Patent Analysis on the Trend of Ornamental Medicinal Plant Industry

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Abstract. Ornamental medicinal plant (OMP) is a type of emerging horticultural greening species with a bright prospect. In this paper, total 26 species of OMP were chosen as samples to analyze their situation of patent declaration and protection. In this way, a deep insight into OMP’s development trend can be brought forth. A set of statistical and bibliometric methods were used to analyze the technical competition situation of OMP from several aspects such as development trend, regional distribution, innovation subject, R&D hotspots etc. [Result] The results indicated that domestic OMP industry had a rapid development in the past decades. Eastern provinces, such as Anhui and Jiangsu, occupied a leading position. The enterprises were the main body of R&D, while the agricultural and forestry universities had individual advantages. The hotspot of patent protection focused on the horticultural technology. There were a large number of patent declarations on new varieties and specialized fertilizers as well. [Conclusion] Beijing International Horticultural Exhibition 2019 may play an important role in promoting the horticultural industry. By developing new varieties, strengthening industry-university-research cooperation and intellectual property, the OMP industry will get a rapid growth and become a new hot spot in the field of horticultural health in the near future.

1. Introduction
Ornamental medicinal plants are plant varieties that have both medicinal and ornamental values [1-4]. China has rich resources of medicinal plants. According to the results of the third national survey of Chinese medicine resources, China's medicinal plants include 383 families, 2309 genera, and 11146 species, including bryophytes, flowering plants, herbs, woody plants, shrubs, trees and other categories, and the resources are very rich. Many of these plants have considerable ornamental value in terms of leaves, flowers, fruits, and appearance. However, at present, domestic medicinal plants are mainly used as medicinal economic plants, and only a few are used in traditional Chinese medicine themed landscape [5-12].

In recent years, with the popularization of the concept of health and the rise of Chinese medicine culture, people have paid more attention to the natural health lifestyle, and the ornamental value of medicinal plants has gradually been recognized by the society. Many cities in China have built special gardens for medicinal plants with their own characteristics [13-15]. The most representative is that the
"China Beijing World Horticultural Exposition 2019" has specially constructed a Chinese herbal medicine theme exhibition park covering an area of 32,000 square meters. The park uses more than 500 Chinese herbal plants. It uses Baicao, Materia Medica, and Herbs as the main veins to design the partition to show the image and temperament of Chinese Materia Medica. It shows the origin of herbal medicine, Chinese medicine processing technology, four seasons health preservation, the development of Chinese medicine science and technology, and exchanges at home and abroad.

Ornamental medicinal plants, as a new type of greening species, have important application value for enriching the types of garden landscapes, promoting the traditional culture of traditional Chinese medicine, and improving people's awareness of health care [16-17]. It is foreseeable that, driven by the Beijing World Horticultural Exposition 2019, ornamental medicinal plants will gain greater development space in urban garden construction and landscaping. Therefore, it is necessary to conduct in-depth research on the development status and future trends of the ornamental medicinal plant industry. From the perspective of patent application, the article analyzes the development status and trends of the domestic ornamental medicinal plant industry, finds problems, proposes countermeasures, and realizes the intellectual property to support the industrial transformation and upgrading.

2. Research objects and methods

2.1. Research object

There are many types of ornamental medicinal plants. We have selected 26 representative ornamental medicinal plants. The selection conditions are as follows: (1) It is relatively well-known and has profound cultural connotation, such as magnolia, eucommia, etc; (2) It has been widely used in landscape and urban greening, such as ginkgo, Liriodendron, etc; (3) Various medicinal plants including herbs, woody, vines, flower viewing, leaf viewing, and fruits viewing.

