Research on the Development of Chinese Medicine and Its Impact on the Environment

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ABSTRACT: Traditional Chinese medicine has been among the two major drug systems in the world since ancient times and has played a very important role in the medical industry. With the development of traditional Chinese medicine, while the efficacy of medicine has been improved, it has gradually had a huge impact on the surrounding environment. The reduction of environmental quality not only affects the quality of traditional Chinese medicine but also causes harm to other organisms. Therefore, it is extremely important to improve the production methods of traditional Chinese medicine. Based on the different production methods of different types of traditional Chinese medicines, the improvement methods are also different. This paper mainly studies the influence of environmental factors on the quality of Chinese herbal medicine and the influence of the industrialization of modern Chinese medicine on the surrounding environment and the solutions. By referring to the relevant literature on traditional Chinese medicine, the problems existing in the whole process from raw materials to the processing of traditional Chinese medicine are analyzed to find corresponding solutions. Through the research of this paper, it is found that although traditional Chinese medicine has some influence on the surrounding environment in the process of industrialization, the improvement of the curative effect of the medicine is still obvious, and it has made a huge contribution to the improvement of the national health level.

1. INTRODUCTION

The raw materials of traditional Chinese medicine include many animals and plants, and every link of processing is crucial. Each step has a critical impact on the efficacy of the finished product. The manufacture of traditional Chinese medicine in ancient times is relatively primitive, and there is no guarantee that every medicine can have the same effect. In recent years, the entry of Western medicine into the Chinese market and the combination of Chinese and Western medicine have caused a huge impact on the Chinese pharmaceutical industry. Combining the advantages of Western medicine makes the efficacy of modern Chinese patent medicine more stable, the production is gradually industrialized, and the output is gradually stable. This paper mainly describes the development of modern Chinese medicine through the production process and efficacy of traditional Chinese medicine. Medicinal materials are the key to ensuring the efficacy of finished Chinese medicines. Through the research in this paper, more stringent methods for controlling the quality of medicinal materials can be proposed. In order to develop more effective, safe and distinctive new drugs. This paper may provide limited help in advancing the development of the medicinal material planting industry and the Chinese medicine market.

2.TRADITIONAL CHINESE MEDICINE AFFECTS THE IMPROVEMENT OF CHINESE NATIONAL HEALTH

Because traditional Chinese medicine has not been scientifically treated, the side effects and dosage of the medicine are not very sure. After the introduction of western medicine into China, the market and sales of traditional Chinese medicine were further squeezed. In the past 10 years, the traditional Chinese medicine system has been perfected after modern industrialization and some combination of western medicine. The more Chinese people begin to believe in traditional Chinese medicine, the market for traditional Chinese medicine is reopened. It can be clearly seen from the figure that from 2015 to 2019, the number of Chinese medicine stores and the number of customers who patronize Chinese medicine stores is also gradually increasing.

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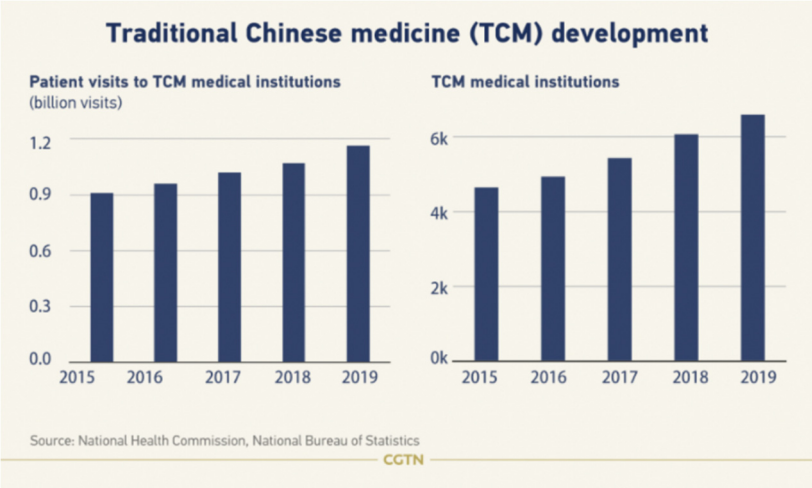

Figure 1 Traditional Chinese medicine (TCM) development trend from 2015 to 2019

Chinese medicine has also played a huge role in the COVID-19 period, "Lianhua Qingwen has antiviral and anti-inflammatory activity against the novel SARS-CoV-2 virus. At the mRNA level," China's top epidemiologist Zhong Nanshan and his team wrote. After an experiment using 284 patients as samples, it was found that the recovery rate of mild and moderate cases was higher after 14 days of treatment with the drug, which helped to reduce the proportion of mild to severe cases and shortened the period from positive to negative for patient's time. [1]

