International Journal of Biology and Life Sciences
ISSN: 2957-9511 | Vol. 1, No. 1, 2022

Research Progress on Changing laws In Chemical Constituents of Seeds Chinese Medicines from Before and After Concocting

Liyan Sun

Tianjin bioengineering vocational and technical college, Tianjin, 300462, China.
sungirlcom@126.com

Abstract: Seed Chinese medicines concocting is a traditional pharmaceutical technology with independent intellectual property rights in China. After years of development and evolution, it has formed a profound cultural heritage in China. This paper analyzes the research status of chemical mechanism in the concocting of seed Chinese medicines, and finds that a large number of chemical reactions usually occur during the process of seed Chinese medicines concocting, resulting in fundamental changes in efficacy. Moreover, there are still many problems in the process of research on the changes of chemical components before and after the concocting of seed Chinese medicines, such as the lack of rationality of quality standards, the lack of specificity of index standards, the lack of clarity of functional components, and the difference in quality assurance of origin. In the follow-up, the academic and related fields should further increase the theoretical research and clinical trials on the changes of chemical components before and after the concocting of seed Chinese medicines, so as to provide effective guidance for the rational clinical application of Chinese herbal medicines.

Keywords: Seed Chinese medicine; Chemical composition; Changing laws; Before and after concocting.

1. Research status of chemical mechanism in the process of seed Chinese medicines concocting

Seed Chinese medicines concocting refers to a traditional Chinese technology for pharmaceutical production based on the characteristics of the drug itself, as well as the concept of traditional Chinese medicine and syndrome differentiation, combined with the differentiated requirements of preparations and dispensing. After a long process of concocting, the seed Chinese medicine will become a Chinese herbal medicine, which is regarded as a necessary clinical prescription drug by traditional Chinese medicine and the raw material drug of the secondary processing plant of traditional Chinese medicine. Therefore, a relatively standardized decoration-piece concocting system is very important, and has far-reaching significance for the modernization, transformation and development of traditional Chinese medicine. To explore the efficacy and efficacy of the processed seed Chinese herbal pieces, and to analyze the evolution of chemical components before and after concocting and during processing, which is an effective kinetic energy to promote the quality of Chinese herbal pieces. In recent years, scholars in related fields at home and abroad have carried out a lot of research and achieved fruitful results. After reviewing the existing literature, the article summarizes the research status of the chemical mechanism in the process of seed Chinese medicine processing into the following aspects.

1.1. Hydrolysis reaction

Usually, saponins and brassin are common ingredients in seed Chinese medicine. Under certain temperature and moderate external environmental conditions, these two kinds of substances can easily cause hydrolysis reaction, and then generate new components, resulting in changes in the efficacy of traditional Chinese medicine. In the specific processing of traditional Chinese medicine, various methods such as boiling, steaming, moistening, and washing are involved. These methods all require heat treatment in a water environment, and some of them require continuous heating for a long time. In this process, hydrolysis reaction after chemical composition change usually occurs. For example, the hydrolysis reaction of brass glycosides, the hydrolysis of polysaccharides, the hydrolysis of alkaloids, the hydrolysis of saponins, and the hydrolysis of cyclohexadiene.

1.2. Oxidation reaction

Oxidation reactions are mainly characterized by the loss of electrons by substances. In a narrow sense, oxidation reaction is a chemical reaction that occurs after substances in the objective world are combined with oxygen or after oxygen is removed. Seed Chinese medicine contains many kinds of chemical components, and it is extremely prone to a relatively slow oxidation reaction in the process of concocting, which leads to the emergence of new chemical components, which in turn lead to changes in clinical efficacy. Taking strychnine as an example, because it has the functions of relaxing meridians and activating collaterals, reducing swelling and dispersing knots and relieving pain, the new pharmacological effects after processing are basically the same as those of the raw product. But the toxicity is greatly reduced, and the sand scalding method has better analgesic effect than other methods.

1.3. Displacement reaction

A displacement reaction is essentially a chemical reaction in which a single species and a compound combine to form another single species and compound. Usually, this kind of substitution reaction is common in organic chemistry. For example, the group in the compound can easily undergo substitution reaction with small molecular organics, thereby deriving new chemical components and triggering changes in

the efficacy of traditional Chinese medicine. Take aconitum and aconite as examples. These two kinds of seed Chinese medicines have good effects of dispelling cold and relieving pain, but they are highly toxic and need to be processed before being used as medicine. During the decoction or cooking process, the acetyl groups in aconite and aconite will be replaced by fatty acyl groups, thereby forming lipid alkaloids with relatively low toxicity, which will greatly reduce the content of diester alkaloids and keep the content of lipid alkaloids continuously increasing.

