

**Fatty Acids Composition of Foxtail millet(*Setariaitalic* BEAUVOIS) Seeds  
Collected in South Korea**

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### Objectives

Essential fatty acids are polyunsaturated fatty acid. Linoleic acid(C18:2) and  $\alpha$ -linolenic acid(C18:3) are the parent compounds of the mega-6( $\omega$ -6) and omega-3( $\omega$ -3) fatty acid series, respectively(De Geus H.J. *et al*, 2001). They are very important for human health, because they cannot be synthesized inside the body. Therefore, the objective of this research is to evaluate the composition of palmitic acid, stearic acid, linoleic acid,  $\alpha$ -linolenic acid and oleic acid in foxtail millet seeds.

### Materials and Methods

Fatty acids analyzed from foxtail millet seeds by the Gas Chromatographic. The Internal standard solution was prepared by dissolving 100mg in 100ml of methanol. The sample flour of 0.2g is weighed in a 50ml conical centrifuge tube and mixed with 5ml solvent [chloroform : methanol=1:1(v/v)]. It is then vortex-mixed for 10s and sonication 60mins and mixed with 5ml 0.5% NaCl solution. After vortex-mixed sonication of 10min., centrifuged for 15min. After collecting the down tier liquid cover the conical centrifuge tube with foil and shaken by hand lightly. Dried under a stream of nitrogen (shake speed 250rpm and temperature 45°C) in a pume hood. 0.5ml toluene and 2ml 0.5N NaOH added in methanol solution vortex-mixed and heated for 5 min at 85°C. After cooling in hume hood, 2ml of BF<sub>3</sub> are added and then vortex-mixed and heated for 5min at 85°C. Vortex-mixed for 15s by hand was heavily placed in a centrifuge allowed to reach a speed of 2000rpm and make sure temperature 4°C after 10min and then stopped immediately. Dried the liquid under a stream of nitrogen in the hume hood. 1ml of petroleum ether added in the glass tube. collected all the liquid and put them in cap vial and submitted to GC analysis.

### Results

The comparison of saturated and unsaturated fatty acids from millet seeds by GC are given in this section(Tables 1 and 2). We analyzed five fatty acids in the foxtail  
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millet seeds. They are palmitic acid stearic acid oleic acid linoleic acid and linolenic acid. All of the varieties contain oleic acid, linoleic acid and linolenic acid as a major unsaturated fatty acids when analyzed by GC. Total amount of unsaturated fatty acids in foxtail millet seeds varies from 78.4% in foxtail millet of 32 to 85.2% in foxtail millet of 26. All of the varieties PUFAs were higher than oleric acids. The content of linoleic acid in the seed was higher than other fatty acids. Among the fatty acids in 32 varieties, content of palmitic acid ranged from 10.9% to 13.5%, stearic acid from 2.5% to 8.3%, oleic acid from 10.0% to 15.8%, linoleic acid from 62.5% to 67.9% and linolenic acid ranged from 3.0% to 5.2%. These results suggested that the foxtail millet seed oils may serve as a potential dietary source of MUFA.

Table 1. Percentage\*(%) of saturated fatty acids analyzed by GC.

Varieties	Concentration(%)		Total SFA
	Palmitic acid	Stearic acid	
Oljo	11.5±0.01	7.4±0.08	18.8
Geurujo(Maejo)	11.0±0.79	7.7±0.11	18.7
Geurujo(Kwangju)	11.2±0.56	6.7±0.89	17.8
Wonju 7ho	11.1±0.36	6.6±1.33	17.7
Maejo	10.9±0.23	7.5±0.59	18.4
Jejujo	12.7±0.22	2.6±0.98	15.3
Hongcheon	12.1±0.65	5.9±0.56	18.0
Ilbanmaejo	13.7±0.98	6.4±0.32	20.2
Nuetjo	13.2±0.23	7.0±0.88	20.2
Hwanggeummaejo	11.8±0.09	7.2±0.36	19.0

SFA: saturated fatty acid

\*:Values represent the average of three replicates±standard deviation(SD).

Table 2. Percentage\*(%)of unsaturated fatty acids analyzed by GC.

Varieties	Concentration(%)			Total	Total PUFA
	Oleric acid	Linoleic acid	linolenic acid		
Oljo	12.5±0.13	65.4±1.09	3.2±0.62	81.2	68.6
Geurujo(Maejo)	12.8±0.09	65.4±1.29	3.0±0.31	81.3	68.4
Geurujo(Kwangju)	11.6±0.06	66.8±0.25	3.8±0.29	82.2	70.6
Wonju 7ho	12.3±0.02	66.5±0.24	3.6±0.49	82.3	70.0
Maejo	13.1±0.15	65.4±0.98	3.1±0.37	81.6	68.5
Jejujo	15.8±0.32	65.0±0.27	3.9±0.09	84.7	68.9
Hongcheon	11.9±0.52	65.5±0.39	4.7±0.35	82.0	70.2
Ilbanmaejo	10.5±0.23	65.0±1.06	4.3±0.13	79.8	69.3
Nuetjo	11.4±0.66	64.1±1.98	4.4±0.64	79.8	68.5
Hwanggeummaejo	12.7±0.25	65.1±0.87	3.3±0.28	81.0	68.4
Olhwangchajo	12.1±0.42	65.3±0.56	3.4±0.34	80.9	68.7

PUFA:polyunsaturated fatty acid.

\*:Values represent the average of three replicates±standard.

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