Chemical and Biological Characteriaztion of Fermentation Extract from *Cudrania tricuspidata* Bureau

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Abstract

Cudrania tricuspidata is a deciduous bread-leaved small tree belonging to the family *Moraceae*. Since ancient times, *C. tricuspidata* has anticancer, liver protecting, and brightening effects, and is recorded in classical literature. *A. oryzae* various taste and aroma. It is known to exhibit various physiological activities. In this study, we investigated the antioxidant active substances according to fermentation time by inoculating *A. oryzae* with *C. tricuspidata* leaves and fruit, and evaluated the physiological activity to determine the optimal fermentation conditions. It was chlorogenic acid, resveratrol increased more than twice in the fermented extract for 36 hours, and the antioxidant, total phenol, and flavonoid contents increased. also through amino acid analysis, it was confirmed that various amino acid compositions such as asparagine and asparic acid were changed according to fermentation time. Therefore, it is expected that functional product, physiological activity increase, and quality improvement can be expected when developing products using *A. oryzae* and it can be used as basic data when setting the optimal manufacturing process in the future.

Method and Material

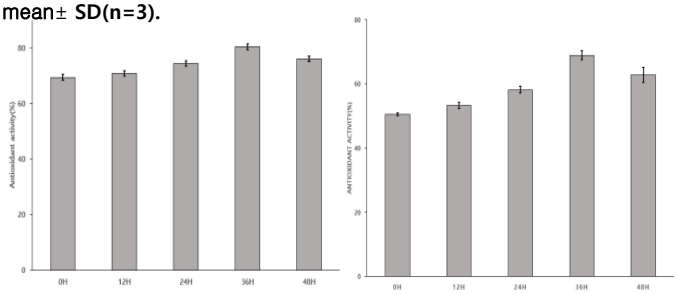
Cudrania Tricuspidate : collected at Jeonanm Shinan sites in Korea
Extraction: Dionex ASE 350
HPLC for LC-MS : Agilent 1200 series HPLC
YMC ODS C-18 column
(250 x 4.6 mm, 5um)
Flow rate : 0.8 mL/min
Solvents: H_2O /acetonitrile gradient
injection volumn : 10 uL
column oven temp: 40℃
detector : 254nm

Procedure:

Drying in the shade
↓
Pulverization
↓
Extraction with Fermentacion ethanol content
↓
Fitration
↓
Phenolic compouds/ free Amino acids Analtsis

Result

Table. 1. Antioxidant activity of fermentation extracts *C. tricuspidata* Leaf, Fruit DPPH, Flavonoid assay Each value was mean± SD(n=3).



Extract	Total flavonoid Content (Gallic Acid eq. mg/g)	
	Leaf	Fruit
Leaf	74.8 ± 1.8	23.5 ± 1.2
12 hour	75.2 ± 1.4	31.3 ± 1.1
24 hour	79.1 ± 1.2	38.1 ± 2.1
36 hour	82.4 ± 0.8	47.4 ± 2.8
48 hour	81.2 ± 1.1	42.2 ± 2.4

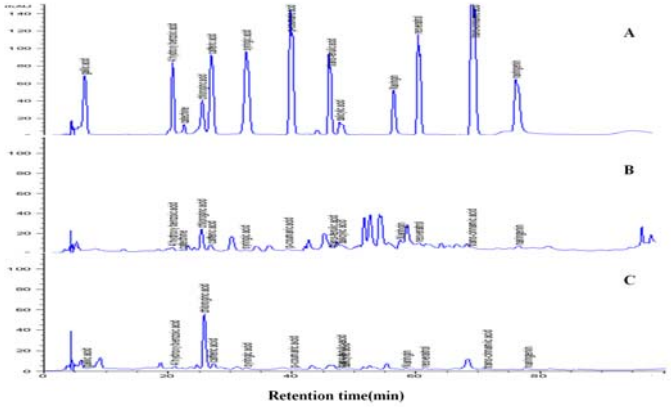


Fig.1. HPLC chromatograms of phenolic compounds standard solution mixture (A) and extract of *C. tricuspidata* Leaf(B) and Fruits(C)

Table. 2. Contents of phenolic acid during fermentation of *C. tricuspidata* Leaf.

