

Supplementary Information

## The Effect of *Lactobacillus plantarum* ATCC 8014 and *Lactobacillus acidophilus* NCFM Fermentation on Antioxidant Properties of Selected *in Vitro* Sprout Culture of *Orthosiphon aristatus* (Java Tea) as a Model Study

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**Tabel S1.** Recent investigations on plant fermentation and its effect on antioxidant properties.

Plant	Condition of fermentation	Results			
		Phe	FD	FL	AA
White cabbage ( <i>Brassica oleracea</i> var. <i>capitata</i> cv. Megaton) [1].	<i>L. plantarum</i> CECT 748, <i>Leuconostoc mesenteroides</i> CECT 219 or a mixed culture of both strains.	NA	NA	NA	Oxygen radical absorbance capacity (ORAC) values (up to 2-fold) and NO production inhibitory potency (up to 2.6-fold).
Oats ( <i>Avena sativa</i> L.) [2]	SSF with <i>A. oryzae</i> var. <i>effuses</i> , <i>A. oryzae</i> , and <i>A. niger</i> on four subfractions of oats: n-hexane, ethyl acetate, n-butanol, and water with ethanol as solvent extractions.	Increased significantly ( $p < 0.05$ ); e.g. oats water sub fraction from $1,580.1 \pm 62.6$ mg GAE/100 g DW (un-fer.) to $3,632.7 \pm 73.1$ mg GAE/100 g DW (fer. with <i>A. oryzae</i> ).	Increased significantly ( $p < 0.05$ ); e.g. Oats ethyl acetate sub fraction from $3,714.8 \pm 94.3$ mg of rutin equivalents/100 g DW (un-fer.) to $7,893.1 \pm 397.3$ mg of rutin equivalents/100 g DW (fer. with <i>A. oryzae</i> ).	NA	Increased significantly ( $p < 0.05$ ); e.g. Oats ethyl acetate sub fraction $747.5 \pm 14.6$ micromoles of Trolox per gram of DW (un-fer.) to $1,687.9 \pm 40.7$ (fer. with <i>A. oryzae</i> ).

Tabel S1. Cont.

Plant	Condition of fermentation	Results			
		Phe	FD	FL	AA
Soybean [3]	The steamed soybeans were let stand for 1 h at 37 °C to cool down. After, the cooked soybeans was inoculated with 5% (w/w) strain <i>Bacillus subtilis</i> CS90 ( $1.43 \times 10^7$ cfu/mL) and fermented for 60 h at 37 °C in incubator and sampled at 0, 12, 24, 36, 48, and 60 h.	253 (0 h) increased to 9,414 mg/kg at the end of fermentation (60 h).	Increased from 53.43mg/kg (0 h) to 67.76 mg/kg (12 h)– 73.39 mg/kg (24 h) – 94.32 mg/kg (36 h) – 105.30 mg/kg (48 h) – 111.98 mg/kg (60 h).	Total flavonols increased (data divided into different type flavonols) although flavanol gallates contents decreased	The level of DPPH radical scavenging activity increased from 53.6 to 93.9% by 60 h.
<i>Anoectochilus formosanus</i> Hayata [4]	$5 \times 10^6$ cfu/mL <i>L. acidophilus</i> BCRC 17002, <i>Bifidobacterium longum</i> BCRC 14602, <i>L. casei</i> subsp. <i>Casei</i> BCRC 12248 was inoculated into 100 mL vegetable juice.	Increased; e.g. leaf (un-fer.) $6.07 \pm 1.0$ and fermented $14.05 \pm 1.0$ mg/g.	NA	NA	It is clearly shown an increase in the detected antioxidant property may owe to the increase of total phenolic compounds.
Spirulina ( <i>Arthrospira platensis</i> ) [5]	<i>B.bifidum</i> , <i>L. casei</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>Lactococcus lactis</i> and <i>L.acidophilus</i> .	The results of their study indicated that LAB-fermented Spirulina contained more polyphenols.	NA	NA	The greater quantity of total phenols in fermented samples indicates it possesses greater antioxidant activity.
<i>Graptopetalum paraguayense</i> E. Walther [6]	<i>L. acidophilus</i> BCRC 10695, <i>L. plantarum</i> BCRC 10357 and <i>L. paracasei</i> BCRC 14023.	Increased: e.g. water extract of immature <i>G. paraguayense</i> E. Walther fermentation by <i>L. plantarum</i> BCRC 10357 increased from 92.2 to 111 µg/mg.	Increased: e.g. water extract of immature <i>G. paraguayense</i> E. Walther fermentation by <i>L. plantarum</i> BCRC 10357 increased from 17.2 to 22.9 µg/mg.	NA	The level of antioxidants was significantly increased in immature <i>G. paraguayense</i> E. Walther fermented by <i>L. acidophilus</i> BCRC 10695, <i>L. plantarum</i> BCRC 10357 and <i>L. paracasei</i> BCRC 14023.

Tabel S1. Cont.

Plant	Condition of fermentation		Results			
			Phe	FD	FL	AA
<i>Codonopsis lanceolata</i> [7]	<i>Bifidobacterium longum</i> B6 and <i>L. rhamnosus</i> GG.		The fermentation process significantly increased the total phenol content of <i>C. lanceolata</i> when compared to the conventional extraction without fermentation. The total phenol content of <i>C. lanceolata</i> was the highest for high pressure assisted extraction from <i>L. rhamnosus</i> fermented (8.45 mg GAE/g), followed by <i>B. longum</i> fermented samples (8.25 mg GAE/g), non-fermented (7.38 mg GAE/g), and conventional extraction without fermentation (6.69 mg GAE/g).	Unlike the total phenols, fermentation decreased the total flavonoids. The lowest flavonoid contents were observed for high pressure assisted extraction of the fermented <i>C. lanceolata</i> with <i>B. longum</i> (0.44 mg RE/g) and <i>L. rhamnosus</i> (0.45 mg RE/g). The high pressure assisted extraction of un-fermented samples showed a maximum flavonoid content of 1.30 mg RE/g, followed by conventional extraction of un-fermented sample (0.78 mg RE/g).	NA	The lowest IC <sub>50</sub> values were 1.25 mg/mL for high pressure assisted extraction of <i>B. longum</i> fermented sample and 1.18 mg/mL for <i>L. rhamnosus</i> fermented sample, indicating that the fermented <i>C. lanceolata</i> extract had the highest antioxidant properties.
Peanuts [8]	<i>Bifidobacterium longum</i> B17, <i>Lactobacillus casei</i> LC35 and <i>Lactobacillus acidophilus</i> LA51	Gallic acid, caffeic acid, chlorogenic acid and <i>p</i> -coumaric lactic acid fermentation resulted in a decrease in the content of these four phenolic acids.				Regardless of the starter organisms used, lactic acid fermentation could highly improve the DPPH radical-scavenging activity of PF (Peanut Flour). For example, at 2 mg/mL, the extract from FPF (Fermented Peanut Flour) showed 54.1 to 85.6% scavenging activity on DPPH radicals.

Phe = total phenolics; FD = total flavonoids; FL = total flavonols; and AA: antioxidant activity; SSF = solid state fermentations; and LSF = liquid state fermentations.

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