

Preparing Approaches of Concretes and Rutin from Sophora Japonica L. Flowers

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Abstract:

The Sophora Japonica L. flower is a kind of very important Chinese medicines. In this work, the concretes and Rutin were extracted by use of SCFE from Sophora Japonica L. flowers. The operation conditions are under 10-15MPa, 40℃ both for fresh and dried flowers. The carbon dioxide flow rate is about 0.2-1.0m³/h (STP). The chemical compositions of extractions were determined by GC-MS analysis. Comparison with these two materials, dried flowers are more suitable to be extracted than that of the fresh flower materials.

For the extraction of chemical Rutin, the SCCO₂ should be modified with alcohol as a co-solvent due to their polarity. The pressure range is from 15 to 20MPa and temperature range is from 40 to 50℃. Under these conditions, the extraction yield of Rutin was about 6.4wt%.

Keywords: SCFE; Sophora Japonica L.; Concretes; Medicals

INTRODUCTION

The Sophora Japonica L. flower is a kind of very important Chinese medicines. The chemical compounds such as concretes and Rutin are known as additives for food and medicines for health. SCFE process was considered of more and more attention in the fields regarding on natural materials and pharmaceuticals. Especially for SCCO₂, due to its environmental benign and low cost et al., it has been become a kind of important solvent for green chemistry. In the present work, the concretes and Rutin were extracted by use of SCFE from Sophora Japonica L. flowers. The operation conditions and chemical compositions were discussed respectively.

I - MATERIALS AND METHODS

The materials were collected in the May this year and saved under the condition of lower than 5℃ for the fresh flowers. The dry ones were collected from air-dry. They contain about 20wt% and 3.0wt% water for the fresh and dry flowers. The entrainer of alcohol was in the purity of 99.0%. The purity of carbon dioxide supplied by Guangming Gas Plant was better than 99.9%. The apparatus of SCFE was described in the literatures [1].

CONCLUSION

The extraction conditions of materials pre-treatment are shown in table 1.

Table 1 Entrainer conditions and extraction yields

No.	Materials pre-treatment method	Mass ratio of material to entrainer	Extraction time, min	Yield, wt%
1	Fresh materials, SCFE	1:0	120	2.48
2	SCFE + Entrainer (EtOH)	1:3	80	2.5
3	Dry materials, Entrainer (EtOH)	1:3	90	1.7
4	Dry materials, Entrainer (H ₂ O)	1:3	310	0.5
5	Swelling with EtOH	1:3	80	1.92
6	Dry materials, swelling with EtOH	1:3	62	2.1

The products of concretes were analyzed by GC-MS. The main composition could be identified was listed in table 2.

Table 2 Main chemical compositions and contents of concretes form SCFE

Peak No	Formula	MW	Contents (%)
1	C ₁₆ H ₂₀ O ₄	276	19.84
2	C ₁₈ H ₃₀ O ₂	278	10.82
3	C ₂₇ H ₅₆	380	7.22
4	C ₁₈ H ₃₂ O ₂	280	2.57
5	C ₁₆ H ₃₀ O ₂	254	1.39
6	C ₂₀ H ₄₀ O ₂	312	0.58

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For the extraction of chemical Rutin, the SCCO₂ should be modified with alcohol as a co-solvent due to their polarity. The pressure range is from 15 to 20MPa and temperature range is from 40 to 50□. Under these conditions, the extraction yield of Rutin was about 6.4wt%.

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