The 26 representative ornamental medicinal plants includes Dianthus chinensis L., Rosa multiflora Thunb., Anethum graveolens L., Erysimum bungee (Kitag.) Kitag., Hemerocallis citrina Baroni, Scilla scilloides (Lindl.) Druce, Begonia grandis Dry., Euphorbia helioscopia L., Dictamnus dasycarpus Turcz., Farfugium japonicum (L. f.) Kitam., Ophiopogon japonicus (Linn. f.) Ker-Gawl., Daphne genkwa Sieb. et Zucc., Mirabilis jalapa L., Isatis indigotica Fortune, Euphorbia tirucalli L., Liriodendron chinense (Hems.) Sarg., Magnolia denudata Desr., Wisteria sinensis (Sims)Sweet, Aconitum kusnezoffii Rchb., Ginkgo biloba L., Eucommia ulmoides Oliver, Robinia pseudoacacia L., Albizia julibrissin Durazz., Betula platyphylla Suk., Toona sinensis (A. Juss.) Roem., Acer truncatum Bunge.

2.2. Data sources

Patent data comes from data search platforms such as State Intellectual Property Office's Patent Search Platform, World Traditional Medicine Patent Database, Patsnap Patent Database and other data platforms. The search time range is from January 1, 2000 to October 31, 2018. The technical scope mainly focuses on the planting, cultivation, processing, application and other horticultural related technical invention patents of medicinal plants.

2.3. Formulation of retrieval strategy

In order to ensure the recall rate and precision rate, when searching each kind of traditional Chinese medicine, we use a variety of names to establish a search strategy, including Latin name of the original plant of traditional Chinese medicine, Latin name of traditional Chinese medicine, Chinese name of traditional Chinese medicine, English name, Pinyin name, etc. The medicinal plants in this study are based on the plant primordia specified in Pharmacopoeia of the People’s Republic of China. The Latin name in "Chinese Materia Medica" is used as the search term for the varieties not included in the Pharmacopoeia, and the patent unrelated to planting and cultivation is excluded, finally, the retrieval strategy is established.
3. Results and analysis

3.1. Patent Status by Variety
The patent application status of 26 ornamental medicinal plant varieties is as shown in Figure 1. G. biloba has the largest number of patent applications, reaching 240, accounting for more than 20% of the total number of patents. This is followed by M. denudata and T. sinensis, with 173 and 110 patents respectively. In addition, the number of patents of I. indigotica, R. pseudoacacia and E. ulmoides are also more than 50. The number of other ornamental plants is relatively small, S. scilloides, D. dasycarpus and E. tirucalli, etc. are the least, all less than 10. Also another 5 kinds of medicinal plants have not retrieved related patents. Of the 26 ornamental medicinal plants studied in this paper, G. biloba has the highest ornamental and greening value, is the most widely distributed and planted in China, followed by M. denudata, and relatively few other plants. This is basically consistent with their patent search results.

![Figure 1. Patent Applications Status of 26 OMPs](image)

3.2. Ranking of OMP Provinces
An in-depth analysis of patent applications of ornamental medicinal plants in provinces, municipalities and autonomous regions of the country is shown in Table 1. The number of published 21 ornamental medicinal plant patents from mainland applicants in mainland China is 1,164, and Anhui, Jiangsu, and Shandong rank top three with 233, 181, and 103 patent applications, respectively. Guangxi, Yunnan, Guangdong, and Sichuan ranked fourth to seventh with 84, 58, 57 and 54 respectively. The number of patents in other provinces, cities, and autonomous regions is less than 50.

Anhui, Jiangsu, and Shandong provinces are located in the plains. The soil is deep and fertile, which provides a good growth environment for domestic species and wild medicinal plants, and provides good resources for medicinal plant research. At the same time, the economic development of these areas is relatively developed, and scientific research is relatively active, which also provides good economic and research conditions for medicinal plant research.
Table 1. Patent Applications in Different Provinces

