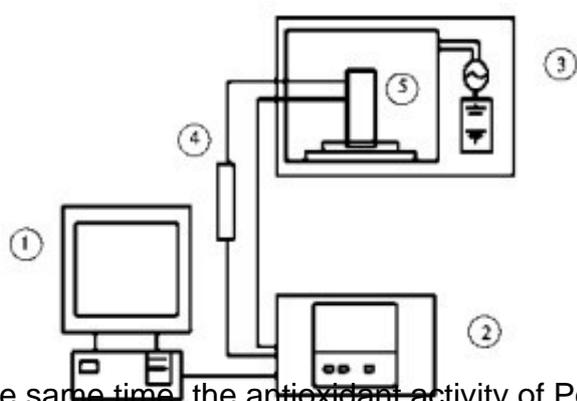


# Effects of different drying methods on drying characteristics and quality of *Polygonatum sibiricum*

Abstract: The effects of microwave vacuum drying, natural sun drying, [microwave drying equipment](#), vacuum drying and hot air drying on the drying curve, polysaccharides, total phenols, total saponins, 5-carboxymethyl furfural content and antioxidant activity of *Polygonatum* were studied.

Polysaccharides, phenols, saponins and 5-hydroxymethyl furfural in *Polygonatum sibiricum* were extracted by ultrasound-assisted method, and their contents were determined by the methods introduced in the literature.



At the same time, the antioxidant activity of *Polygonatum* polysaccharide was detected by FRAP and superoxide anion free radical assay. The results showed that microwave vacuum drying had the highest drying rate and the shortest drying time. The loss of polysaccharides, total phenols and total saponins was the least. The production of 5-carboxymethyl furfural was small. The polysaccharide content of *Polygonatum sibiricum* in the dried product was 63.59 (+1.25) mg.g<sup>-1</sup>, and the inhibition rate of 20 mg.mL<sup>-1</sup> polysaccharide solution on superoxide anion free radicals was 30.01 (+1.3). 0%). It is concluded that microwave vacuum drying method is more suitable for obtaining high quality xanthate dried products.

Key words: [microwave drying polygonatum](#), drying curve, *Polygonatum* polysaccharide, antioxidant activity



*Polygonatum sibiricum* is a perennial herb, which has the health-preserving effect of enriching qi and nourishing and strengthening the body. Since ancient times, *Polygonatum sibiricum* has been widely used in people's daily life as a medicinal material, boiled into soup for the treatment of various diseases, or as a food material, cooked into a medicinal diet with special efficacy.

*Polygonatum polysaccharide* is the most abundant active ingredient in *Polygonatum*, which has anti-aging, anti-cancer, hypoglycemia and lipid, anti-atherosclerosis, diabetes and other pharmacological effects. In addition, phenolic compounds and saponins are the active ingredients of *polygonatum*.

So far, the natural drying method is mainly used in the processing of *Polygonatum sibiricum*. Influenced by the weather and air-drying conditions, the quality of the dried product of *Polygonatum sibiricum* by this method is not high. It not only has the problems of easy mildew and moth, but also has the problems of heavy loss of active ingredients caused by too long air-drying time. In order to reduce the loss of active ingredients, it is necessary to explore new drying methods of *polygonatum*.

However, literature shows that with the prolongation of drying and processing time, 5-hydroxymethyl furfural (5-HMF) and other harmful substances will be produced in *Polygonatum*, and excessive intake of 5-HMF will cause adverse effects on human liver and kidney.

In this paper, the effects of microwave vacuum drying, natural sun drying, microwave drying, vacuum drying and hot air drying on the contents of polysaccharides, phenolic compounds, saponins, 5-hydroxymethyl furfural and the activity of polysaccharides were compared to provide experimental basis for obtaining high-quality drying methods of *polygonatum*.