

### Comparison of Tocopherol Contents According to The Size of Adzuki Bean

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#### 팥의 크기에 따른 토코페롤 함량의 비교

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### Introduction

The tocopherols and tocotrienols are found in whole grains, seeds, vegetable oils, fruits, meat, fish, egg products and milk. The tocopherols are free radical scavengers that reduce the risk of cancer, cardiovascular diseases, and other neurodegenerative diseases such as Alzheimer's and Parkinson's.

### Objectives

The purpose of this research was to analyze the tocopherol contents in adzuki bean germplasm using gas chromatography.

### Materials and Methods

#### ○ Material

A total of 116 adzuki bean germplasm were donated from the gene bank of RDA. They were divided into three groups according to 100 seed weight( small (< 12g), medium (12~18g) and large (> 18g) seeds)

#### ○ Methods

- ① 0.5g of smashed sample was extracted in 10mL ethanol with 0.1g of ascorbic acid
- ② Shaked in a hot water bath at 80°C for 10minutes
- ③ Add 300 $\mu$ l of 44% KOH for saponification
- ④ More shake for 10 min at 80°C and coo down on ice for 30min
- ⑤ Add 10mL of hexane and distilled water
- ⑦ Shaking and centrifugation for 4 min at 4000rpm
- ⑧ Collect the hexane layer and add 10mL of hexane
- ⑨ Centrifugation as above
- ⑩ Repeat the hexane-extraction process two more times

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- ⑪ Collected hexane layers were pooled and washed twice with distilled water.
- ⑫ Remove the water layer
- ⑬ Filter the collected hexane layer through a funnel with anhydrous sodium sulfate
- ⑭ Concentrate the hexane layer using a vacuum evaporator
- ⑮ Redissolve the residues in 2mL of iso-octane and transfer to 2mL vials.

○ Conditions for analysis by GC

| item                                 | conditions                         |
|--------------------------------------|------------------------------------|
| GC                                   | Shimadzu Instrument Co. LTD, Japan |
| temperature<br>(injector / detector) | 290°C / 320°C                      |
| Detector                             | FID(Flame Ionization Detector)     |
| Column                               | Varian GC column (50m×0.32mm I.D.) |
| Sample injection volume              | 2.0 $\mu$ l                        |

## Results and Discussion

The average total tocopherol content was 194.95  $\mu$ g/g in the small adzuki bean. In the medium adzuki bean, the average tocopherol content was 190.7 $\mu$ g/g. The average total tocopherol content in the large adzuki bean seeds was 190.75 $\mu$ g/g.

|        |                   |        |
|--------|-------------------|--------|
| small  | number of variety | 94     |
|        | maximum           | 236.4  |
|        | minimum           | 165.6  |
|        | mean              | 194.95 |
| medium | number of variety | 16     |
|        | maximum           | 212.75 |
|        | minimum           | 179.55 |
|        | mean              | 190.7  |
| large  | number of variety | 6      |
|        | maximum           | 200.35 |
|        | minimum           | 189.85 |
|        | mean              | 190.75 |

table1. comparison of the total tocopherol concentration between small, medium and large adzuki bean( $\mu$ g/g)

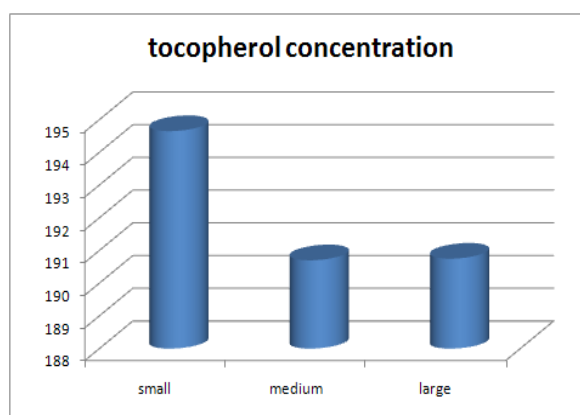


Figure 1. comparison of the total tocopherol concentration (mean) ( $\mu$ g/g)

In this study, the average tocopherol concentration in small sized bean was the highest compared to other sized adzuki bean. Thus, we can concluded that the tocopherol contents were compressed in the small seeds and dispersed at the low density in the large size adzuki bean seeds.

Therefore, seed weight influenced the accumulation and synthesis of tocopherols. In conclusion, genotypic factors such as seed weight were affect tocopherol accumulation.