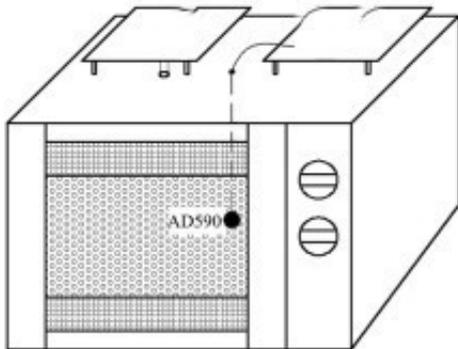


## Study on drying method of Shujin Tongluo extract



Schematic diagram of microwave drying temperature control system

Objective To optimize the drying process of Shujin Tongluo extract. Methods [Microwave drying equipment](#) was used. 4 drying methods, namely decompression drying, drying and spray drying, were used to dry the extract of Shu Jin Tong Luo. The yield of dry paste, the solubility of the granules, naringin and gastrodin content were determined. The moisture absorption percentage of the granules was determined, and the hygroscopic time curve was drawn to compare the hygroscopicity of the granules.

Results the relative moisture absorption rate and the equilibrium moisture content of Shu Jin Tong Luo granules from 4 drying methods were small and large in order of decompression drying, microwave drying, spray and drying. Conclusion The best drying method of Shujin Tongluo extract is decompression drying.

Key words: Shujin Tongluo Granules; Drying Method; Solubility; Hygroscopicity? [Microwave Drying of Traditional Chinese Medicine](#)



Shujin Tongluo Granule is a new Chinese medicine developed by Xiyuan Hospital of Chinese Academy of Traditional Chinese Medicine and Shenwei Pharmaceutical Group Co., Ltd. It is composed of 9 kinds of Chinese medicines, such as *Rhizoma Drynariae*, *Achyranthes bidentata*, *Ligusticum Chuanxiong* and *Gastrodia elata*. It has the functions of tonifying liver and kidney, activating blood circulation and relaxing tendons, and is mainly used to treat cervical

The preparation technology of Shujin Tongluo granules requires that Shujin Tongluo extract be dried, crushed, and properly prepared into granules with dextrin and modifier. The drying

method, decompression drying method, microwave drying method and spray drying method were used in 4 ways to dry the extract of Shu Jin Tong Luo. The effects of 4 drying methods on the solubility and hygroscopicity of the granules were investigated, so as to screen the best drying method for the extract of Shu Jin Tong Luo.

There are many drying methods for Chinese medicine extract, including drying method, vacuum drying method, spray drying method, vacuum freeze drying method, microwave vacuum drying method and so on. In accordance with the characteristics of traditional Chinese medicine, reasonable drying methods should be chosen reasonably. Through comparing the 4 drying methods of drying method, decompression drying method, microwave drying method and spray drying method, the influence of different drying methods on the solubility and hygroscopicity of particles was investigated, so as to provide data support for production.

The hygroscopicity of materials usually includes hygroscopicity time curve, isothermal curve, equilibrium hygroscopicity and critical relative humidity. In this study, the author used hygroscopicity time curve and equilibrium hygroscopicity to measure the hygroscopicity of particles, which can intuitively reflect the trend of material hygroscopicity changing with time. The largest of the four particle fitting equations  $R^2$  is the logarithmic model, which shows that the logarithmic model used in this case is the closest to the real process of particle moisture absorption.

The drying methods of extracts of traditional Chinese medicine not only affect the solubility of granules, but also affect the hygroscopicity of granules. Different extracts use different drying methods. Because of different drying principles, the extract powder after drying also shows different hygroscopicity characteristics.

Because the properties and specific surface area of extract powders obtained by different drying methods are quite different, it is not suitable to investigate the moisture absorption of extract powders directly. In this study, Shujin Tongluo granules with the same granularity were prepared from four different extract powders and the same excipients. The hygroscopicity of the granules was investigated to reduce the experimental error.

The experimental results show that vacuum drying and microwave drying can significantly improve the hygroscopicity of Shujin Tongluo granules, which is similar to the results of Yang Xu et al. Compared with vacuum drying, vacuum drying is slower, but the material treatment is milder and the yield is higher. In the process of microwave drying, unstable temperature control will lead to excessive local temperature and gelatinization of extract, resulting in unqualified particle solubility. Therefore, the best drying method of Shujin Tongluo extract is vacuum drying.