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Inhibitory Effect of Angelicae dahuriae Radix Extracts on COPD and Determination of Marker Substance for Quality Control

Department of Industrial Plant Science & Technology, Chungbuk National University
Ho-Geun Kwak*, Heung-Bin Lim

Objectives

Angelica dahuria Radix(ADR), the dried Root of Angelica dahuria(Umbelliferae) have been used for the treatment of common cold, headache, toothache, ulcer and melena in oriental medical clinic. Various of study about ADR were already reported to have antifungal activity, antioxidative activity and etc. However, inhibitory effects of ADR on a respiratory disease have not been reported yet. So, in this study, we determined imperatorin as a marker substance for quality control of ADR, and investigated the inhibitory effect of ADR extracts on COPD induced by cigarette smoke condensate (CSC) and lipopolysaccaride (LPS) in mice.

Materials and Methods

○ Materials

Angelicae Dahuricae Radix (ADR) was harvested in Yeongju, KyungSang Buk Do, Korea and was proved by Kyoungdong Herb Co. 18~20 g of female SPF (specific pathogen-free) BALB/c mice (8-weeks-old) were purchased from Orient Bio Inc. Imperatorin (from Angelica archangelica) was purchased from Sigma Co.

○ Methods

Imperatorin was determinated by HPLC-MWD (Multi-Wavelength Detector) equipped with C18 column. The mobile phase water:methanol (30:70) was delivered at a flow rate of 1 mL/min and the wavelength of MWD set at UV 254 nm. Control group was treated with LPS and CSC by intratracheal injection 5 times for 12 days. ADR extraction of 50 mg/kg and 200 mg/kg concentrations and cyclosporine A(CsA, 10 mg/kg) as positive control were administered to mice by oral medication for 12 days. Inflamation cells and mediators in BALF and blood was determinated by trypan blue staining, flow cytometry and ELISA.

Result

Imperatorin was used in this study as marker substance and the average contents of imperatorin in ADR extracts were measured at the rate of 0.098 ± 0.018 %. The LPS + CSC + ADR group showed the significant difference of the inflammatory cells such as CD23+/B220+, CD25+/CD4+, MHC II+/CD11c+ and Gr-1+/CD11b+ in BALF compared with the control group. The concentration of MIP-2 as the inflammation mediator in the LPS + CSC + ADR group was significantly lower than the control group. As a result, we concluded that ADR extracts may be associated with inhibitory effect in COPD-mice induced by LPS and CSC.

Corresponding author : Kwak, Ho-Geun E-mail : Luffey@nate.com Tel : 043-261-3288

* 시험성적

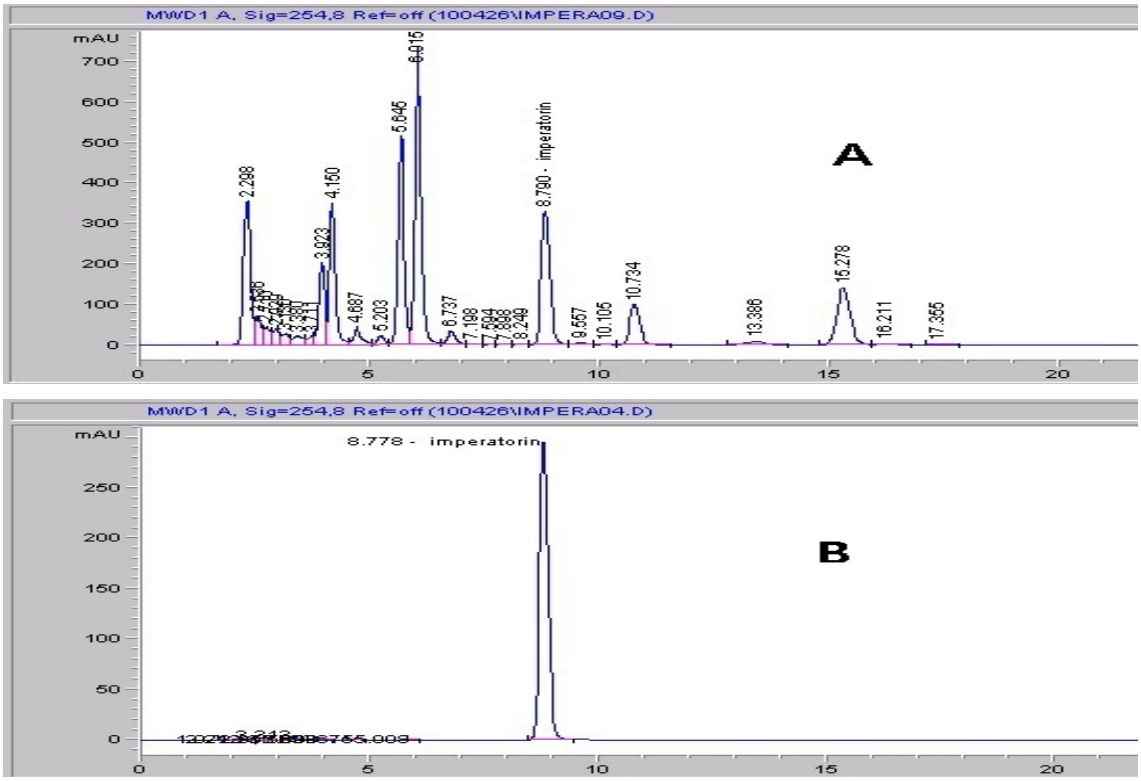

Figure 1. Chromatograms of ADR extract (A) and imperatorin (B)

Table 1. The concentrations of MIP-2 in serum and BALF

Group	MIP-2	
	Serum (pg/mL)	BALF (pg/mL)
Normal	22.14 ± 0.50	5.25 ± 2.19
CSC + LPS (Control)	134.23 ± 2.18$^{\#\#}$	64.31 ± 1.27$^{\#\#}$
CSC + LPS + CsA	23.49 ± 2.63**	4.11 ± 0.79**
CSC + LPS + ADR (200 mg/kg)	34.52 ± 3.99**	11.48 ± 3.54**
CSC + LPS + ADR (50 mg/kg)	70.89 ± 7.09**	30.85 ± 3.30**

$^{\#\#}$:$p < 0.01$ compared with normal group **:$p < 0.01$ compared with control group

Table 2. The number of inflammatory cells in BALF.

Group	Number of cells ($\times 10^5$)		
	$CD23^+/B220^+$	$CD4^+/CD25^+$	$MHCII^+/CD11c^+$
Normal	0.28 ± 0.01	0.29 ± 0.04	0.17 ± 0.03
CSC+LPS (Control)	2.46 ± 0.11$^{\#\#}$	1.28 ± 0.15$^{\#\#}$	0.86 ± 0.17$^{\#\#}$
CSC+LPS+CsA	0.94 ± 0.01**	0.34 ± 0.02**	0.22 ± 0.01**
CSC+LPS+ADR (200mg/kg)	1.20 ± 0.02**	0.52 ± 0.05**	0.30 ± 0.01**
CSC+LPS+ADR (50mg/kg)	1.98 ± 0.01*	1.00 ± 0.16	0.82 ± 0.09

$^{\#\#}$:$p < 0.01$ compared with normal group *:$p < 0.05$ and **:$p < 0.01$ compared with control group