Gongliu County, Yumin County, Bole City, Wenquan County, Jimsar County, and others. It has the effects of moistening the lung and descending qi, relieving cough and resolving phlegm.

Arctii Fructus is the dried mature fruit of *Arctium lappa* L., a biennial herb of the genus *Arctium* in the family Asteraceae; the dried root of the same plant is also used as a medicinal material. They are mainly produced in Ili Prefecture, Altay Prefecture, Tacheng Prefecture, and others. The fruit has the effects of dispersing wind-heat, ventilating the lung and promoting eruption of rashes, and detoxifying and relieving sore throat. The root has the effects of dispersing wind-heat and reducing toxic swelling.

Taraxaci Herba is the dried whole plant of *Taraxacum mongolicum* Hand.-Mazz., *Taraxacum borealisinense* Kitag., or other species of the same genus. It is widely distributed in various parts of Xinjiang. It has the effects of clearing heat and detoxifying, reducing swelling and resolving nodules, and promoting diuresis and relieving stranguria.

Asteris Radix Et Rhizoma is the dried root and rhizome of *Aster tataricus* L. f., a perennial herb of the genus *Aster* in the family Asteraceae. It is mainly produced in Shaya County, Baicheng County, Zhaosu County, Tekes County, Shihezi City, and others. It has the effects of moistening the lung and descending qi, eliminating phlegm and relieving cough.

Rhaponticum carthamoides (Willd.) Iljin, a perennial herb of the genus *Rhaponticum* in the family Asteraceae, provides its dried rhizome as a medicinal material. It is mainly produced in Fuyun

County, Burqin County, Habahe County, Emin County, Tacheng City, and others. It has the effects of tonifying qi and strengthening the spleen, calming the mind, and nourishing the brain.

3.2 Fabaceae *Alhagi sparsifolia* Shap., a subshrub of the genus *Alhagi* in the family Fabaceae, provides its dried aerial part as a medicinal material. It is widely distributed in various parts of Xinjiang. It has the effects of astringing the intestines and stopping diarrhea, and alleviating pain.

Sophorae Flavescentis Radix is the dried root of *Sophora flavescens* Ait., a subshrub of the genus *Sophora* in the family Fabaceae. It is mainly produced in Makit County, Heshuo County, Shaya County, Qinghe County, and others. It has the effects of clearing heat and draining dampness, killing parasites, and promoting diuresis.

Sophora alopecuroides L., a perennial herb or subshrub of the genus *Sophora* in the family Fabaceae, provides its dried mature seeds as a medicinal material. It is widely distributed in various parts of Xinjiang. It has the effects of clearing heat and draining dampness, relieving pain, and killing parasites.

Astragali Complanati Semen is the dried mature seed of *Astragalus complanatus* R. Br., a perennial herb of the genus *Astragalus* in the family Fabaceae. It is mainly produced in Hotan Prefecture and others. It has the effects of tonifying the kidney and consolidating essence, securing essence and reducing urination, and nourishing the liver and improving eyesight.

3.3 Lamiaceae *Ocimum basilicum* L., an annual herb of the genus *Ocimum* in the family Lamiaceae, provides its dried aerial parts or mature fruits as medicinal materials. It is mainly produced in Ili Prefecture, Hotan Prefecture, Bayingolin Prefecture, Aksu Prefecture, and others. The aerial parts have the effects of dispersing wind and relieving the exterior, resolving dampness and harmonizing the middle, promoting qi circulation and activating blood, and detoxifying and reducing swelling. The fruits have the effects of clearing heat, improving eyesight, and dispelling nebula.

Scutellariae Radix is the dried root of *Scutellaria baicalensis* Georgi, a perennial herb of the genus *Scutellaria* in the family Lamiaceae. It is mainly produced in Heshuo County, Qinghe County, Changji City, Fukang City, Jimsar County, Gongliu County, Yining County, Luopu County, Yutian County, and others. It has the effects of clearing heat and draining dampness, purging fire and detoxifying, stopping bleeding, and calming the fetus.

Ziziphora clinopodioides Lam., a subshrub of the genus *Ziziphora* in the family Lamiaceae, provides its dried aerial part as a medicinal material. It is mainly produced in the Tianshan Mountains, the Altay Mountains, and others. It has the effects of dispersing wind-heat and calming the mind and tranquilizing the spirit.

Perillae Folium is the dried leaf (or with young branches), *Perillae Caulis* is the dried stem, and *Perillae Fructus* is the dried mature fruit of *Perilla frutescens* (L.) Britt., an annual herb of the genus *Perilla* in the family Lamiaceae. They are mainly produced in Ili Prefecture, Changji Prefecture, Tacheng Prefecture, and others. The leaf has the effects of relieving the exterior and dispelling cold, promoting qi flow and harmonizing the stomach. The stem has the effects of regulating qi and soothing the middle, relieving pain, and calming the fetus. The fruit has the effects of descending qi and resolving phlegm, relieving cough and asthma, and moistening the intestines to relieve constipation.

Salviae Miltiorrhizae Radix Et Rhizoma is the dried root and rhizome of *Salvia miltiorrhiza* Bge. , a perennial herb of the genus *Salvia* in the family Lamiaceae. It is mainly produced in Makit County, Minfeng County, Alar City, Gongliu County, and others. It has the effects of promoting blood circulation and removing blood stasis, regulating menstruation and relieving pain, clearing heart fire and relieving restlessness, and cooling blood and reducing carbuncles.

3.4 Apiaceae *Anethum graveolens* L. , an annual herb of the genus *Anethum* in the family Apiaceae, provides its dried mature fruits as a medicinal material. It is mainly produced in Yining City, Huocheng County, Qapqal County, Xinyuan County, and others. It has the effects of warming the spleen and stimulating appetite, dispelling cold and warming the liver, and regulating qi and relieving pain.

Trachyspermum ammi (L.) Sprague, a perennial herb of the genus *Trachyspermum* in the family Apiaceae, provides its dried mature fruits or their processed products as a medicinal material. It is mainly produced in Hotan Prefecture, Kashgar Prefecture, Hami City, and others. It has the effects of dispelling wind and relieving pain, warming the middle and promoting qi flow, and promoting digestion and resolving food stagnation.

Pimpinella anisum L. , an annual herb of the genus *Pimpinella* in the family Apiaceae, provides its dried mature fruits as a medicinal material. It is mainly produced in Urumqi County, Toksun County, Yuepuhu County, Awat County, Jimsar County, Yanqi County, and others. It has the effects of preventing cancer, stimulating appetite and aiding digestion, and resolving phlegm and relieving cough.

