

Effect of high pressure with sonification on extraction of antioxidant and anticancer compound from Korean barberry root

College of Bioscience and Biotechnology, Kangwon National University

Jae Gun Han, Syed Abdul Qadir, Minchul Kwon, Juhee Ahn and Hyeon-Yong Lee*

Objectives

High pressure technology could maintain compound quality attributes such as colour, flavour and nutritional values due to its limited effects on covalent bonds. In this work, the effects of high pressure with sonification on the extraction yield of bioactive compounds from *Berberis koreana* root and its impacts on anticancer capacity have been studied.

Materials and Methods

Fresh plants of Korean barberry (*Berberis koreana*) at the mature stage were picked from a commercial orchard in Hoengseong Mt. Balgyo in July, 2007. The root of *Berberis koreana* was used for this study.

Two different extraction methods, normal extraction and 5 minute HPE with one hour sonification were used for the extraction from root. The anticancer activity against A549, AGS, Hep3B and MCF-7 and cytotoxicity against HEK293 were measured by SRB assay. The scavenging activity of DPPH radical and xanthine oxidase activity were also measured.

Results

The highest yield from *B. koreana* root was $11.31 \pm 0.4\%$ at 500 MPa for 5 minute where as the extract yield from normal extraction was $9.68 \pm 0.45\%$. All plant extracts inhibited tumor cell growth and exerted antioxidant effects compared with vehicle controls. The DPPH scavenging activity of root by normal and high pressure with sonification extract were 84.7% and 92.4% respectively. The anticancer activity was increased over 5-20% in different cancer cells by high pressure with sonification extraction. The maximum inhibition was showed in MCF-7 was 95.4% by high pressure with sonification extract. Cytotoxicity was decrease in human kidney cell (HEK293) by high pressure with sonification extraction. In general, the extracts isolated at higher pressure were more effective free radical scavengers, although this dependence for some extracts, and the application of sonification with high pressure can improve the extraction condition and biological activity. The high pressure technique can be combined with other techniques such as ultrasonic extraction to improve the extracting rate and the extracting efficiency.

Corresponding author : Hyeon Yong Lee E-mail : Hyeonl@kangwon.ac.kr Tel : 033-250-6455

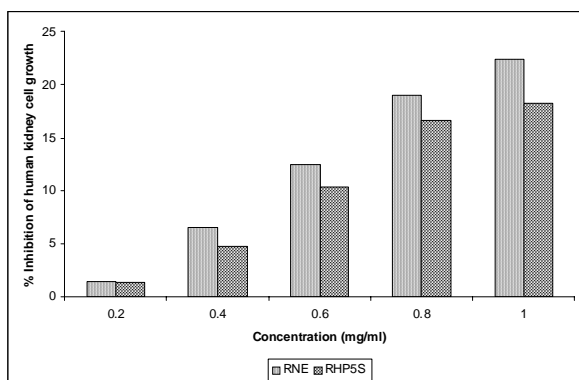


Fig. 1. The cytotoxicity of normal human kidney cell line (HEK293) by adding several concentration of different aqueous extract of root of *Berberis koreana*.

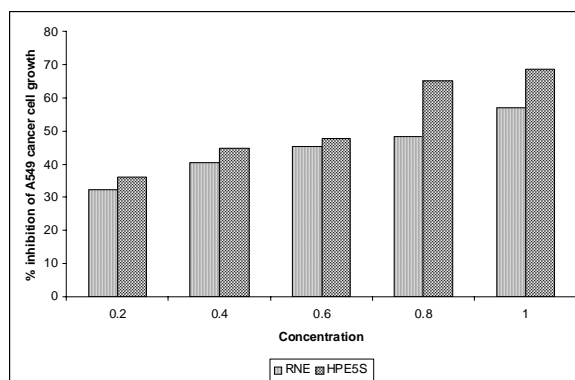


Fig. 2. The percentage inhibition of human cancer cell line (A549) by adding several concentration of different aqueous extract of root of *Berberis koreana*.

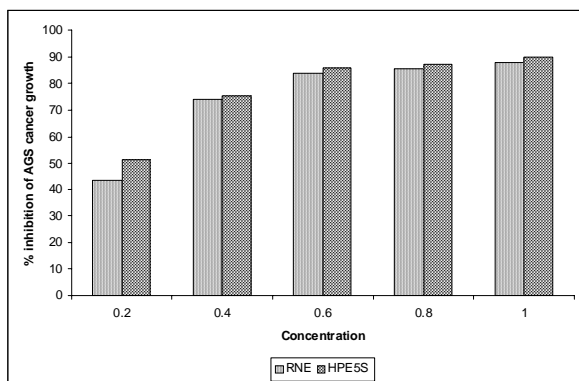


Fig. 3. The percentage inhibition of human cancer cell line (AGS) by adding several concentration of different aqueous extract of root of *Berberis koreana*.

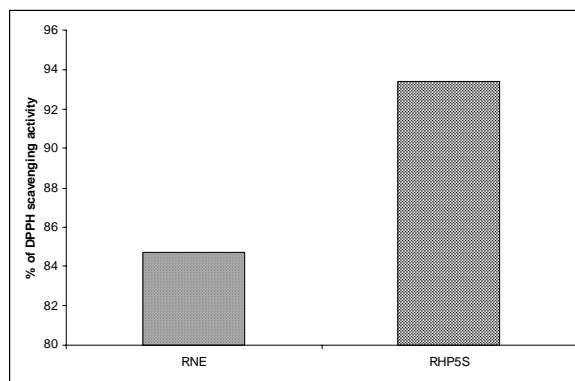


Fig. 4. DPPH radical scavenging activities of crude extracts by adding different aqueous extract of root of *Berberis koreana*.