3. PLANTING/CULTIVATION OF MEDICINAL MATERIALS

Common traditional Chinese medicine mainly includes three categories: natural medicine, botanical medicine and animal medicine, of which botanical medicine occupies the majority. Usually, the production of medicinal materials is closely related to the region and the harvest time. Botanical and animal medicines will be treated according to different medical needs before they are made into medicines.[2] The purpose of treatment is to further purify the medicinal materials, which can enhance efficacy and reduce side effects. With the continuous improvement of industrialization, human demand for natural resources is also increasing day by day. Sewage from chemical, paper and other industries flows into rivers, and urban waste such as batteries, plastics, etc. pollutes the soil. The widespread use of pesticides and insecticides has led to increased levels of compounds such as organophosphorus and organochlorine in soil and air. This aspect affects the growth of surface medicinal materials. lead to a decrease in the quality of the medicine. Substances such as sulfur dioxide flowing into the atmosphere increase the acidity of rainwater and affect the growth of plant medicinal materials. The large amount of dust produced by industrialization has led to an increase in smog weather. The light time of medicinal materials is shortened or the light intensity is reduced. Plants are stunted, and yield and efficacy are severely reduced. Disposal of waste such as acid rain and batteries leads to lower soil pH and soil compaction. The heavy metal content in the soil near the industrial park exceeds the standard, and the absorption of nitrogen, phosphorus and potassium by plant medicinal materials is reduced. [3] In recent years, in order to prevent pests, chemical pesticides have been used frequently. The residual period of chemical pesticides is long. Whether it is sprayed pesticides or pesticides sprinkled on the ground, they may accumulate in plants, resulting in a large amount of toxicity in the medicinal materials used for disease treatment. Especially for natural medicines. Natural medicine usually refers to medicinal materials for direct consumption without treatment, which may endanger human health. Animal medicines are usually insects, which are also the most toxic and difficult to control. Animal traditional Chinese medicine includes the whole animal, such as whole scorpion, centipede, part of the animal body, such as toad oil, antlers, etc., and animal secretions, such as musk, toad, and other types. [4]

4. STORAGE AND TRANSPORTATION OF CHINESE HERBAL MEDICINES

The storage, maintenance and prevention of failure of Chinese herbal medicines as raw materials are very important. In the 2007 sampling survey of 'China Pharmaceutical', it was found that some Chinese herbal medicines used in Chinese herbal medicine warehouses, Chinese herbal medicine wholesale stations, Chinese medicine hospitals and individual Chinese medicine clinics of some drug manufacturers have been mildewed, moth-eaten, discolored, and stale, oily phenomenon, etc. It seriously affects the curative effect of medicinal materials, and then directly or indirectly affects the quality and curative effect of medicines and prescriptions. The predecessor of China Pharmaceutical Magazine was the China Pharmaceutical News Agency established in Chongqing in 1983, which was a division-level institution directly under the former State Pharmaceutical Administration. "China Pharmaceutical" mainly publishes drug research and development, pharmaceutical process innovation, drug quality control, pharmacology, toxicology and drug interaction research, drug clinical

efficacy and safety evaluation, pharmacoeconomic evaluation, clinically rational drug use and adverse reactions Monitoring, scientific supervision theory and model innovation and other scientific papers. The purpose of the publication of "China Pharmaceutical" is to publicize food and drug regulatory policies, transmit medical science and technology research results, exchange information on the pharmaceutical industry, disseminate medical science and technology knowledge, and guide the development of the pharmaceutical industry. [5] The main storage problems are as follows:

4.1. Mildew

The best way to preserve medicinal materials is to store them dry. If the temperature of the storage place is between 20-25 degrees Celsius and the air humidity is about 70%, it is most likely to mold. Enzymes secreted by molds can erode the tissue of medicinal materials and make them ineffective.

4.2. Insect-Eaten

Some raw medicinal materials may be stored or processed improperly after harvesting, which can lead to moth infestation. Insects will cause the medicinal materials to be hollowed out, and the excrement of the pests will contaminate the medicinal materials. Some pests may also carry viruses.

4.3. Discoloration

When using the drying method to treat the medicinal materials, the high temperature will cause the medicinal materials to be oxidized to different degrees, resulting in failure.

4.4. Oily

Some medicinal materials containing more oil, such as almonds, may cause oil to overflow on the surface of the medicinal materials when stored for a long time, and these oils will cause the medicinal materials to accelerate mildew.

4.5. Dispersion and Smell

The medicinal properties of some medicinal materials are easily volatile, such as Glauber's salt, which is prone to weathering and dehydration.