Saposhnikovia Radix is the dried root of *Saposhnikovia divaricata* (Turcz.) Schischk. , a perennial herb of the genus *Saposhnikovia* in the family Apiaceae. It is mainly produced in Heshuo County, Habahe County, Jinghe County, Gongliu County, Tekes County, Nilka County, and others. It has the effects of dispelling wind and relieving the exterior, eliminating dampness and relieving pain, and relieving spasms.

Bupleuri Radix is the dried root of *Bupleurum chinense* DC. , a perennial herb of the genus *Bupleurum* in the family Apiaceae. It is mainly produced in Gongliu County, Habahe County, Qinghe County, and others. It has the effects of dispersing and reducing fever, soothing the liver and relieving depression, and raising yang qi.

Angelicae Dahuricae Radix is the dried root of *Angelica dahurica* (Fisch. ex Hoffm.) Benth. et Hook. f. , a tall perennial herb of the genus *Angelica* in the family Apiaceae. It is mainly produced in Ili Prefecture, Kashgar Prefecture, Bayingolin Prefecture, and others. It has the effects of relieving the exterior and dispelling cold, dispelling wind and relieving pain, unblocking the nasal passages, drying dampness and stopping leukorrhea, and reducing swelling and expelling pus.

Conioselinum vaginatum (Spreng.) Thell. , a perennial herb of the genus *Conioselinum* in the family Apiaceae, provides its dried rhizome as a medicinal material. It is mainly produced in Xinyuan County, Nilka County, Gongliu County, Tekes County, and others. It has the effects of dispelling wind and eliminating dampness, and dispelling cold and relieving pain.

3.5 Iridaceae *Crocus Stigma* is the dried stigma of *Crocus sativus* L. , a perennial herb of the genus *Crocus* in the family Iridaceae. It is mainly produced in Pishan County, Moyu County, Hotan City,

and others. It has the effects of promoting blood circulation and removing blood stasis, cooling blood and detoxifying, and relieving depression and calming the mind.

Belamcandae Rhizoma is the dried rhizome of *Belamcanda chinensis* (L.) DC, a perennial herb of the genus *Belamcanda* in the family Iridaceae. It is mainly produced in Altay Prefecture, Ili Prefecture, Hotan Prefecture, and others. It has the effects of clearing heat and detoxifying, resolving phlegm, and relieving sore throat.

3.6 Liliaceae *Anemarrhenae Rhizoma* is the dried rhizome of *Anemarrhena asphodeloides* Bge. , a perennial herb of the genus *Anemarrhena* in the family Liliaceae. It is mainly produced in Shule County, Shaya County, Kunyu City, Shihezi City, and others. It has the effects of clearing heat and purging fire, and nourishing yin and moistening dryness.

3.7 Brassicaceae *Lepidium sativum* L. , an annual herb of the genus *Lepidium* in the family Brassicaceae, provides its dried mature seeds as a medicinal material. It is mainly produced in Altay Prefecture, Tacheng Prefecture, Changji Prefecture, Ili Prefecture, Bortala Prefecture, and others. It has the effects of reducing inflammation, lowering fever, and relieving pain.

3.8 Ranunculaceae *Paeoniae Radix Alba* is the dried root of *Paeonia lactiflora* Pall. , a perennial herb of the genus *Paeonia* in the family Ranunculaceae. It is mainly produced in Shufu County, Emin County, Xinyuan County, Yining City, Gongliu County, Zhaosu County, Yanqi County, Toksun County, and others. It has the effects of nourishing blood and softening the liver, relieving pain and harmonizing the middle, and astringing yin and arresting sweating.

3.9 Boraginaceae *Arnebiae Radix* is the dried root of *Arnebia guttata* Bunge, a perennial herb of the genus *Arnebia* in the family Boraginaceae. It is widely distributed in various parts of Xinjiang. It has the effects of clearing heat and cooling blood, promoting blood circulation and detoxifying, and promoting eruption of rashes and eliminating macules.

3.10 Violaceae *Violae Herba* is the dried whole plant of *Viola yedoensis* Makino, a perennial herb of the genus *Viola* in the family Violaceae. It is mainly produced in Ili Prefecture, Bortala Prefecture, Urumqi City, and others. It has the effects of clearing heat and detoxifying, cooling blood and reducing swelling.

3.11 Zygophyllaceae *Peganum harmala* L. , a perennial herb of the genus *Peganum* in the family Zygophyllaceae, provides its dried mature seeds or aerial parts as medicinal materials. It is widely distributed in various parts of Xinjiang. The seeds have the effects of relieving cough and asthma, dispelling wind-dampness, and relieving depression. The aerial parts have the effects of dispelling wind-dampness and reducing toxic swelling.

3.12 Crassulaceae *Rhodiola rosea* L. , a perennial herb of the genus *Rhodiola* in the family Crassulaceae, provides its dried root and rhizome as a medicinal material. It is mainly produced in Qinghe County, Fuyun County, Burqin County, Habahe County, Qitai County, Urumqi County, Hoboksar County, Emin County, Bole City, Wenquan County, Huocheng County, Tekes County, Hejing County, and others. It has the effects of antioxidation, anti fatigue, regulating immunity, and protecting the cardiovascular system.

3.13 Euphorbiaceae *Euphorbia sororia* Schrenk. , an annual herb of the genus *Euphorbia* in the family Euphorbiaceae, provides its dried mature fruits or whole plant as medicinal materials. It is

mainly produced in Urumqi County, Fukang City, and others. The fruits have the effects of dissipating cold qi. The whole plant has the effect of purging water.

Euphorbiae Humifusae Herba is the dried whole plant of *Euphorbia humifusa* Willd., an annual herb of the genus *Euphorbia* in the family Euphorbiaceae. It is widely distributed in various parts of Xinjiang. It has the effects of clearing heat and detoxifying, cooling blood and stopping bleeding, and promoting diuresis and alleviating jaundice.

3.14 Urticaceae *Urtica cannabina* L., a perennial herb of the genus *Urtica* in the family Urticaceae, provides its dried mature fruits as a medicinal material. It is widely distributed in various parts of Xinjiang. It has the effects of dispelling wind and eliminating dampness, promoting blood circulation and unblocking collaterals, and detoxifying and reducing swelling.

3.15 Scrophulariaceae *Rehmanniae Radix* is the fresh or dried root tuber of *Rehmannia glutinosa* Libosch., a perennial herb of the genus *Rehmannia* in the family Scrophulariaceae. It is mainly produced in Bayingolin Prefecture, Ili Prefecture, Aksu Prefecture, Hotan Prefecture, and others. It has the effects of clearing heat and cooling blood, and nourishing yin and promoting fluid production.

