

Research process on extraction methods of shixiang oil from ten incense

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Abstract. Essential oil of Shixiang vegetable is not only used in food, cosmetics, daily necessities, tobacco and alcohol products, also has a wide range of uses in medical field. The extraction methods of shixiang oil has summarized in this paper, this study provide reference for the further development and utilization of Shixiang.

Keywords: Shixiang, essential oil, way of extracting.

1. Introduction

Shixiang is a local specialty of Henan .The Henan Shixiang is a kind of spearmint belongs to perennial herbaceous plant, Angiophyta, Dicotyledons, Labiatae and genus Mentha [1]. Shixiang vegetable contains essential oil, and this essential oil with pure and fresh, cool and refreshing, sweet smell, is mainly used in food, cosmetic and pharmaceutical industries [2].

The traditional extraction methods of Shixiang oil mainly include the distillation, solvent extraction and squeezing method. The squeezing method is not suitable for extraction of Shixiang oil because of Shixiang is low in essential oil [3]. Currently, some new technology are gradually applied in the extraction of volatile oil, such as the method of microwave assisted extraction, ultrasonic assisted extraction, supercritical CO₂ extraction method, etc.

2. Extraction methods of shixiang oil from ten incense

2.1 Distillation.

Distillation is divided into steam distillation and molecular distillation. Steam distillation is put shixiang vegetable stem leaf in distiller, then add water vapor to distillation (water distillation),or put the shixiang stem leaf in water, direct heating distillation (water distillation). Shixiang essential oils with rich faint scent were obtained when the fractional compositions were separated in oil-water separator after being congealed.Zhong li,Wei jin feng etal.[4] found that crude oil yield were low by steam distillation,but this method has a quick oil, less impurity, product has nice color and good smell,improved water distillation for crude oil production rate is twice as tall as water vapor distillation,but the speed of oil is slower,the crude oil color fragrance is not as good as water distillation of crude oil.

Relatively, distillation equipment is simple, low cost, fast oil. But the yield is low, this is because some compositions of Shixiang oil are slightly dissolve in water, so them easy to scatter in the distillate water and be caused loss. At the same time in the process of distillation, the thermal unstable material in the Shixiang oil at high temperature for a long time of contact with water easy to cause the hydrolysis or oxidation, thus has brought a certain degree of changes in the Shixiang oil fragrance, eventually lead to the Shixiang oil obtained by the distillation is slightly different with the original plant aromatic smell.

2.2 Extraction.

Extraction is dry after Shixiang vegetable, put into the extraction container, and add a moderate amount of organic solvent and proper stirring, leaching after filtering. Residue with solvent extraction times repeatedly, to merge the filtrate, after distillation to remove organic solvents. Shixiang

vegetable extraction used in organic solvents ethanol, ethyl ether, acetone, petroleum ether, cyclohexane, etc. Liu Zheng yuan [5] using the organic solvent such as ethanol, ether, extracted by Soxhlet extraction method from the shixiang oil, the results showed that the volume ratio of anhydrous ethanol and ether 1:1 mixture solvent, high yield, and the quality of the oil well; Marita cheng, treat people such as [6] with Soxhlet extraction method from the shixiang vegetable extracting shixiang oil, respectively to investigate with water ethanol, ether, acetone, cyclohexane do solvent extraction of shixiang vegetable oil yield, the results showed that ethanol, ethyl ether extraction rate is higher, both with the different ratio of mixture of leaching experiment, found that the volume ratio of the anhydrous ethanol and ether was 1:1. 5. The mixture of spearmint oil production rate is highest, while doing solvent and oil quality is better.

Compared with the distillation method, the temperature is low with extraction method, extraction using less effect on the Shixiang oil fragrance, also won't destroy the composition of essential oil, but steps quite tedious. Organic solvents not only either a single petroleum ether or ethanol, etc., but also be mixed solvent. Ethanol to person body non-toxic side effects, spearmint oil extracted by the rich smell, color and luster is very good also, and higher yield. Petroleum ether and ethyl ether has a low boiling point and easy to burn, not easy to control in industrial production. Spearmint oil is mainly used in food and daily necessities industry, so unfavorable also use petroleum ether and ethyl ether as solvent.

2.3 Microwave assisted extraction

Microwave is a kind of high frequency electromagnetic wave. The principle of Microwave assisted extraction is the use of high frequency electromagnetic wave on cell wall-breaking effect and heating effect, accelerate the rapid dissolution of effective components in the cell. Microwave has a strong penetrating power, high selectivity, uniform heating up fast, high heating efficiency, etc. So by microwave extraction can shorten extraction time, increase extraction efficiency. Qiufan and others [7] by microwave assisted extraction of volatile oil, through the orthogonal experiment of extracting temperature, extracting time, solid-liquid ratio and extraction times four factors on the effect of volatile oil extraction technology in the spearmint. It is concluded that the best process conditions for: extraction temperature 60°C, material liquid than 1:7, extraction one time, maintain 60 min. Under the condition of the spearmint oil yield was 0.66%.

Compared with the water vapor distillation, microwave heating helps to shorten the extraction time, reduce liquid ratio, to avoid then thermal decomposition of from high temperature for a long time, at the same time, the volatile oil composition more easily with water vapor distillation, and thus can get a higher yield of volatile oil, has a advantages of convenient operation, economy, save time.

2.4 Ultrasonic assisted extraction

Ultrasonic extraction is will generate the ultrasonic cavitation, vibration, crushing, mixing effect is applied to the extraction of natural product composition, break the cell wall, efficient and rapid extraction process of the cell contents.

Compared with the distillation method, ultrasonic assisted extraction can shorten extraction time, increase extraction yield, and avoid high temperature damage to the active ingredients. The application of this method in plant essential oil extraction has shown obvious advantages, and has been gradually to the attention of the people. But domestic for ten fragrant essential oil extracted by the method of the article is not reported. At present, a lot of research on ultrasonic extraction in the majority with technology route, the lack of machine rational discussion; The lack of the ultrasonic field parameter on the mechanism of ultrasonic, in-depth study of extracting effect; Lack of pilot and industrial data support; Other ultrasonic generator for liquid the effective distance of only about 30 m, due to the range and intensity of ultrasonic field limits the material amount for each of the processing, thus limiting the application of ultrasonic technology in the large-scale industrial production[8].

2.5 Supercritical CO₂ extraction

Al - Marzouqi A H [9] compare the volatile oil in supercritical fluid extraction and steam distillation extraction yield. It is concluded that the former extraction rate is higher than the latter. Two methods for volatile oil components have certain differences. Supercritical fluid extraction have

been the main aromatic components concentration is higher. But the supercritical CO₂ extraction equipment complex, investment is high, this method has not been widely recognized.

3. Conclusion

From what has been discussed above, Shixiang Vegetable of volatile oil extraction method has its advantages and disadvantages, but on average, distillation method might be the best extracting spearmint oil production methods. While other extraction is mainly used in laboratory research.

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