During the transportation of herbal medicines, due to a large amount of accumulation, some herbal medicines are under heavy pressure and lead to the loss of medicinal components. Herbs are usually shipped dry, and there is a risk of burning if the weather is hot. In severe cases, it may even cause disasters such as wildfires.[6][7]

Any of these conditions can lead to the deterioration of medicinal materials, affect the quality of medicines, and even make them lose their efficacy.

5. ENVIRONMENTAL ISSUES DURING PROCESSING

Traditional Chinese medicine treatment methods in ancient times mainly include frying, blanching, calcining, carbon making, cooking, roasting, simmering and so on. These ancient methods have little impact on the environment but have large losses, long cycles, many processes, and low extraction efficiency. In modern times, with the increasing demand, in order to ensure the output, the production of traditional Chinese medicine has gradually become industrialized. The impact on the environment has also become impossible to ignore. Extraction new technologies include supercritical extraction (SFE), ultrasonic method, semi-bionic extraction method, enzymatic chemical technology, microwave extraction technology (MAE) and so on [8]. Appropriate methods and steps can be used to extract the maximum amount of active ingredients. The industrialization of traditional Chinese medicine has also increased the demand for raw materials, and the profit of planting Chinese medicinal materials will gradually surpass that of traditional agricultural products. This situation will lead many farmers to give up growing crops and use large tracts of land resources to grow Chinese herbal medicines. This led to a total decline in the production and processing industries of grain. The remaining medicinal residues after industrial processing can no longer be classified as kitchen waste. Landfilling the dregs as industrial solid waste would render the surrounding land unsuitable for any crops. The volatility and degradability of medicinal residues may release high concentrations of harmful gases such as ammonia and methanol in a short period of time, causing potential harm to nearby residents [9]. The components of the drug residues seep into the underground soil and may be eaten by some nearby animals, causing the animals to die or to accumulate a large number of toxins in their bodies after being hunted by other predators.

6. SOLUTIONS TO ENVIRONMENTAL PROBLEMS

In order to solve the storage and environmental problems of medicinal materials, the packaging methods and materials used are best for transportation and ventilation, and carton packaging should be used as much as possible. Before packaging, inferior products and foreign objects should be checked and removed. The storage time is determined according to the actual situation of the medicinal materials. Some medicinal materials, such as dried tangerine peel and Evodia, are better as they age, while some medicinal materials, such as mint, nepeta, and angelica containing volatile oils, must be used as soon as possible. In summer, if the temperature in the warehouse is high, the ventilation is poor, the inventory is large, and the container is too dry and closed, the medicinal materials are squeezed and sultry, and the oil often occurs. If the cooling method cannot be used or the cooling method is more expensive, these medicinal materials need to be processed as soon as possible and should not be stored.

Before the rainy season, the medicinal herbs are packed tightly and roasted until 80% dry to avoid mold. Generally, the storage temperature of Chinese herbal medicines or decoction pieces should be kept below 25℃, and the ventilation, drying and moisture content should be controlled at about 8%-10%. Pack some volatile and oxidized medicinal materials in airtight containers. Salted decoction pieces are susceptible to moisture or high temperature to precipitate salt, so they should be placed in a cool and dry place, and should not be stored in metal containers.

The research prospects of traditional Chinese medicine dregs are very broad. The research is not only to eliminate or reduce the pollution of traditional Chinese medicine dregs to the environment but also to make them a resource. However, traditional treatment methods such as landfill or incineration are costly, waste resources and may cause secondary pollution. Treatment methods such as composting, edible mushroom cultivation, and feed processing can be used. [10]

Chinese herbal medicine dregs belong to high-moisture solid waste materials. In order to realize the reuse of its resources, dewatering the medicinal dregs is a necessary process, and the traditional Chinese medicine dregs dryer is the main equipment for dewatering the medicinal dregs. The high-humidity medicinal residue is dried to about 18% water content, which meets the water content standard for Chinese medicinal residues to be shipped or reused. At present, the comprehensive utilization of a large number of waste residues in pharmaceutical factories mainly includes fuel, organic fertilizer, feed, etc. The drying and reuse of pharmaceutical residues can not only create secondary income for pharmaceutical companies but also improve resource utilization and reduce environmental pollution. [11]

7. CONCLUSION

In conclusion, although traditional Chinese medicine has a history of thousands of years, traditional Chinese medicine has many disadvantages. After combining with the advantages of western medicine, there is still a lot of room for improvement of traditional Chinese medicine in modern society. Today's proprietary Chinese medicines are easy to use, but the conditions for the use of raw materials are relatively harsh, and the storage of raw materials also has many disadvantages. Most of the use of traditional Chinese medicine is to regulate the body, and the effect of the medicine is not as stimulating as that of western medicine. There are some side effects of traditional Chinese medicines that have not been fully studied. It is hoped that future research can completely cover traditional Chinese medicines.

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