Scrophulariae Radix is the dried root of *Scrophularia ningpoensis* Hemsl., a tall perennial herb of the genus *Scrophularia* in the family Scrophulariaceae. It is mainly produced in Shufu County, Yengisar County, Yutian County, Shaya County, Huocheng County, Qitai County, and others. It has the effects of nourishing yin, reducing fire, relieving restlessness, and detoxifying.

3.16 Plumbaginaceae *Limonium gmelinii* (Willd.) Kuntze, a perennial herb of the genus *Limonium* in the family Plumbaginaceae, provides its root or whole plant as a medicinal material. It is mainly produced in Altay Prefecture, Tacheng Prefecture, Ili Prefecture, and others. It has the effects of nourishing blood and beautifying the skin, regulating immunity, and exerting antioxidant effects.

3.17 Cucurbitaceae *Trichosanthis Fructus* is the dried mature fruit, and *Trichosanthis Radix* is the dried root, of *Trichosanthes kirilowii* Maxim., a perennial climbing herbaceous vine of the genus *Trichosanthes* in the family Cucurbitaceae. They are mainly produced in Hotan Prefecture and others. The fruit has the effects of clearing heat and resolving phlegm, relieving chest stuffiness and dispersing nodules, and moistening the intestines to relieve constipation. The root has the effects of clearing heat and purging fire, promoting fluid production and quenching thirst, and reducing swelling and expelling pus.

Citrullus colocynthis (L.) Schrad., a perennial herbaceous vine of the genus *Citrullus* in the family Cucurbitaceae, provides its dried mature fruit as a medicinal material. It is mainly produced in Fukang City, Gongliu County, Luopu County, Hotan City, and others. It has the effects of purging, expelling parasites, and reducing inflammation.

3.18 Polyporaceae *Fomes officinalis* (Vill. ex Fr.) Ames, a fungus of the genus *Fomes* in the family Polyporaceae, provides its dried fruiting body as a medicinal material. It is mainly produced in the Tianshan Mountains, the Altay Mountains, and the Ili River Valley, among others. It has the effects of relieving cough and resolving phlegm, exerting antibacterial and anti-inflammatory actions, and regulating immunity.

3.19 Solanaceae *Lycium ruthenicum* Murray, a thorny shrub of

the genus *Lycium* in the family Solanaceae, provides its dried mature fruits as a medicinal material. It is widely distributed in various parts of Xinjiang. It has the effects of tonifying the kidney, replenishing essence, nourishing the liver, improving eyesight, and promoting fluid production.

3.20 Moraceae *Ficus carica* L., a deciduous shrub or small tree of the genus *Ficus* in the family Moraceae, provides its mature or nearly mature fruits (which contain the enclosed flowers and achenes) as dried figs, and its dried leaves as medicinal materials. They are cultivated in many areas of Xinjiang, especially in Kashgar Prefecture, Hotan Prefecture, Turpan City, and others. The dried fruits have the effects of moistening the lung and relieving cough, strengthening the stomach and promoting bowel movement, and clearing heat and promoting fluid production. The leaves have the effects of clearing damp-heat, relieving sores and toxins, and reducing swelling and alleviating pain.

3.21 Ericaceae *Vaccinium myrtillus* L., a deciduous shrub of the genus *Vaccinium* in the family Ericaceae, provides its dried aerial part as a medicinal material. It is mainly produced in Altay City, Habahe County, Burqin County, Fuyun County, and others. It has the effects of detoxifying and promoting diuresis.

3.22 Vitaceae *Vitis vinifera* L. 'SuoSuo', a woody vine of the genus *Vitis* in the family Vitaceae, provides its dried mature fruits as a medicinal material. 'SuoSuo' is a grape cultivar. It is mainly produced in Turpan City. It has the effects of tonifying qi and blood, strengthening sinews and bones, and promoting diuresis.

3.23 Capparaceae *Capparis spinosa* L., a subshrub of the genus *Capparis* in the family Capparaceae, provides its dried nearly mature fruits or root bark as medicinal materials. It is widely distributed in various parts of Xinjiang. The root bark has the effects of dispelling wind and relieving pain, eliminating dampness and dispelling cold. The fruits have the effects of dispelling wind and eliminating dampness, relieving pain, and reducing swelling.

3.24 Cupressaceae *Juniperus sabina* L., a prostrate shrub of the genus *Juniperus* in the family Cupressaceae, provides its fruits as a medicinal material. It is mainly produced in the Tianshan Mountains, the Altay Mountains, and others. It has the effects of dispelling wind and clearing heat, and promoting diuresis.

3.25 Caprifoliaceae *Lonicerae Japonicae Flos* is the dried flower bud or the flower at the early opening stage of *Lonicera japonica* Thunb., a semi-evergreen twining vine of the genus *Lonicera* in the family Caprifoliaceae. It is mainly produced in Kizilsu Prefecture, Ili Prefecture, and others. It has the effect of clearing heat and detoxifying.

3.26 Oleaceae *Forsythiae Fructus* is the dried fruit of *Forsythia suspensa* (Thunb.) Yahl, a shrub of the genus *Forsythia* in the family Oleaceae. It is mainly produced in Yining City, Huocheng County, Tekes County, Zhaosu County, Manas County, Hutubi County, Yutian County, Makit County, Tiemenguan City, and others. It has the effects of clearing heat and detoxifying, reducing swelling and resolving nodules, and dispersing wind-heat.

3.27 Rosaceae *Rosae Rugosae Flos* is the dried flower bud of *Rosa rugosa* Thunb., a shrub of the genus *Rosa* in the family Rosaceae. It is mainly produced in Hotan Prefecture, Ili Prefecture, Changji Prefecture, and others. It has the effects of promoting qi flow and relieving depression, harmonizing blood, and alleviating pain.

3.28 Equidae *Asini Corii Colla* is the solid glue made by decoc-

ting and concentrating the dried or fresh hide of *Equus asinus* L. , a mammal of the genus *Equus* in the family Equidae. It is raised in many areas of Xinjiang. It has the effects of nourishing blood and yin, moistening dryness, and stopping bleeding.

3.29 Buthidae Scorpio is the dried body of *Buthus martensii* Karsch, an arachnid of the genus *Buthus* in the family Buthidae. It is mainly produced in Changji Prefecture, Ili Prefecture, Kizilsu Prefecture, and others. It has the effects of extinguishing wind and relieving convulsions, counteracting toxicity and resolving masses, and unblocking collaterals and relieving pain.

4 Intellectual property resources related to medicinal materials

Intellectual property related to genuine and characteristic medicinal materials can be classified into cultural heritage^[16], brand and trademark^[17], and scientific and technological innovation^[18].

