

Immune Activity of *Rhodiola sachalinensis* A. Bor fractionized extracts by Solvent separation

Ji Hye Ha¹, Jae Gun Han¹, Hyang Suk Jeong¹, Ling Jin¹, Myoung hoon Jeong¹,
Seong Ho Oh¹, Seung Seop Kim¹, Baik Hwang², Hyeon Yong Lee¹

1. Department of Biomaterials Engineering, College of Bioscience and Biotechnology,
Kangwon National University, Chuncheon 200-701, Korea
2. Department of Biology, Chonnam National University, Kwangju 520-830, Korea.

Objectives

To develop functional food material using *Rhodiola sachalinensis* A. Bor, which has been used to traditional medicine for against fever, overcome fatigue and prevent diabetes, this study was performed to compare the effects of biological activities to measurement cytotoxicity, anticancer and immuno-modulating effects of *R. sachalinensis* A. Bor fractionized by consecutive solvent separation.

Materials and Methods

Experimental studies were performed to measure cytotoxicity, anticancer activity and immune activity by fractionized extracts of *R. sachalinensis* A. Bor using human cancer cell, immune B & T cell, leukemic cell and macrophage cell. *R. sachalinensis* A. Bor were extracted with ultrasonification process and then further fractionized to water, butanol, ethyl acetate and chloroform, stepwise. The each extracts were freeze-dried before use.

Results

The cytotoxicity of all fractionized extracts on human kidney cell (HEK293) was lower than crude extracts. Chloroform fraction extracts have low cytotoxicity. And, on human cancer cells, Chloroform fraction extracts was showed high anticancer activity inhibited under 60% of cells growth. For human immune B & T cell, chloroform fraction extracts showed the highest cell growth. And NK cell growth was improved up to nearly 47% by adding the supplement of immune cells medium with the chloroform fractions. It was also found that the extracts could yield higher nitric oxide production. These results indicate that the chloroform fraction of *R. sachalinensis* have high immune activity than others fractions and the crude extracts, implying that this chloroform fractions could be used a new functional material.

* 시험성적

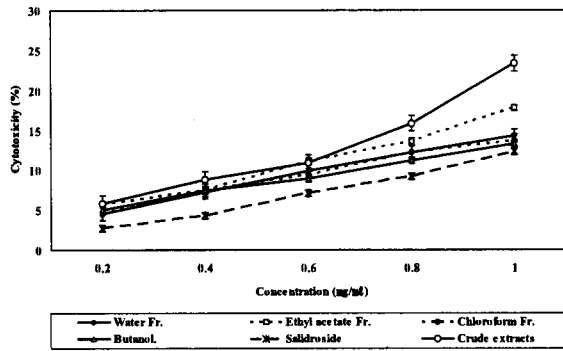


Fig. 1. Cytotoxicity of the crude and fractionized extracts of *R. sachalinensis* A. Bor on human normal cell lines (HEK293).

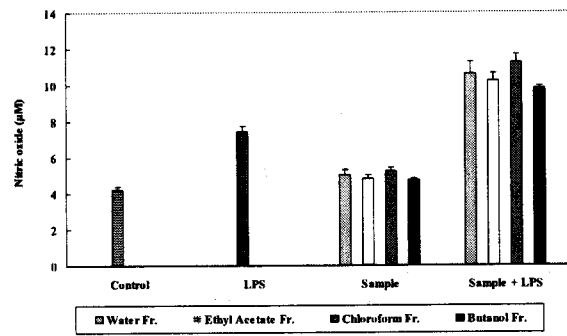


Fig. 2. Stimulation of nitric oxide production by adding the fractions of *R. sachalinensis*.

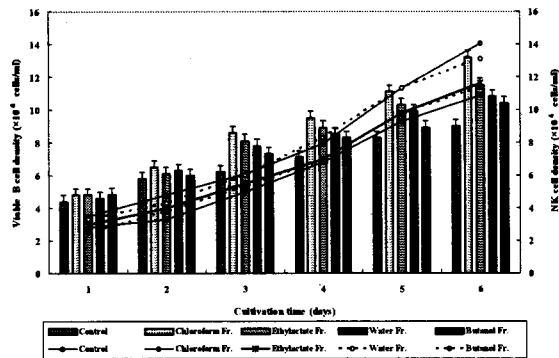


Fig. 3. Enhancement of NK cell growth in adding the supernatant of human immune B cell with the fractionized extracts of *R. sachalinensis* A. Bor.

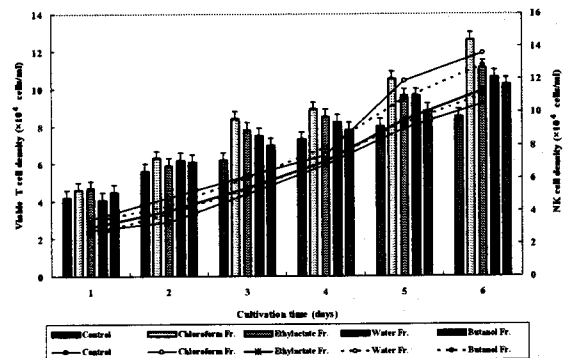


Fig. 4. Enhancement of NK cell growth in adding the supernatant of human immune T cell with the fractionized extracts of *R. sachalinensis* A. Bor.

Table 1. Inhibition ratio of growth of cancer cell (A549, AGS) in adding the fraction extracts from *R. sachalinensis*.

cell line	Concentration(mg/ml)		0.2	0.4	0.6	0.8	1.0
	Sample						
A549	Water Fr		5.37±0.22	14.02±0.62	17.54±0.41	35.62±0.26	36.77±0.33
	Ethyl acetate Fr		16.57±0.12	28.43±0.22	30.88±0.57	45.14±0.34	54.07±0.75
	Chloroform Fr		17.06±0.41	34.11±0.56	34.72±0.62	49.64±0.78	59.25±0.54
	Salidroside		18.49±0.33	21.67±0.24	26.56±0.221	60.2±0.52	33.49±0.22
AGS	Water Fr		13.04±0.21	17.81±0.17	21.57±0.45	25.47±0.62	26.83±0.10
	Ethyl acetate Fr		25.00±0.72	28.14±0.82	30.64±0.73	32.2±0.09	45.45±0.45
	Chloroform Fr		25.00±0.85	28.57±0.34	34.43±0.3i	48.05±0.74	47.71±0.74
	Salidroside		6.98±0.42	16.67±0.86	18.92±0.57	23.08±0.21	29.82±0.35