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Mutagenicity and Antimutagenicity of Aged Sulfur-Containing Edible Cultivars

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Objectives

Most of sulfur-containing food materials have various biological and medicinal activities. However, they have been investigated to their biological activity on a case by sample basis. It is necessary that they have to be compare their biological activity using by same conditions and methods for optional use to consumers. In this study, 3 cultivars(garlic (*Allium sativum* L.), onion (*Allium cepa* L.), Korean leek (*Allium tuberosum* R.), were selected and made aged samples by heating to compare their biological activities (mutagenicity, antimutangenicity and antiradical activity).

Materials and Methods

Materials : The raw materials 3 cultivars [(garlic (*Allium sativum* L.), onion (*Allium cepa* L.), Korean leek (*Allium tuberosum* R.)] were purchased in the market. The aged materials were made by using heating systems (autoclave and dry-oven). The aged samples were prepared by 70 % ethanol(EtOH) and then fractionationed by hexane, chloroform. ethyl acetate, and butanol from the ethanol extracts.

Methods : The mutagenicity and antimutagenicity on Ames strains(TA 98, TA100) of the samples were investigated. The antiradical activity was studied by electron spin resonance spectroscopy(ESR).

Results

1. The mutagenicity of 70% EtOH extracts of the 3 samples on Ames strain(TA100 and TA98) was shown a weak mutagenicity in the presence of S9 metabolic activation mixture(S9 Mix) and without S9 Mix and also antimutagenicity on the standard mutagens(MNNG, 4NQO and B(a)P) a similar activity. The antiradical activity on superoxide and hydroxyl radicals by ESR did not indicated a strong.

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Table 1. Mutagenicity of 70 % EtOH Extracts of Sample on Ames Strains

			His + revertant/plate			
		Dose (mg/plate)	TA 100		TA 98	
			(-S-9)	(+S-9)	(-S-9)	(+S-9)
Spontaneous			170±10	165±4	26±8	22±4
DMSO (100㎕)			193±6	125±6	30±4	32±3
MNNG (0.5㎍)			1192±12			
B[a]P (10㎍)				602±10		174±5
Onion	*Allium cepa L.*	0.25	187±3	166±5	29±2	25±4
		0.5	194±2	176±2	41±5	37±5
		1	206±1	235±1	52±7	43±4
		2	210±6	253±3	63±7	60±2
Garlic	*Allium satuvum L.*	0.25	169±6	154±9	30±1	22±1
		0.5	236±4	213±2	29±3	22±6
		1	298±5	259±10	39±5	28±4
		2	321±5	294±9	48±1	39±5
Korean Leek	*Allium tuberosum L.*	0.25	251±7	209±7	20±9	26±4
		0.5	307±1	245±6	40±6	40±2
		1	360±8	312±9	45±5	40±4
		2	395±6	345±3	56±9	46±2

Table 2. Antimutagenicity on Ames Strain(TA98) of the Fractions of Aged Samples

Sample (mg/plate)	70% EtOH Ex	Hexane	$CHCl_3$	EtOAc	BuOH	Aqueous	MNNG
0	0.00	0.00	0.00	0.00	0.00	0.00	554.00
50	51.29	62.55	45.40	56.23	48.88	47.54	
100	64.97	69.79	44.42	60.41	58.80	49.89	
150	64.70	64.70	47.77	65.50	62.45	53.55	
200	75.31	70.33	56.80	67.52	68.31	62.10	

Table 3. Antimutagenicity on Ames Strain(TA100) of the Fractions of Aged Samples

Sample (mg/plate)	70% EtOH Ex	Hexane	$CHCl_3$	EtOAc	BuOH	Aqueous	MNNG
0	0.00	0.00	0.00	0.00	0.00	0.00	554.00
50	393.00	342.00	366.33	316.67	318.00	398.67	
100	335.33	313.33	331.00	308.67	306.00	329.33	
150	299.33	321.00	340.67	300.33	265.33	301.00	
200	231.00	277.00	297.67	267.67	275.67	280.00	