4.1 Cultural heritage intellectual property Cultural heritage intellectual property is characterized by inheritance, collectivity, regionality, timelessness, and wholeness. It mainly refers to traditional knowledge in a broad sense, including genetic resources of medicinal organisms (germplasm resources), traditional knowledge, and expressions of traditional culture (particularly intangible cultural heritage).

4.1.1 Genetic resources of medicinal organisms. Xinjiang is a strategic area for genetic resources of medicinal organisms^[15]. Protecting the germplasm resources of medicinal organisms is to safeguard the root and lifeblood of Chinese medicinal materials^[19]. The above-mentioned 44 types of genuine medicinal materials and 51 types of characteristic medicinal materials, totaling 95 medicinal materials, involve 41 families, 86 genera, and 106 species of medicinal plants and animals, many of which are unique genetic resources of medicinal organisms.

Among them, there are 15 species of Asteraceae plants: *Saussurea involucrata* (Kar. & Kir.) Sch.-Bip., *Carthamus tinctorius* L., *Cichorium glandulosum* Boiss et Huet, *Cichorium intybus* L., *Artemisia rupestris* L., *Matricaria chamomilla* L., *Vernonia anthelmintica* (L.) Willd., *Helichrysum arenarium* (L.) Moench, *Artemisia absinthium* L., *Tussilago farfara* L., *Arctium lappa* L., *Taraxacum mongolicum* Hand.-Mazz., *Taraxacum borealisinense* Kitag., *Aster tataricus* L. f., and *Rhaponticum carthamoides* (Willd.) Iljin.

There are 10 species of Fabaceae plants: *Glycyrrhiza uralensis* Fisch., *Glycyrrhiza inflata* Batal., *Glycyrrhiza glabra* L., *Trigonella foenum-graecum* L., *Astragalus membranaceus* (Fisch.) Bunge var. *mongolicus* (Bunge) P. K. Hsiao, *Astragalus membranaceus* (Fisch.) Bunge., *Alhagi sparsifolia* Shap., *Sophora flavescens* Ait., *Sophora alopecuroides* L., *Astragalus complanatus* R. Br.

There are 10 species of Lamiaceae plants: *Mentha haplocalyx* Briq., *Dracocephalum moldavica* L., *Hyssopus cuspidatus* Boriss., *Hyssopus officinalis* L., *Lavandula angustifolia* Mill., *Ocimum basilicum* L., *Scutellaria baicalensis* Georgi, *Ziziphora clinopodioides* Lam., *Perilla frutescens* (L.) Britt., *Salvia miltiorrhiza* Bge.

There are 11 species of Apiaceae plants: *Ferula sinkiangensis* K. M. Shen, *Ferula fukanensis* K. M. Shen, *Foeniculum vulgare* Mill., *Cuminum cyminum* L., *Anethum graveolens* L., *Trachyspermum ammi* (L.) Sprague, *Pimpinella anisum* L., *Saposhnikovia divaricata* (Turcz.) Schischk., *Bupleurum chinense* DC., *Angelica dahurica* (Fisch. ex Hoffm.) Benth. et Hook. f., *Conioselinum vaginatum* (Spreng.) Thell.

There are 5 species of Rosaceae plants: *Rosa damascena* Mill., *Rosa rugosa* Thunb., *Prunus armeniaca* L., *Prunus domestica* L., *Cydonia oblonga* Mill.

There are 4 species of Liliaceae plants: *Fritillaria walujewii* Regel, *Fritillaria pallidiflora* Schrenk, *Allium sativum* L., *Anemarrhena asphodeloides* Bge.

There are 3 species of Brassicaceae plants: *Isatis indigotica* Fort., *Brassica rapa* L., *Lepidium sativum* L.

There are 3 species of Solanaceae plants: *Physalis alkekengi* L. var. *francheti* (Mast.) Makino, *Lycium barbarum* L., *Lycium ruthenicum* Murray.

There are 2 species of Euphorbiaceae plants: *Euphorbia sororia* Schrenk. and *Euphorbia humifusa* Willd.

There are 2 species of Cucurbitaceae plants: *Trichosanthes kirilowii* Maxim. and *Citrullus colocynthis* (L.) Schrad.

There are 2 species of Ranunculaceae plants: *Nigella glandulifera* Freyn & Sint. and *Paeonia lactiflora* Pall.

There are 2 species of Iridaceae plants: *Crocus sativus* L. and *Belamcanda chinensis* (L.) DC.

There are 2 species of Violaceae plants: *Viola kunawarensis* Royle Illustr. and *Viola yedoensis* Makino.

There are 2 species of Scrophulariaceae plants: *Rehmannia glutinosa* Libosch. and *Scrophularia ningpoensis* Hemsl.

There are 2 species of Boraginaceae plants: *Arnebia euchroma* (Royle) Johnst and *Arnebia guttata* Bunge.

There are 2 species of Orobanchaceae plants: *Cistanche deserticola* Y. C. Ma and *Cistanche tubulosa* (Schrenk) Wight.

There are 2 species of Ephedraceae plants: *Ephedra intermedia* Schrenk et C. A. Mey. and *Ephedra equisetina* Bge.

There are 2 species of Apocynaceae plants: *Apocynum venetum* L. and *Apocynum pictum* Schrenk.

There are 2 species of Moraceae plants: *Morus alba* L. and *Ficus carica* L.

There are 2 species of Rhamnaceae plants: *Ziziphus jujuba* Mill. and *Ziziphus jujuba* Mill. var. *spinosa* (Bunge) Hu ex H. F. Chou.

There are one species of Crassulaceae plants: *Rhodiola rosea* L., one species of Plumbaginaceae plants: *Limonium gmelinii* (Willd.) Kuntze; one species of Zygophyllaceae plants: *Peganum harmala* L.; one species of Urticaceae plants: *Urtica cannabina* L.; one species of Campanulaceae plants: *Codonopsis pilosula* (Franch.) Nannf; one species of Malvaceae plants: *Alcea rosea* L.; one species of Clusiaceae plants: *Hypericum perforatum* L.; one species of Nymphaeaceae plants: *Nymphaea candida* J. Presl & C. Presl.; one species of Cynomoriaceae plants: *Cynomorium sogaricum* Rupr.; one species of Polyporaceae plants: *Fomes officinalis* (Vill. ex Fr.) Ames.

There are one species of Punicaceae plants: *Punica granatum* L.; one species of Elaeagnaceae plants: *Hippophae rhamnoides* L.; one species of Vitaceae plants: *Vitis vinifera* L.; one species of Ericaceae plants: *Vaccinium myrtillus* L.; one species of Capparaceae plants: *Capparis spinosa* L.; one species of Oleaceae plants: *Forsythia suspensa* (Thunb.) Yahl.; one species of Cupressaceae plants: *Juniperus sabina* L.; one species of Caprifoliaceae: *Lonicera japonica* Thunb.