| ID | Provinces | Amount | Percent | ID | Provinces | Amount | Percent |
|----|-----------|--------|---------|----|-----------|--------|---------|
| 1  | Anhui     | 233    | 20.0%   | 16 | Henan     | 21     | 1.8%    |
| 2  | Jiangsu   | 181    | 15.5%   | 17 | Shanghai  | 21     | 1.8%    |
| 3  | Shandong  | 103    | 8.8%    | 18 | Liaoning  | 20     | 1.7%    |
| 4  | Guangxi   | 84     | 7.2%    | 19 | Shanxi    | 16     | 1.4%    |
| 5  | Yunnan    | 58     | 5.0%    | 20 | Tianjin   | 13     | 1.1%    |
| 6  | Guangdong | 57     | 4.9%    | 21 | Xinjiang  | 10     | 0.9%    |
| 7  | Sichuan   | 54     | 4.6%    | 22 | Hebei     | 7      | 0.6%    |
| 8  | Beijing   | 48     | 4.1%    | 23 | Jiangxi   | 7      | 0.6%    |
| 9  | Gansu     | 35     | 3.0%    | 24 | Shanxi    | 5      | 0.4%    |
| 10 | Heilongjiang | 32 | 2.7% | 25 | Other | 5 | 0.4% |
| 11 | Hubei     | 32     | 2.7%    | 26 | Jilin     | 4      | 0.3%    |
| 12 | Guizhou   | 30     | 2.6%    | 27 | Fujian    | 3      | 0.3%    |
| 13 | Zhejiang  | 30     | 2.6%    | 28 | Inner Mongolia | 3 | 0.3% |
| 14 | Hunan     | 25     | 2.1%    | 29 | Tibet     | 2      | 0.2%    |
| 15 | Chongqing | 24     | 2.1%    | 30 | Henan     | 1      | 0.1%    |

3.3. Patent Type Distribution

The distribution of patent application types in various regions of China is shown in Table 2. It can be seen that the number of invention patents occupies the main body of patents, the number of utility model patents is small, and there are no appearance patents. In the fields of planting, cultivation, processing, and application of medicinal plants, method patents are the majority. According to Article 2 of the Chinese Patent Law, method patents can only apply for invention patents. Therefore, in all patent applications for medicinal plants, invention patents occupy an absolute advantage, accounting for 98.4% of the total number of patent applications. The technical contents of utility model patent and invention patent are all related to greening, environmental protection, planting and other fields, without obvious difference.

Table 2. Distribution of Patent Types

| ID | Provinces   | Invention patent | Utility model patent | ID | Provinces     | Amount | Percent |
|----|-------------|------------------|----------------------|----|--------------|--------|---------|
| 1  | Anhui       | 232              | 1                    | 16 | Jiangxi      | 6      | 1       |
| 2  | Beijing     | 45               | 3                    | 17 | Liaoning     | 20     | 0       |
| 3  | Fujian      | 3                | 0                    | 18 | Inner Mongolia | 3 | 0 |
| 4  | Gansu       | 35               | 0                    | 19 | Shandong     | 102    | 1       |
| 5  | Guangdong   | 57               | 0                    | 20 | Shanxi       | 5      | 0       |
| 6  | Guangxi     | 84               | 0                    | 21 | Shaanxi      | 16     | 0       |
| 7  | Guizhou     | 29               | 1                    | 22 | Shanghai     | 21     | 0       |
| 8  | Hainan      | 1                | 23                   | Sichuan | 53 | 1 |
| 9  | Hebei       | 6                | 24                   | Tianjin | 13 | 0 |
| 10 | Henan       | 20               | 1                    | 25 | Tibet        | 2      | 0       |
| 11 | Heilongjiang | 32             | 0                    | 26 | Xijin       | 10     | 0       |
| 12 | Hubei       | 31               | 1                    | 27 | Yunnan       | 57     | 1       |
| 13 | Hunan       | 24               | 1                    | 28 | Zhejiang     | 29     | 1       |
| 14 | Jilin       | 4                | 0                    | 29 | Chongqing    | 24     | 0       |
| 15 | Hunan       | 177              | 4                    | 30 | Henan        | 1      | 0       |

3.4. Legal status distribution

The legal effect distribution of ornamental medicinal plant patents is shown in Table 3. Nationwide, there are 784 patents applied for maintenance, accounting for 67.5%. 189 patent applications in valid
status, accounting for 16.3%, 520 patent applications under review, accounting for 44.8%. The trend of new patent application in this field is good. The development momentum in the field is strong.

