

Oxidative stability of baked products incorporated with *Phyllanthus emblica* seed extract: A functional alternative to synthetic antioxidants

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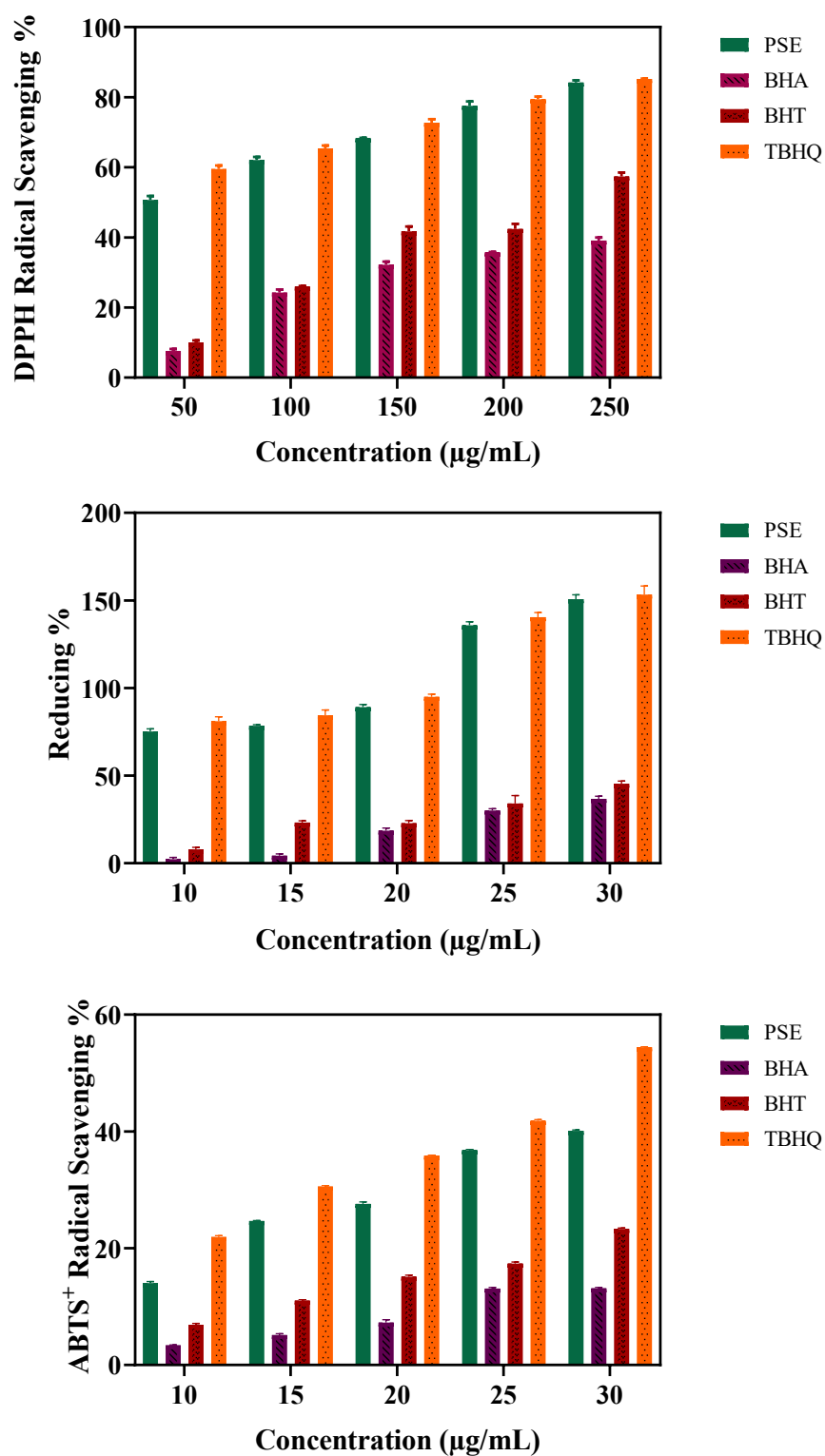


Figure S1 Antioxidant activities of phenolic extract and synthetic antioxidants. (a) DPPH radical scavenging activity. (b) Reducing power. (c) ABTS radical scavenging activity. PSE: *Phyllanthus emblica* seed extract, BHT: butylated hydroxytoluene, BHA: butylated hydroxyanisole, and TBHQ: *tert*-butylhydroquinone.

