

초고압과 초음파 추출 공정을 통한 마치현의 미백 활성 증진

강원대학교 생물소재공학과 : 서용창, 최운용, 김지선, 이춘근, 송치호, 이현용  
농진청 국립원예특작과학원 인삼특작부 : 김영옥, 차선우

**Enhancement of Whitening Activity of *Portulaca oleracea L.* by both High Pressure and Ultrasonification Extraction Processes**

<sup>1</sup>Department of Biomaterials Engineering, Kangwon National University, Chuncheon 200-701, Korea

<sup>2</sup>Department of Herbal Crop Research, National Institute of Horticultural & Herbal Science, RDA, Eumseong 369-873, Korea

Yong Chang Seo<sup>1</sup>, Woon Yong Choi<sup>1</sup>, Ji Seon Kim<sup>1</sup>, Choon Geun Lee<sup>1</sup>, Chi Ho Song<sup>1</sup>, Young Ock Kim<sup>2</sup>, Seon Woo Cha<sup>2</sup>, Hyeon Yong Lee<sup>1\*</sup>

**실험목적 (Objectives)**

This study was investigated to enhance the whitening activity of *Portulaca oleracea L.* extracted by high pressure and ultrasonification extraction processes at 50~60°C of relatively low process temperature. These processes could significantly reduce toxicity substances and also prevent the breakdown of heat labile biologically active components by low temperature processing.

**재료 및 방법 (Materials and Methods)**

The *Portulaca oleracea L.* was extracted under several extraction conditions : water extraction for 24 hours at 100°C as control (WE), 70% ethyl alcohol extraction for 24 hours at 60°C (EE) and high pressure process for 30 minutes at 300 MPa after ultrasonification process for 20 minutes at 50 KHz and 60°C with 70% ethyl alcohol (HPE + UE), respectively.

**실험결과 (Results)**

Extraction yields of HPE + UE showed the highest extraction yield as 20.4% (w/w), which value was 10~15% higher than those of WE and EE. The HPE + UE also showed the lowest cytotoxicity against skin fibroblast cell, CCD-986sk as 10.4% while EE showed the highest cytotoxicity as 13.5% in adding 1.0 mg/ml. The HPE + UE showed the highest inhibitory effects on tyrosinase as 54% in adding 1.0 mg/ml, and WE showed lowest inhibitory effects as 36%. The extracts from HPE + UE had good inhibitory melanin synthesis from Clone M-3 cells as 62.5%, which was 15% higher than the case of EE. In general, the HPE + UE processes had better whitening activities than the extracts from other processes due to the efficient release of useful compounds by easy destruction of the cell walls and reducing the toxicity at low temperature extraction.

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주저자 연락처 (Corresponding author) : 이현용 E-mail : hyeonl@kangwon.ac.kr Tel : 033-256-4819

Table 1. The extraction yields of *Portulaca oleracea L.*

Sample	Extraction condition	Yields (% , w/w)
<i>Portulaca oleracea L.</i>	WE <sup>1)</sup>	17.5
	EE <sup>2)</sup>	16.8
	HPE + UE <sup>4)</sup>	20.4

<sup>1)</sup>WE: water extraction for 24 hours at 100°C.

<sup>2)</sup>EE: 70% ethyl alcohol extraction for 24 hours at 60°C.

<sup>3)</sup>HPE + UE: high pressure process for 30 minutes at 300 MPa after ultrasonification process for 20 minutes for 20 minutes at 50 KHz and 60°C with 70% ethyl alcohol.

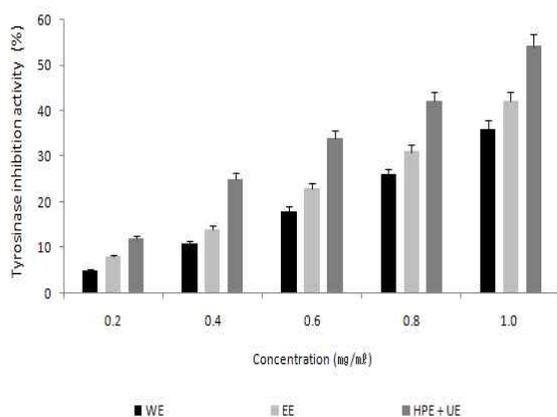


Fig. 2. Tyrosinase inhibitory activity of the extracts of *Portulaca oleracea L.* by different extraction processes.

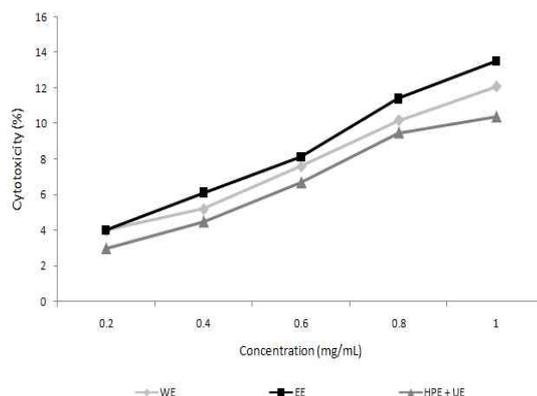


Fig. 1. Cytotoxicity of the extracts of *Portulaca oleracea L.* by different extraction processes on skin fibroblast cell, CCD-986sk.

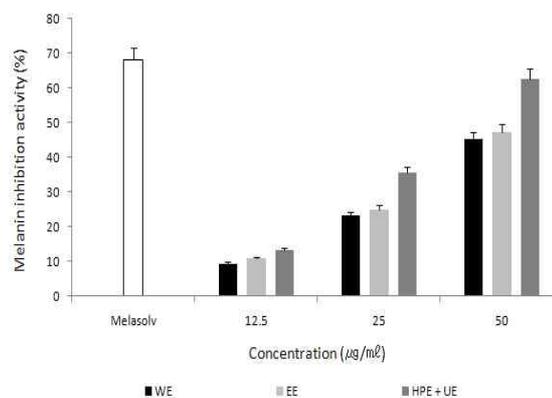


Fig. 3. Melanin inhibitory activity of the extracts of *Portulaca oleracea L.* by different extraction processes in Clone M-3 cells.