There are one species of Buthidae: *Buthus martensii* Karsch, one species of Equidae: *Equus asinus* L.; one species of Cervidae: *Cervus elaphus* Linnaeus.

In addition, in the *National Catalog of Livestock and Poultry Genetic Resources Breeds (2024 edition)*, the local breeds include Xinjiang donkey, Turpan donkey, Hotan grey donkey, and Ashan red deer. In the *List of State Key Protected Wild Animals (2021 edition)*, the red deer is listed as a state second-class protected animal.

In the *List of State Key Protected Wild Animals (2021 edition)*, the above plants are not listed into the state first-class protected species, while 16 species are listed into the state second-class protected species: *Saussurea involucrata* (Kar. & Kir.) Sch.-Bip., *Glycyrrhiza uralensis* Fisch., *Glycyrrhiza inflata* Batal., *Ferula sinkiangensis* K. M. Shen, *Ferula fukanensis* K. M. Shen, *Rosa rugosa* Thunb., *Prunus armeniaca* L., *Fritillaria walujewii* Regel, *Fritillaria pallidiflora* Schrenk, *Lycium ruthenicum* Murray, *Arnebia euchroma* (Royle) Johnst., *Cistanche deserticola* Y. C. Ma, *Cistanche tubulosa* (Schrenk) Wight, *Rhodiola rosea* L., *Nymphaea candida* J. Presl & C. Presl, and *Cynomorium sogaricum* Rupr.

4.1.2 Traditional knowledge. Xinjiang is rich in traditional knowledge related to medicinal materials, including knowledge of traditional cultivation and breeding of medicinal plants and animals, knowledge of collection and harvesting, traditional processing techniques, as well as knowledge of theories, diagnosis, prescriptions, treatment, and prevention in traditional medicines (such as Traditional Chinese Medicine, Uyghur medicine, Kazakh medicine, Mongolian medicine, Xibe medicine, Hui medicine, Manchu medicine, Kirgiz medicine, and others).

4.1.3 Intangible cultural heritage. Among the items inscribed on the *Representative List of the Intangible Cultural Heritage of Humanity*, only The Twenty-Four Solar Terms-knowledge in China of Time and Practices Developed Through Observation of the Sun's Annual Motion and Sericulture and Silk Craftsmanship of China are related to Xinjiang's medicinal materials.

Among the representative items of China's national intangible cultural heritage, Xinjiang has two items in the category of traditional medicine that involve the use of medicinal materials: IX-21 Uyghur medicine (including traditional processing skills of Uyghur medicine, the preparation technique of Muniziqi · Musili decoction making skills, Hotan medicinal tea preparation technique, dietary therapy, and the Kuxitai therapy), and IX-23 Kazakh medicine (including Bulaowu medicinal bath and fumigation therapy, and frostbite therapy).

Among the representative items of Xinjiang's autonomous region-level intangible cultural heritage, five items in the category of traditional medicine involve the use of medicinal materials: Uyghur medicine, Kazakh medicine, Xinjiang Mongolian medicine, TCM diagnosis and therapy, and sheepskin wrapping therapy.

4.2 Brand and trademark intellectual property Brand and trademark intellectual property refers to intellectual achievements in signs and logos, mainly including geographical indications, trademarks, and design patents for packaging and containers.

4.2.1 Geographical indications. Among the 95 medicinal materials mentioned above, which involve 106 biological species, there are 52 geographical indication products related to the same biological species: Qiemo jujube, Ruqiang jujube, Aksu jujube, Qira jujube, Toksun jujube, 48th Regiment jujube, Hotan jujube, Hami jujube, Minfeng jujube, Hotan jade jujube, Hotan imperial jujube, Makit grey jujube, Luntai white apricot, Kuqa small white apricot, Toksun apricot, Shufu Muyage apricot, Yengisar Saimaiti apricot, dried

Yengisar Saimaiti apricot, Huocheng tree-dried apricot, Alimari tree-dried apricot, Kashgar pomegranate, Piyalma sweet pomegranate, Qira pomegranate, Turpan grape, Turpan raisin, Mohur grape, Toutunhe grape, Bole red grape, Heshuo wine, Turpan wine, 170th Regiment sea buckthorn, Altay large-fruit sea buckthorn, Jinghe wolfberry, Yutian desert rose, 31st Regiment *Apocynum venetum*, Shaya *Apocynum venetum* tea, Yuli *Apocynum venetum* tea, Keping chamagu (turnip), Zhaosu garlic, Jimsar white-skinned garlic, Telimu cumin, Qira cumin, Yumin spineless safflower, Gongliu Tianshan Yibe (Fritillaria), Huocheng lavender, Ili lavender essential oil, Shihezi Cistanche (*Cistanche deserticola* and *Cistanche tubulosa*), Hotan Cistanche (*Cistanche tubulosa*), Yutian Hongliu Dayun (*Cistanche tubulosa*), Tarim Reclamation Area pilose antler of red deer, Tarim Reclamation Area antler base of red deer, and Tarim Reclamation Area deer antler glue.

These geographical indication products involve a total of 17 biological species: *Ziziphus jujuba* Mill., *Prunus armeniaca* L., *Punica granatum* L., *Vitis vinifera* L., *Hippophae rhamnoides* L., *Lycium barbarum* L., *Rosa rugosa* Thunb., *Apocynum venetum* L., *Raphanus sativus* L., *Allium sativum* L., *Foeniculum vulgare* Mill., *Carthamus tinctorius* L., *Fritillaria walujewii* Regel & Pendl., *Lavandula angustifolia* Mill., *Cistanche deserticola* Y. C. Ma, *Cistanche tubulosa* (Schenk) Wight, *Cervus elaphus* L.

There are 51 geographical indication trademarks related to the same biological species: Aksu jujube (Registration No.: 5015105, 5098712), Kashgar jujube, Alar jujube (Registration No.: 49268109, 55053185), Qiemo jujube, Ruqiang jujube (Registration No.: 3590206, 3590207), Hami jujube, Hotan jade jujube (Registration No.: 7711765, 7871448), Makit grey jujube, Tumushuke winter jujube, Zepu jujube, Luntai white apricot (Registration No.: 4137411, 66293014), Kuqa white apricot (Registration No.: 4650471, 4650472), Akto Baren apricot, Kashgar sweet apricot, Yengisar apricot, Hotan pomegranate, Kashgar pomegranate, Yuepuhu fig, Atush fig, Turpan grape, Turpan raisin, Hotan grape, Kashgar grape, Atush Munage grape, Heshuo grape, Kuqa Akxaywa grape, Xinhé grape, Toutunhe grape, Awat Musalai (Registration No.: 5717691, 5717692), Yanqi Basin wine, Wushi sea buckthorn, Jinghe wolfberry, Xiayedi wolfberry, Kuqa medicinal mulberry, Hotan rose, Yuli *Apocynum venetum*, Jimsar garlic, Kashgar cumin, Yuepuhu cumin, Yanqi cumin, Jimsar safflower, Yumin spineless safflower, Ili lavender, Hotan Cistanche.