Table 3. Distribution of Patent Legal Status (Top 10 Provinces)

| provinces  | disclosure | substantive examination | dismissed or withdrawn | unpaid annual fee | grant |
|------------|------------|-------------------------|------------------------|-------------------|-------|
| Total      | 75         | 520                     | 297                    | 80                | 189   |
| Shandong   | 18         | 37                      | 29                     | 4                 | 15    |
| Jiangsu    | 14         | 46                      | 62                     | 12                | 47    |
| Anhui      | 10         | 163                     | 34                     | 8                 | 18    |
| Gansu      | 5          | 9                       | 15                     | 2                 | 4     |
| Guangxi    | 4          | 49                      | 24                     | 1                 | 6     |
| Hubei      | 4          | 10                      | 4                      | 1                 | 13    |
| Hunan      | 4          | 7                       | 6                      | 1                 | 7     |
| Chongqing  | 4          | 12                      | 7                      | 0                 | 1     |
| Guizhou    | 3          | 17                      | 8                      | 0                 | 2     |
| Shandong   | 2          | 11                      | 13                     | 6                 | 15    |

3.5. OMP Patent Application Trends

As there is a period of delay (usually 1-2 years) between the application and publication of patents, and the analysis is based on the currently disclosed patents, the data of the last 1-2 years do not have reference value, the same below.

![Figure 2. OMP Patent Application Status over the Years](image)

It can be seen from Figure 2 that from 2000 to 2009, the number of patent applications for 26 ornamental medicinal plants was very small, with only a few or more than a dozen per year, and it fluctuated. After 2010, the number of annual patent applications began to increase significantly, with an average annual growth rate of about 50%. By 2017, the number of applications had reached 260, indicating that research activities related to ornamental medicinal plants have become increasingly active, and their attention has been increasing, and they have gradually become one of the hot areas in the horticultural industry. Due to the impact of the delay in publication, the annual patent application data for 2017 and 2018 is not complete, but it can still be seen that the annual patent application volume remains at a high level.
3.6. OMP Industry Innovation Subjects

We perform corresponding statistical analysis based on the type of innovation subject (enterprises, colleges and universities, research institutions, government agencies and individuals), as shown in Table 4.