1.4. Decomposition reaction

The decomposition reaction can be understood as a reaction in which a compound is decomposed under some specific conditions to form two or more compounds. The chemistry contained in traditional Chinese medicine is very complex. During the specific processing process, it is very easy to be affected by the thermal environment and undergo decomposition reactions, resulting in new components and changes in clinical efficacy. Taking the type of traditional Chinese medicine white mustard seeds as an example, the analysis is carried out as follows. White mustard seeds have multiple functions such as dispersing knots, dredging collaterals, relieving pain, warming lungs, removing phlegm and invigorating, and are usually put into clinical use after frying. White mustard seeds contain a variety of glycoside compounds, although they are not irritating, they will produce a certain pungent taste after enzymatic hydrolysis. During the frying process, the enzyme composition of mustard seed can be reduced and the glycoside composition can be increased, ensuring that people can slowly hydrolyze themselves when taking it into the gastrointestinal tract, and then promote the release of mustard oil from the white mustard drug, and fully release the therapeutic effect of the drug.

1.5. Condensation reaction

A condensation reaction is a chemical reaction in which two or more organic molecules interact and fuse to form another macromolecule. During the condensation reaction, small molecules, such as hydrogen chloride and water, are easily lost. During the concocting of some traditional Chinese medicines, due to the complex process, it is easy to produce condensation reactions to generate new components, which in turn lead to changes in efficacy and efficacy. Taking Qingdai as an example, it belongs to the stems and leaves of Malanthaceae, and the condensation reaction is mainly a chemical reaction in which the precursor substances contained in the plant are gradually converted into high-purity indirubin and indigo.

1.6. Other complex chemical reactions

The chemical reactions of traditional Chinese medicines containing different kinds of chemical components are not the same after being concocted. In the same way, different types of chemical reactions will occur during the processing of the same traditional Chinese medicine. For example, hydrolysis and isomerization occur simultaneously during the concocting of ginseng. At the same time, due to the complexity of the chemical components of traditional Chinese medicines, it is difficult to fully elucidate the chemical reactions that occur during concocting, and further in-depth research is urgently needed. Take Tian nanxing and Pinellia as examples, both are highly toxic Chinese medicines, and the raw products are strongly irritating and toxic, mainly in terms of irritation to mucous membranes.

2. Problems faced in the process of research on the change laws of chemical components of seed Chinese medicine before and after concocting

The research on the change law of chemical composition of seed Chinese herbal medicine pieces is closely related to its quality, and the quality of the pieces is directly related to the health of the general public. With the continuous deepening of scientific research in recent years, great progress has been made in the study of the changes in chemical composition of traditional Chinese medicines before and after concocting, but there are still many problems to be solved, and the relevant quality standards for traditional Chinese medicines still need to be further improved.

2.1. Insufficient reasonableness of quality standards

The quality standards of Chinese herbal decoction pieces cover many fields, including inspection, identification, shape, source, content and determination of excipients, functions and indications, packaging and storage, matters needing attention. The variety of quality standards makes it difficult for some drugs to have a complete and mature reference basis. Taking morning glory seeds as an example, the drug is often used in clinical medicine. However, in the 2015 version of the Chinese Pharmacopoeia, there is no specific content determination index for the quality standard of morning glory seeds. Basically, this is because the processing mechanism is not clear, that is, what are the ingredients that exert real medicinal effects after processing, and what toxicity has fundamentally changed after processing. Some scholars have analyzed the actual effect of processing on the active ingredients of the morning glory, and found that the morning glory will produce strong irritating chemical components after immersion in water, the laxative effect will be greatly weakened, and the toxicity will also be significantly reduced, but the irritant is relatively strong. The chemical changes of the water-soluble components of , there is still no definite research conclusion.

2.2. Insufficient specificity of indicators

Once the seed Chinese medicine has undergone concocting, its components will change greatly, and the efficacy will also be different. Therefore, the quantitative measurement indicators of raw products and processed products should be different. However, before and after the actual processing, the concocting personnel still use the raw material content to measure the indicators obtained, and control the quality of the processed decoction pieces, which leads to a serious lack of specificity in the quality standards of the seed Chinese medicine decoction pieces. Take radish as an example, its properties are sweet and pungent, and it has multiple functions such as lowering qi and resolving phlegm, digesting food and removing bloating. However, from the 2015 version of the first part of the Chinese Pharmacopoeia, although the chemical composition and efficacy during the processing process have changed a lot, the decoction pieces still use sinapine as the main measurement index. This not only leads to the inability to truly reflect the processed quality of raisins, but also greatly reduces the specificity of its quality standards.

In addition, by combing the 2015 edition of the Chinese *Pharmacopoeia*, it was found that there are only a few quantitative differences in the quantitative determination of the current Chinese herbal decoction pieces before and after concocting, such as Caowu, Yuanzhi, and Rehmannia glutinosa. It can be seen that the specificity of the indicators before and after the processing of seed Chinese medicine still needs to be improved.