These geographical indication trademarks involve a total of 15 biological species: *Ziziphus jujuba* Mill., *Prunus armeniaca* L., *Punica granatum* L., *Ficus carica* L., *Vitis vinifera* L., *Hippophae rhamnoides* L., *Lycium barbarum* L., *Morus alba* L., *Rosa rugosa* Thunb., *Apocynum venetum* L., *Allium sativum* L., *Foeniculum vulgare* Mill., *Carthamus tinctorius* L., *Lavandula angustifolia* Mill., *Cistanche tubulosa* (Schenk) Wight.

4.2.2 Trademarks. According to the Trademark Announcement Search System of the China National Intellectual Property Administration (CNIPA), trademarks are divided into three basic types: ordinary trademarks, collective trademarks, and certification trademarks. Among these, ordinary trademarks are numerous, with a single market entity typically registering several ordinary trademarks, yet their branding impact is generally limited. Those with greater branding impact include collective trademarks, certification trademarks, China's well-known trademarks, and Madrid international trademarks.

Xinjiang has only 18 collective trademarks, of which only 5 are related to the 44 genuine medicinal materials and 51 characteristic medicinal materials mentioned above: "Xinjiang Jujube Association" registered by the Xinjiang Uygur Autonomous Region Jujube Association, "Xinyu" (Registration No. : 3655353, 3655354) registered by the Rose Association of Yiliqi Township, Hotan City, and "Anxiang" (Registration No. : 6826060, 6826061) registered by the Breeding Association of Angelig Township, Wenquan County.

Xinjiang has only 120 certification trademarks, all of which are geographical indication certification trademarks. Among them, those related to these medicinal materials are the 51 geographical indication trademarks mentioned above.

Xinjiang has 45 active well-known trademarks in China, of which 11 are related to these medicinal materials: Red Sail, Graphic (Registration No. : 3597044), Yiparhan, Princess Jieyou, Hotan Jade Jujube, Ruoqiang Jujube, Northern Xinjiang, Arman, Loulan (Registration No. : 1029081, 3505616), and Xiangdu.

Xinjiang has only registered 168 Madrid international trademarks, of which 26 are related to these medicinal materials: AURE-ATE (domestic registration No. : 8951012, 8950979, 8950998), Jieyou Gongzhu (Princess Jieyou) (domestic registration No. : 13773913, 10074486, 10948394), Xipa, Hongfan (Red Sail), Graphic (international registration No. : 1200081), AH PH BI (domestic registration No. : 5158088, 5158087), Jiaruile GOVERNOR G, Tianye (international registration No. : 999574, 1001882), Yuyi HOH H (international registration No. : 856692, 934951, 1338894, 1338895), Loulan (international registration No. : 1287666, 1319768, 1287666, 1062612, 1068668, 1104531), and SUNTIME (international registration No. : 824476, 841690).

4.2.3 Design patents for packaging and containers. As shown in Table 1, there are 169 valid design patents for packaging and containers related to the 44 genuine and 51 characteristic medicinal materials of Xinjiang (Locarno Classification No.: 09-01 to 09-05, 09-07).

4.3 Scientific and technological innovation category Intellectual property in the scientific and technological innovation category is based on achievements created through scientific and technological innovation, mainly including new varieties of plants and animals, invention patents, utility model patents, and design patents for the products themselves.

4.3.1 New varieties of animals and plants. Xinjiang has obtained 6 new agricultural plant varieties related to the aforementioned medicinal materials. Among them, in the genus *Vitis*, there are "Huozhou Cuiyu" and "Luzhou Baoshi" bred by the Xinjiang Uygur Autonomous Region Grape and Melon Research Institute. In the genus *Lavandula*, there are "Xinnongxun 1" and "Xinnongxun 2" bred by Xinjiang Agricultural University, "Xinxun 5" bred by the Agricultural Science Research Institute of the Fourth Division of Xinjiang Production and Construction Corps, and "Yixun 1" bred by the Agricultural Science Research Institute of Ili Kazakh Autonomous Prefecture.

Xinjiang has obtained 13 new forest and grass plant varieties related to the aforementioned medicinal materials. Among them, for the genus *Prunus*, there are "Huangxin", "Shengmei", "Xinlu", and "Xinrui" bred by the Institute of Economic Forestry of the Xinjiang Academy of Forestry Sciences, "Zhenzhu" and "Huanghou" bred by the Kashgar Prefecture Forestry Workstation, and "Jiangbianfeng" bred by the Xinjiang Academy of Agricultural Sciences.

For the genus *Ziziphus*, there are "Saimisu 2" and "Qianghui 3" bred by the Xinjiang Academy of Agricultural Sciences. For the genus *Rosa*, there are "Caoyuan Muge" bred by Xinjiang Vocational and Technical College of Applied Sciences and "Tianshan Xianguang" bred by the Kuitun Campus of Yili Normal University. In addition, for *Ziziphus* and *Prunus* (apricot), there are respectively "Pan Zao" bred by the Xinjiang Jujube Association and "Deyuan 1" bred by Turpan Deyuan Winery Co., Ltd.

According to the *National Catalog of Livestock and Poultry Genetic Resources Breeds (2024 edition)*, the red deer has two cultivated breeds: Tahe red deer and Yihe red deer.

4.3.2 Invention and utility model patents. Xinjiang has 907 valid national invention patents related to its 44 genuine and 51 characteristic medicinal materials (Table 1). According to the International Patent Classification (IPC), these include 12 patents in the field of plant and animal breeding (IPC classes A01H, A01K67/027, and A01K67/60 to A01K67/68), 166 in agriculture (IPC class A01), 179 in food (IPC class A23), 332 in medicine and health (IPC class A61), and 154 in chemistry (IPC classes C01 to C14).

There are also 1 265 valid national utility model patents (Table 1), of which one is in plant and animal breeding, 319 in agriculture, 260 in food, 22 in medicine and health, and 327 in chemistry.