| Provinces | colleges and universities | individuals | research institutions | enterprises | government agencies | Total |
|------------|---------------------------|-------------|-----------------------|-------------|---------------------|-------|
|            | Amount | Percent | Amount | Percent | Amount | Percent | Amount | Percent | Amount | Percent | Amount | Percent |
| Total      | 221    | 19.0%   | 264    | 22.7%   | 134    | 11.5%   | 504    | 43.3%   | 41     | 3.5%    | 1164   |         |
| Anhui      | 2      | 0.9%    | 56     | 24.0%   | 2      | 0.9%    | 154    | 66.1%   | 19     | 8.2%    | 233    |         |
| Jiangsu    | 48     | 26.5%   | 40     | 21.1%   | 14     | 7.7%    | 72     | 39.8%   | 7      | 3.9%    | 181    |         |
| Shandong   | 22     | 21.4%   | 22     | 21.4%   | 14     | 13.6%   | 44     | 42.7%   | 1      | 1.0%    | 103    |         |
| Guangxi    | 5      | 6.0%    | 38     | 45.2%   | 6      | 7.1%    | 28     | 33.3%   | 7      | 8.3%    | 84     |         |
| Yunnan     | 10     | 17.2%   | 0      | 0       | 24     | 41.4%   | 24     | 41.4%   | 0      | 0       | 58     |         |
| Guangdong  | 7      | 12.3%   | 27     | 47.4%   | 8      | 14.0%   | 15     | 26.3%   | 0      | 0       | 57     |         |
| Sichuan    | 15     | 27.8%   | 5      | 9.3%    | 6      | 11.1%   | 27     | 50.0%   | 1      | 1.9%    | 54     |         |
| Beijing    | 22     | 45.8%   | 2      | 4.2%    | 12     | 25.0%   | 12     | 25.0%   | 0      | 0       | 48     |         |
| Gansu      | 6      | 17.1%   | 22     | 62.9%   | 1      | 2.9%    | 6      | 17.1%   | 0      | 0       | 35     |         |
| Heilongjiang| 27    | 84.4%   | 2      | 6.3%    | 2      | 6.3%    | 1      | 3.1%    | 0      | 0       | 32     |         |
| Hubei      | 7      | 21.9%   | 1      | 3.1%    | 2      | 6.3%    | 22     | 68.8%   | 0      | 0       | 32     |         |
| Guizhou    | 5      | 16.7%   | 3      | 10.0%   | 4      | 13.3%   | 15     | 50.0%   | 3      | 10.0%   | 30     |         |
| Zhejiang   | 2      | 6.7%    | 9      | 30.0%   | 2      | 6.7%    | 17     | 56.7%   | 0      | 0       | 30     |         |
| Hunan      | 7      | 28.0%   | 3      | 12.0%   | 1      | 4.0%    | 13     | 52.0%   | 1      | 4.0%    | 25     |         |
| Chongqing  | 0      | 0       | 3      | 12.5%   | 1      | 4.2%    | 20     | 83.3%   | 0      | 0       | 24     |         |
| Henan      | 1      | 4.8%    | 8      | 38.1%   | 7      | 33.3%   | 5      | 23.8%   | 0      | 0       | 21     |         |
| Shanghai   | 5      | 23.8%   | 1      | 4.8%    | 9      | 42.9%   | 6      | 28.6%   | 0      | 0       | 21     |         |
| Liaoning   | 5      | 25.0%   | 6      | 30.0%   | 5      | 25.0%   | 4      | 20.0%   | 0      | 0       | 20     |         |
| Shaanxi    | 12     | 75.0%   | 2      | 12.5%   | 0      | 0       | 2      | 12.5%   | 0      | 0       | 16     |         |
| Tianjin    | 3      | 23.1%   | 0      | 0       | 2      | 15.4%   | 6      | 46.2%   | 2      | 15.4%   | 13     |         |
| Xinjiang   | 2      | 20.0%   | 6      | 60.0%   | 0      | 0       | 2      | 20.0%   | 0      | 0       | 10     |         |
| Jiangxi    | 0      | 0       | 5      | 14.3%   | 1      | 4.2%    | 1      | 14.3%   | 0      | 0       | 7      |         |
| Hebei      | 4      | 57.1%   | 0      | 0       | 1      | 14.3%   | 2      | 28.6%   | 0      | 0       | 7      |         |
| Shanxi     | 0      | 0       | 3      | 60.0%   | 1      | 20.0%   | 1      | 20.0%   | 0      | 0       | 5      |         |
| Other      | 0      | 0       | 1      | 20.0%   | 2      | 40.0%   | 2      | 40.0%   | 0      | 0       | 5      |         |
| Jilin      | 2      | 50.0%   | 1      | 25.0%   | 1      | 25.0%   | 0      | 0       | 0      | 0       | 4      |         |
| Fujian     | 0      | 0       | 2      | 66.7%   | 0      | 0       | 1      | 33.3%   | 0      | 0       | 3      |         |
| Inner Mongolia | 1  | 33.3%   | 0      | 0       | 0      | 0       | 2      | 66.7%   | 0      | 0       | 3      |         |
| Tibet      | 1      | 50.0%   | 0      | 0       | 1      | 50.0%   | 0      | 0       | 0      | 0       | 2      |         |
| Hainan     | 0      | 0       | 0      | 0       | 1      | 100.0%  | 0      | 0       | 0      | 0       | 1      |         |

From the analysis results, it can be seen that the main innovation bodies of the ornamental medicinal plant industry are mainly enterprises and individuals. Colleges and universities and research institutions also have a large number of patent applications in this field, and the number of applications from government agencies is the smallest.