(unit, μg/ml)

compounds	Leaf	12h	24h	36h	48h
gallic aicd	–	–	–	–	–
4-hydroxy benzoic acid	16.19	17.27	28.32	29.98	27.20
catechin	1.49	1.54	1.61	1.75	1.71
chlorogenic acid	14.49	16.52	18.16	33.75	12.69
caffeic acid	12.25	10.18	15.47	21.65	22.18
syringic acid	13.11	14.10	17.95	22.92	22.02
p-coumaric acid	1.62	2.04	2.50	3.51	2.72
trans-ferulic acid	0.55	1.62	0.69	0.91	0.80
salicylic acid	9.00	9.32	9.42	9.54	9.51
naringin	2.35	2.42	2.49	3.54	3.42
resveratrol	12.40	13.11	14.70	24.90	22.60
trans-cinnamic acid	0.58	0.59	0.62	0.64	0.64
naringenin	35.25	35.42	36.21	37.51	37.12

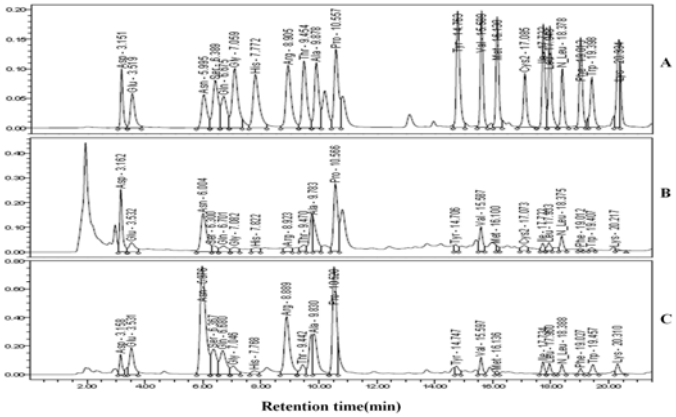


Fig.2. HPLC chromatograms of amino acid standard solution mixture (A), *C. tricuspidata* Leaf(B) and Fruit(C)

Table. 3. Contents of phenolic acid and flavonoid during fermentation of *C. tricuspidata* Leaf.

(unit, mg/g)

amino acid	Fruit	12h	24h	36h	48h
Aspartic acid	0.73	0.82	0.92	1.21	1.02
Glutamic acid	1.68	1.97	2.34	2.49	2.42
Asparagine	6.49	8.21	10.21	12.24	8.41
Serine	0.84	0.89	0.95	1.19	1.07
Glutamine	1.70	1.92	2.24	3.57	3.45
Glycine	0.15	0.15	0.18	0.23	0.21
Histidine	0.14	0.15	0.15	0.17	0.13
Arginine	2.38	2.92	3.42	4.12	3.91
Threonine	0.26	0.31	0.42	0.52	0.48
Alanine	0.85	0.92	0.98	1.18	1.09
Proline	2.09	2.49	3.18	3.63	3.54
Tyrosine	0.20	0.24	0.24	0.25	0.23
Valine	0.26	0.28	0.33	0.48	0.45
Methionine	0.06	0.11	0.15	0.21	0.18
Isoleucine	0.21	0.38	0.49	0.52	0.49
Leucine	0.19	0.28	0.34	0.42	0.38
Phenylalanine	0.14	0.24	0.28	0.35	0.31
Tryptophan	0.55	0.58	0.62	0.92	0.81
Lysine	0.20	0.24	0.25	0.39	0.39
Total	19.12	23.10	27.69	34.09	28.97

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