Table 1 Valid national patents related to the 44 genuine and 51 characteristic medicinal materials in Xinjiang (Unit: item)

Region	Invention	Utility model	Packaging and containers	Product itself
Urumqi City	538	318	54	18
Turpan City	18	151	10	2
Hami City	9	41	13	2
Aksu Region	22	48	15	1
Kashgar Region	23	66	21	4
Hotan Region	21	63	5	3
Changji Prefecture	18	96	9	1
Bortala Prefecture	11	62	1	3
Bayingolin Prefecture	30	126	6	1
Kizilsu Prefecture	5	19	1	0
Tacheng Region	16	50	6	0
Altay Region	18	60	8	0
Areas under direct jurisdiction of Ili Prefecture	27	56	12	2
XPCC	151	109	8	15
Total	907	1 265	169	52

4.3.3 Design patents for the products themselves. As shown in Table 1, there are 52 valid national design patents for the products themselves (excluding those for packaging and containers) related to the 44 genuine and 51 characteristic medicinal materials in Xinjiang.

5 Major issues concerning medicinal materials and their intellectual property

5.1 Many characteristic and genuine medicinal materials not included in the catalogues of genuine and characteristic medicinal materials The first batch includes only 44 genuine medicinal materials and 51 characteristic medicinal materials, totaling 95 me-

dicinal materials, involving only 41 families, 86 genera, and 106 species of medicinal plants and animals. A considerable number of genuine and characteristic medicinal materials have not yet been listed in the catalogues, such as snow chrysanthemum, products of Xinjiang black bees, and other renowned high-quality medicinal materials, as well as varieties for fresh-cutting processing at the place of production (including *Achyranthis Bidentatae Radix*, *Dictamnii Cortex*, *Rhei Radix Et Rhizoma*, *Phragmitis Rhizoma*, *Platycodonis Radix*, and *Atractylodis Macrocephalae Rhizoma*) and mineral medicinal materials.

5.2 Insufficient protection and inheritance of cultural heritage intellectual property The collection and systematization of traditional knowledge in Xinjiang's traditional medicines remain insufficient, especially for ethnic medicines such as Uyghur medicine, Kazakh medicine, Mongolian medicine, Xibe medicine, Hui medicine, Manchu medicine, and Kirgiz medicine. There are too few national-level and autonomous region-level intangible cultural heritage items in the category of traditional medicine, and the protection of genetic resources of medicinal organisms needs to be strengthened. In general, the protection and inheritance of cultural heritage intellectual property are inadequate.

5.3 Weak regional branding effect of brand and trademark intellectual property The current catalogues of genuine and characteristic medicinal materials cover 95 medicinal materials and 106 biological species, but the related geographical indication products involve only 17 biological species, and the related geographical indication trademarks involve only 15 biological species. Moreover, many of these do not specifically target medicinal use; for example, the geographical indications for grapes do not cover the cultivated variety SuoSuo grape, and the geographical indication for chamagu (turnip) targets the enlarged fleshy root for food use rather than the medicinal material turnip seed (*Brassica rapa* seeds). There are relatively few relevant collective trademarks and certification trademarks. Well-known trademarks in China, as well as design patents for packaging and containers, are scarce, and those involving geographical indications are even rarer. Madrid international trademarks are few in number, and none of them concern geographical indication trademarks. In summary, the regional branding effect of brand and trademark intellectual property is weak.

5.4 Weak creation of intellectual property in the scientific and technological innovation category The scientific and technological innovation capability in Xinjiang's medicinal materials sector is weak. There are very few new varieties of medicinal plants and animals, and the numbers of national invention patents, national utility model patents, and national design patents for the products themselves are not high. Generally, the creation of intellectual property in the scientific and technological innovation category is weak.

6 Strategies for high-quality development of medicinal materials and protection of their intellectual property

6.1 Collecting and evaluating medicinal material resources, and enriching the catalogues of genuine and characteristic medicinal materials We should collect and evaluate Xinjiang's medicinal material resources, especially bulk Chinese medicinal materials, ethnic medicinal materials, varieties for fresh-cutting processing at the place of production, animal medicinal materials, mineral medicinal materials, and medicinal material products that are listed as national famous, special, excellent and new agricultural prod-

ucts. We should also analyze their genuineness and characteristic advantages, determine the second batch of catalogues of genuine and characteristic medicinal materials as soon as possible, and build high-quality production bases for genuine medicinal materials.

6.2 Protecting the genetic resources of medicinal organisms and safeguarding their biodiversity Based on the findings of the Fourth National Survey of Traditional Chinese Medicine Resources (2012–2024), particularly the monograph *Grand Compendium of Chinese Medicinal Resources: Xinjiang Volume*, we should collect and evaluate medicinal material resources, and establish germplasm repositories, Good Agricultural Practice (GAP) bases for Chinese medicinal materials, customized medicinal gardens, living conservation nurseries for medicinal plants, seed bases, and breeding bases for endangered medicinal materials. We should also give full play to the protective functions of important agricultural heritage sites of China, national nature reserves, national forest parks, national wetland parks, national important habitats for terrestrial wildlife, national parks, and national geoparks with respect to the genetic resources of medicinal organisms, improve the national and autonomous region-level protection systems for biological germplasm resources, and maintain the biodiversity of medicinal organisms.

6.3 Promoting traditional medicine culture and building a Chinese traditional medicine community It is recommended to collect and systematize the cultural heritage of Traditional Chinese Medicine and ethnic medicines in Xinjiang, strengthen cultural confidence, promote traditional medicine culture, and advance the TCM Culture Promotion Project and the Project for Inheriting and Developing China's Excellent Traditional Culture. In conjunction with Traditional Chinese Medicine, Uyghur medicine, Kazakh medicine, Mongolian medicine, Xibe medicine, Hui medicine, Manchu medicine, and Kirgiz medicine, and with the overarching goal of consolidating the sense of community for the Chinese nation, we should build a Chinese traditional medicine community by focusing on medicinal material production, medical and health preservation, sharing of traditional knowledge, and cultural inheritance of medicine, thereby facilitating exchanges, interactions, and integration among traditional medicines.

6.4 Using brand and trademark intellectual property to build regional public brands for genuine medicinal materials It is necessary to investigate the resources of genuine and characteristic medicinal materials in Xinjiang, analyze the natural and human factors of their geographical indications, implement geographical indication product protection or register geographical indication collective trademarks and certification trademarks, and create national design patents for packaging and containers that bear the special mark of geographical indications.

In addition, it is recommended to integrate regional public brands through geographical indications, build regional public brands for Chinese agricultural products and geographical indication brands for the Belt and Road Initiative, cultivate well-known trademarks in China and register Madrid international trademarks through geographical indication trademarks, and ultimately build regional public brands for Xinjiang's genuine medicinal materials.