From the perspective of time development, from 2000 to 2011, the number of patents of innovation subject was very small. Since 2012, the annual patent application volume of enterprises has increased significantly. It has maintained a strong growth trend in the rest years except for slight fluctuations in 2013. Beginning in 2013, the number of patent applications filed by colleges and universities, research institutions, and individuals has also started to increase significantly. The growth of applications from
government agencies was the slowest, it did not show a clear growth trend until 2016. Due to the impact of the delay in disclosure, the annual patent application data for 2017 and 2018 is not complete, but the growth trend is still expected.

![Figure 3. Patent Application Status of Innovative Subjects over the Years](image)

3.7. Distribution of OMP Technologies

As shown in Table 5, it is the situation of each type of application. It can be seen from the results that the OMP patents are mainly concentrated in A01G(Horticulture, cultivation of vegetables, flowers, rice, fruit trees, grapes, hops or seaweed, forestry, watering), A01H(A new plant or method of obtaining a new plant, plant regeneration by tissue culture) and C05G (A mixture of one or more fertilizers and substances without special fertilizer effects, such as pesticides, soil conditioners, and wetting agents). The number of patent applications is 725, 123 and 105 respectively. The research on Cultivation and planting of ornamental medicinal plants mainly focuses on the improvement of conventional methods, and the research on improving the planting effect through tissue culture, soil chemical fertilizer and other methods also accounts for a large proportion, which may gradually become the research in this field Focus direction.

| Subclass | Licensing | Examination | Publication | Rejection | Withdrawal | Abandonment | annual fee unpaid | Total |
|----------|-----------|-------------|-------------|-----------|------------|-------------|------------------|-------|
| A01G     | 104       | 358         | 48          | 62        | 112        | 3           | 38               | 725   |
| A01H     | 31        | 28          | 3           | 11        | 28         | 1           | 21               | 123   |
| C05G     | 6         | 56          | 11          | 9         | 22         | 0           | 1                | 105   |
| A01C     | 17        | 32          | 4           | 3         | 8          | 0           | 0                | 64    |
| C12N     | 19        | 15          | 0           | 2         | 4          | 0           | 5                | 45    |
| A01N     | 4         | 9           | 4           | 4         | 3          | 0           | 4                | 28    |
| A61L     | 2         | 8           | 1           | 1         | 11         | 0           | 1                | 24    |
| B09C     | 1         | 6           | 2           | 2         | 1          | 0           | 4                | 16    |
| A01B     | 0         | 2           | 0           | 0         | 3          | 0           | 1                | 6     |
| C05F     | 0         | 4           | 1           | 0         | 0          | 0           | 0                | 5     |

Table 5. Distribution of Patent Applications in Main Technological Directions
4. Conclusions and recommendations

4.1. OMP Patent application summary

(1) There are many patent applications for the famous medicinal plant varieties. The ornamental medicinal plant horticulture industry is in its infancy. G. biloba and M. denudata, which are familiar and widely recognized by the public, have a large number of horticultural technology patent applications. The number of patents for I. indigotica, R. pseudoacacia and E. ulmoides has also started. And most others Ornamental medicinal plants have not been fully developed.

(2) The patent application for ornamental medicinal plants has entered a rapid development stage. From the time point of view, from 2000 to 2009, patent applications for ornamental medicinal plants were in a slow development stage, with only a few or a dozen applications each year. Since 2010, the annual patent application volume has increased significantly, with an average annual growth rate of about 50%, showing a rapid development trend. This shows that the research activities of ornamental medicinal plants are becoming more and more active, which has become a hot area of horticultural industry.