Table S1 Phenolic compounds and flavonoids identified in ethyl acetate extract of *Phyllanthus*

Peak No	Compound	RT (min)	Content (mg/g DW)
1	Gallic acid (C ₇ H ₆ O ₅)	3.94	7.79 ± 0.08
2	Vanillic acid (C ₈ H ₈ O ₄)	4.60	3.22 ± 0.14
3	Sinapic acid (C ₁₁ H ₁₂ O ₅)	5.10	6.53 ± 0.06
4	<i>p</i> -coumaric acid(C ₉ H ₈ O ₃)	5.30	9.99 ± 0.04
5	Ellagic acid (C ₁₄ H ₆ O ₈)	4.46	11.35 ± 0.08
6	Myricetin (C ₁₅ H ₁₀ O ₈)	8.31	4.81 ± 0.03
7	Quercetin (C ₁₅ H ₁₀ O ₇)	12.83	30.03 ± 0.24

emblica seed

Table S2 Effect of phenolic and synthetic antioxidants on aerobic plate count and yeast and mold count of sponge cakes

Sponge cake sample	Aerobic plate count (CFU/g)					Yeast and mold count (CFU/g)				
	Day 0	Day 3	Day 6	Day 9	Day 12	Day 0	Day 3	Day 6	Day 9	Day 12
Control	<10	3.0 x 10 ³	9.9 x 10 ⁴	1.7 x 10 ⁶	n.d.	<10	2.0 x 10 ²	1.0 x 10 ³	1.0 x 10 ⁴	n.d.
PSE-added	<10	<10	5.8 x 10 ²	3.0 x 10 ⁴	9.2 x 10 ⁵	<10	<10	3.0 x 10 ²	8.0 x 10 ³	1.2 x 10 ⁴
BHT-added	<10	2.4 x 10 ³	8.5 x 10 ⁴	1.0 x 10 ⁶	n.d.	<10	<10	2.0 x 10 ²	5.1 x 10 ³	2.0 x 10 ⁴
BHA-added	<10	9.7 x 10 ³	6.0 x 10 ⁴	8.9 x 10 ⁴	1.5 x 10 ⁶	<10	<10	3.0 x 10 ³	1.0 x 10 ⁴	n.d.
TBHQ-added	<10	<10	2.0 x 10 ³	6.7 x 10 ⁴	1.0 x 10 ⁶	<10	<10	4.2 x 10 ²	9.0 x 10 ²	1.0 x 10 ⁴

n.d. – not detected

Table S3 Effect of phenolic and synthetic antioxidants on yeast and mold count of biscuits

Biscuit sample	Aerobic plate count (CFU/g)								Yeast and mold count (CFU/g)					
	Day 0	Day 14	Day 28	Day 42	Day 56	Day 70	Day 84	Day 0	Day 14	Day 28	Day 42	Day 56	Day 70	Day 84
Control	<10	<10	8.9 x 10 ⁵	2.1 x 10 ⁶	n.d.	n.d.	n.d.	<10	<10	4.8 x 10 ³	1.7 x 10 ⁴	n.d.	n.d.	n.d.
PSE-added	<10	<10	<10	6.0 x 10 ³	4.0 x 10 ⁴	1.8 x 10 ⁵	8.0 x 10 ⁵	<10	<10	<10	4.0 x 10 ²	2.0 x 10 ³	8.4 x 10 ³	9.0 x 10 ³
BHT-added	<10	<10	8.5 x 10 ³	5.0 x 10 ⁴	9.8 x 10 ⁵	1.0 x 10 ⁶	n.d.	<10	<10	<10	5.0 x 10 ⁴	8.0 x 10 ³	1.0 x 10 ⁴	n.d.
BHA-added	<10	<10	4.0 x 10 ³	6.0 x 10 ⁵	4.0 x 10 ⁶	n.d.	n.d.	<10	<10	<10	2.5 x 10 ²	9.1 x 10 ³	3.0 x 10 ⁴	n.d.
TBHQ-added	<10	<10	<10	9.0 x 10 ²	8.0 x 10 ³	7.0 x 10 ⁵	9.0 x 10 ⁵	<10	<10	<10	9.4 x 10 ²	4.0 x 10 ³	7.0 x 10 ³	1.0 x 10 ⁴

n.d. – Not detected