2.3. Insufficient clarifying of efficacy ingredients

At present, the efficacy and efficacy of seed Chinese medicine have undergone great changes after processing, but the ingredients that cause the change in efficacy are still not very clear. Taking perilla seeds as an example, it has the function of moisturizing dryness and smoothing the intestines, and can be used to treat intestinal dryness, constipation, cough and dyspnea. It is a common clinical drug. The antiasthmatic and antitussive effects of perilla frutescens focused on the research on the chemical components of low-grade fatty oil Hassan, but the research on intermediate and high-level chemical components and the effect of reducing phlegm is still blank. In addition, only on the basis of clarifying the influencing factors of the components of efficacy changes, can the targeted processing of seed Chinese medicines be made to ensure the quality of drugs and the safety of clinical medication. However, in the actual concocting process, whether new chemical composition changes occur, and whether there is an inevitable connection between these changes and the dissipation of spicy taste and the strengthening of lung-warming and qi-lowering effects after processing, further in-depth exploration and experimental research are urgently needed.

2.4. Differentiated quality assurance of origin

Usually, there are multiple choices for the origin of a single medicinal material. The quality of medicinal materials from different origins varies greatly. Some scholars have collected nearly ten kinds of dodder from different origins, and found that the anti-aging effect of Henan and Hebei dodder water decoction is significantly stronger through the method of differential determination of index content. Using orange cassia, chrysophanol, and emodin as indicators, some scholars have clustered and analyzed the chemical components of cassia seeds from different origins, and found that the quality of traditional Chinese medicines in Henan seeds is significantly higher than that in other regions. In fact, the chemical composition of traditional Chinese medicine in seeds will change regularly with the change of latitude and longitude, and the efficacy will also change. Specifically, by setting the latitude and longitude parameters, the content of the six chemical components in Schisandra chinensis was determined.

3. Summary and outlook

Traditional Chinese medicine has always been a cultural treasure of ancient Chinese science, and it is also the key to unlocking the treasure house of Chinese civilization. Generally speaking, seed Chinese medicine needs to be fried with charcoal, coke, and yellow. The concept of "every seed must be fried" has scientific connotations to a certain extent. According to the 2015 edition of the Chinese Pharmacopoeia, the general principles of traditional Chinese medicine processing and the standard collection records, stir-fry yellow needs to use slow or medium heat to ensure that the surface of the drug is yellow or the color is significantly deepened, and the smell of the drug itself is emitted. It is difficult to quantitatively control these empirical terms, so it is very necessary to study the changes of chemical components before and after the processing of seed Chinese medicines. By combing the correlation analysis and research of the chemical composition changes before and after the processing of the existing representative seed Chinese medicines, it is found that complex chemical reactions such as hydrolysis, oxidation, and substitution usually occur during the concocting of seed Chinese medicines. In addition, before and after concocting, there are still some difficult problems in the change of the chemical composition of seed Chinese medicines, and further research is urgently needed.

Acknowledgment

In 2021, Tianjin Vocational School's "14th five year plan" education and teaching reform research project "Research on the development path of new loose leaf teaching materials of traditional Chinese medicine processing technology based on school enterprise dual cooperation" (Project No.: 2021080, project host: Sun Liyan).

References

[1] Hu J., Tong H.J., Zeng Q.Q., Cai B.C., Cai T., Qin K.M. (2017). Research progress on the change mechanism of chemical constituents in the frying process of traditional Chinese medicines from seeds. Chinese Herbal Medicine, (12): 2548-2556.

[2] Gao Y.Y. (2022). Discussion on the influence of processing on the chemical composition and function of traditional Chinese medicine. Chinese Medicine Guide, (7): 107-109.

[3] Hu Z.P., Deng X.K., Wang C.M., Lu T.X., Han Z.Y., Li X. (2021). Analysis of differences in the quality of traditional Chinese medicines by processing. Journal of Qiannan National Medical College, (2): 155-157.

[4] Jin Z.M. (2021). Study on the processing technology of red Codonopsis and its composition changes. Gansu Province, Affiliated Hospital of Gansu University of Traditional Chinese Medicine, 06-03.

[5] Shi Y.,Xu C.L.,Jin J.J.,Yin F.Z.,Wu H., Cai B.C., Qin K.M., Li W.D. (2022). Traditional understanding and modern research progress of the theory of “every child must be fried”.Chinese Herbal Medicine, (7):2227-2236.

[6] Sun Y.J., Huo Z.P., Wang Y., Li R.M., Qin M.J., He Y. (2022). Analysis of the change law of chemical constituents of Psyllium chinensis at different processing times based on UPLC-Q-TOF/MS-E. Chinese Journal of Experimental Formulary, (4):146-153.

[7] Yang L., Gong Y.T., Xu M.S., Yang L., Chen J.B., Dong L. (2020). Research on the relationship between color and composition changes during the processing of rhubarb charcoal based on “external and internal correlation”. Chinese Herbal Medicine, (22): 5705- 5713.