(3) The number of patents is unbalanced due to location advantages. Affected by the basic conditions of nature, economy and R & D, the development of provinces and cities in China is uneven. According to the geographical division, Provinces with both natural and economic advantages, such as Anhui, Jiangsu and eastern Shandong, have the largest number of patent applications, ranking the first tier. Guangxi, Yunnan, Guangdong, Sichuan and other southwest and South China provinces have significant natural advantages, ranking the second tier. The number of patent applications in other regions is high or low.

(4) Invention patent is the main type of patent. In the fields of planting, cultivation, processing and application of medicinal plants, the majority of patent types are method patents, so the number of invention patents accounts for 98.4% of the total. The number of utility model patents is very small, and the degree of attention needs to be improved.

(5) The main body of innovation is enterprises and colleges and universities. The ornamental medicinal plant industry belongs to the application-oriented technology field, the number of patent applications of enterprises accounts for 43.3% of the patent application volume of the total industry, the main body of innovation is enterprises. In Beijing and other areas where scientific research is concentrated, the main innovation body is colleges and universities (patent accounts for 45.8%).

(6) The optimization of planting method is a hot spot of innovation. The optimization of planting methods is a hot spot for innovation. The current patent protection of ornamental medicinal plants is mainly focused on the improvement of existing cultivation methods. The research of high-tech methods such as tissue culture and soil chemical fertilizer improvement is gradually becoming the focus of research in this field.

4.2. Suggestions for the development of ornamental medicinal plants

(1) Continue to excavate the varieties of ornamental medicinal plants. There are many kinds of medicinal plants in China, with different shapes and tenacious vitality. It is a treasure house for the development of new horticultural varieties. For example, Ganoderma Lucidum Karst and Dendrobium nobile Lindl are both Chinese herbal medicines with the reputation of "fairy grass". In history, they are only used for medicinal materials. In recent years, they have been developed into bonsai and bonsai products, which are popular in the market. Through independent innovation, cooperative development and other ways, actively exploring and cultivating new ornamental medicinal plant varieties, promoting the application of ornamental medicinal plants in indoor decoration, air purification, urban greening and other aspects, promoting the application of ornamental medicinal plants in interior decoration, air purification, urban greening, etc, driving the development, integration, demonstration application and promotion of new technologies in planting, processing, product development and other aspects can eventually form a new industry.
(2) Increase publicity and enhance cultural connotation. The common characteristics of ornamental horticultural plants include: beautifying the environment, improving living conditions, purifying the air, reducing dust and harmful particles, reducing noise, increasing humidity, etc. In addition, ornamental medicinal plants also have a long history of use and profound cultural heritage, so it can effectively increase the urban cultural atmosphere. Based on this, it will effectively promote the development of the industry by strengthening the publicity, increasing the awareness of the public, and building a demonstration city of ornamental medicinal plants greening.

(3) Build industrial clusters and improve the scale effect. The development time of ornamental medicinal plant industry is still short, the level of Industrial Science and technology is low, and the industrial chain is short. In terms of production, publicity and brand building, it has not yet formed a centralized advantage and can not achieve large-scale output value. With the opportunity of 2019 World Horticultural Exposition, guiding the cluster development of ornamental medicinal plant industry, promoting the formation of scale effect, so as to realize the innovative development of ornamental medicinal plant industry.

(4) Improve the level of intellectual property protection. Make full use of comprehensive means such as patents, trademarks, new plant varieties, geographical indication certification, legislation, and administration to strengthen the intellectual property protection of technologies and products related to ornamental medicinal plants and enhance IP Services. While protecting your own rights, you can avoid possible intellectual property disputes and product sales risks, and remove obstacles for later product promotion.

(5) Enhance technical cooperation in production, learning and research. Encouraging enterprises to carry out in-depth cooperation with innovation bodies such as scientific research institutions, colleges and universities, form an industrial technology innovation alliance with enterprise as the main body, market-oriented and Industry-University-Research-Application combination. The OMP industrial technology innovation alliance jointly carries out technology research and product promotion, so as to jointly improve the technical level of the industry.

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