6.5 Implementing the modern seed industry improvement project for medicinal organisms, and strengthening, expanding and enhancing the agricultural "chips" of Xinjiang It is recommended to implement the modern seed industry improvement project for medicinal organisms, build bases for the breeding of seeds

and seedlings of Chinese medicinal materials, strengthen the cultivation of medicinal plants and animals and the propagation of improved varieties, create new varieties of plants and animals, and apply for rights to new agricultural plant varieties, new forest and grass plant varieties, and new animal varieties, so as to consolidate, strengthen, and expand the agricultural "chips" of Xinjiang's medicinal organisms.

6.6 Strengthening scientific and technological innovation and patent creation to empower the development of new quality productive forces

We should strengthen innovation across the entire industrial chain of Xinjiang's medicinal materials, with particular emphasis on scientific and technological innovation. We should improve the creation, protection, utilization, management, and services of intellectual property rights such as invention patents, utility model patents, and new varieties. With scientific and technological innovation as the core driving force, we should empower the development of new quality productive forces, integrate advanced elements such as modern information technology, biotechnology, and artificial intelligence, and promote the transformation of the medicinal material industry from traditional cultivation and processing towards high-quality, intelligent, green, and international development.

6.7 Providing targeted assistance to Xinjiang's genuine medicinal material industry and traditional medicine sector, and enhancing the quality and effectiveness of paired medical and health assistance to Xinjiang in the new era

On the basis of previous efforts in selecting and dispatching cadres, doctors, and other technical personnel, central authorities, central government bodies, central enterprises, and relevant provinces and cities should uphold the principles of comprehensive, targeted, and long-term assistance to Xinjiang. They should provide targeted support to the genuine medicinal material industry and the traditional medicine sector in Xinjiang, covering areas such as the protection of medicinal plant and animal resources, the construction of a modern industrial system for medicinal materials, the preservation and innovation of traditional Chinese medicine and ethnic medicines, the development of a Chinese traditional medicine community and national-level key clinical specialties, the establishment of international medical centers as well as national and autonomous region-level regional medical centers, the improvement and optimization of the healthcare service system, the advancement of the TCM Culture Promotion Project, and the protection of intellectual property rights. These efforts aim to comprehensively enhance the quality and effectiveness of paired medical and health assistance to Xinjiang in the new era, thereby fully, accurately and comprehensively implementing the Party's governance strategy for Xinjiang in the new era and consolidating the sense of community for the Chinese nation.

References

- [1] LI YH, WANG HL. Exploring Traditional Chinese Medicine Culture[M]. Zhengzhou: Henan Science and Technology Press, 2026. (in Chinese).
- [2] NIU SZ, NIU MY. Research on the Promotion Path and Guarantee Mechanism of Traditional Chinese Medicine Culture[M]. Shijiazhuang: Hebei Education Press, 2025. (in Chinese).
- [3] ZHU GB. Ethnic Medicine and Ethnic Culture[M]. Beijing: Traditional

Chinese Medicine Classics Press, 2022. (in Chinese).

- [4] DUAN ZY, ZHANG C, DUAN XH, *et al.* Research on the Integrated Development of Ethnic Medicine and Cultural Tourism in Yunnan[M]. Kunming: Yunnan Nationalities Press, 2025. (in Chinese).
- [5] SHI L, WANG FZ. Report on the Construction of the Core Area of the Silk Road Economic Belt (2024–2025)[M]. Beijing: Social Sciences Academic Press, 2025. (in Chinese).
- [6] State Council Information Office of the People's Republic of China. Successful Practice of the Party's Governance Strategy for Xinjiang in the New Era[M]. Beijing: People's Daily Press, 2025. (in Chinese).
- [7] LIU GF, ZENG HP, YANG FQ, *et al.* Outline of the Party's Governance Strategy for Xinjiang in the New Era[M]. Urumqi: Xinjiang People's Publishing House, 2024. (in Chinese).
- [8] ZHAO Y, GUO B, *et al.* The Overall Goal of Xinjiang Work and the Modernization of the Governance System and Governance Capacity[M]. Urumqi: Xinjiang People's Publishing House, 2022. (in Chinese).
- [9] NIHEMAITI K, SU C, *et al.* Strengthening Party Leadership and Consolidating Grassroots Foundations[M]. Urumqi: Xinjiang People's Publishing House, 2024. (in Chinese).
- [10] ZHAO Y, HEINIYATI M, *et al.* Ideological Work and the Fight Against Extremism in Xinjiang[M]. Urumqi: Xinjiang People's Publishing House, 2024. (in Chinese).
- [11] LIU GF, ABUDUWAILI M, MAI YH, *et al.* Research on Several Historical Issues of Xinjiang and Its Contemporary Significance[M]. Urumqi: Xinjiang People's Publishing House, 2024. (in Chinese).
- [12] DING SQ, SHI L, *et al.* Building the Core Area of the Silk Road Economic Belt[M]. Urumqi: Xinjiang People's Publishing House, 2022. (in Chinese).
- [13] LIU GF, SONG JH, *et al.* Guiding Xinjiang's High-Quality Development with the New Development Philosophy[M]. Urumqi: Xinjiang People's Publishing House, 2023. (in Chinese).
- [14] YANG XL, WUPUR A, YAN WW, *et al.* Cultural Development and the Growth of Cultural Tourism Economy in Xinjiang[M]. Urumqi: Xinjiang People's Publishing House, 2023. (in Chinese).
- [15] HUANG LQ. Grand Compendium of Chinese Medicinal Resources: Xinjiang Volume[M]. Beijing: Beijing Science and Technology Press, 2024. (in Chinese).
- [16] SUN ZG, XING DB, BAI YL, *et al.* Thoughts on the agricultural practice of the Party's governance strategy for Xinjiang in the new era: Based on the traditional knowledge and cultural heritage[J]. Asian Agricultural Research, 2026, 18(6):1–12.
- [17] SUN ZG, XING DB, BAI YL, LIU M, *et al.* Thoughts on agricultural practice of the Party's governance strategy for Xinjiang in the new era: Based on advantageous and characteristic industry and brand mark-related intellectual property[J]. Asian Agricultural Research, 2026, 18(5):1–14.
- [18] SUN ZG, LIU M, XING DB, *et al.* Thoughts on the agricultural practice of the party's governance strategy for Xinjiang in the new era: Based on the new productive force and technological innovation-related intellectual property[J]. Asian Agricultural Research, 2026, 18(7):1–12, 19.
- [19] HUANG LQ. Compendium of Chinese Traditional Medicine Resources: Germplasm Volume[M]. Beijing: Beijing Science and Technology Press. (in Chinese).