

論文概要

所 属： 生命環境科学研究科 生物資源科学専攻

氏 名： Xueying MEI (梅 雪瑩)

学籍番号： 201025036

論文題目： Production of Essential Oil from *Eucalyptus globulus* Leaves

(*Eucalyptus Globulus* 葉からの精油生成)

Eucalyptus oil (EO) has been used for medicinal purposes commercially since 1851(in Australia), because of its activities: antimicrobial, antioxidant, anti-inflammatory and possible surface properties. As EO also has the scent of aromatic and camphoric, it can be used as perfumery and flavor preparations. In Japan, eucalyptus leaf extract is included as one of natural food additive in the List of Existing Food Additives.

Distillation is the mainly used method for extracting EO, by this method, decomposition of EO can be prevented, wear and tear during distill can be reduced. Besides that it is economical and environmental. However, the method cost a little bit longer time; also, the yield seems not as high as other techniques. In addition, at present, there are few studies concerning the effects of storage conditions, ultrasound, agitation and other treatment on EO distillation by WSD and WD.

In view of the above reasons, the main aim of this study is to improve the method EO producing process. Moreover, in order to further the practical application, EO quantity, kinetic models and energy cost is analyzed and evaluated.

Three main parts are included in this study. The first one is exploring appropriate sample preparation conditions. Storage requirement (4 °C chilling, drying and -20 °C freezing), particle size, ultrasonic and over-assisted drying are acted as four aspects to be studied. The second part is to improve and adjust the producing process. Effect of different distillation methods and stirring will be taken in to consideration. The last part will be composition analysis, applicable kinetic model finding for further practical production and economy problems.

The results show that by GC/MC analysis, influences of different pretreatments and producing methods on compositions on EO could be revealed. Frozen leaves distilled by WSD (F-WSD), air dried leaves by WD (AD-WD), small size oven-assisted dried leaves by WD under the agitation rate of 25 rpm (S-WD-A) could all produce high yield of EO, however, S-WD-A cost lower energy when producing the same amount of EO. Thus S-WD-A was regarded to be an ideal technique in EO production. Logistic model can characterize well for all of F-WSD, AD-WD and S-WD-A, giving the opportunity to generalize the experimental results, and be useful for and scaling-up for industrial production from laboratory to pilot and industrial scales.

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