

Supplementary data

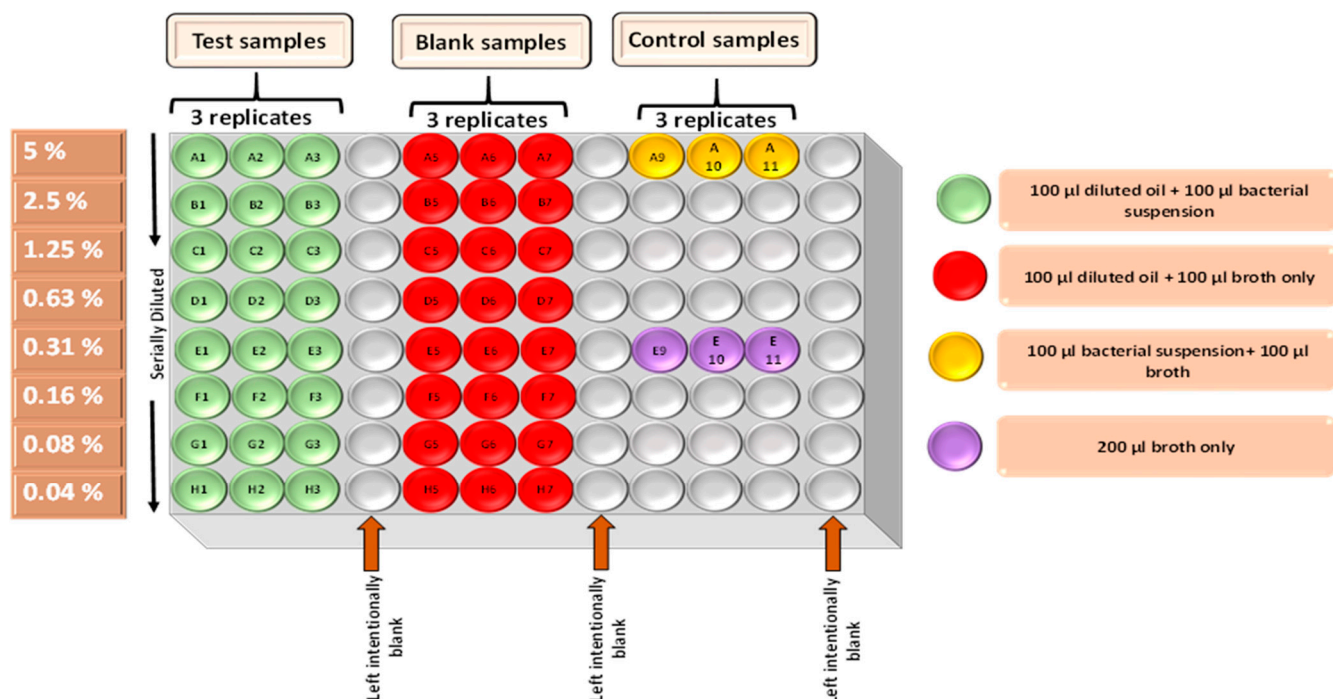


Figure S1. The layout of the 96-well plate experiment used for the broth dilution method.

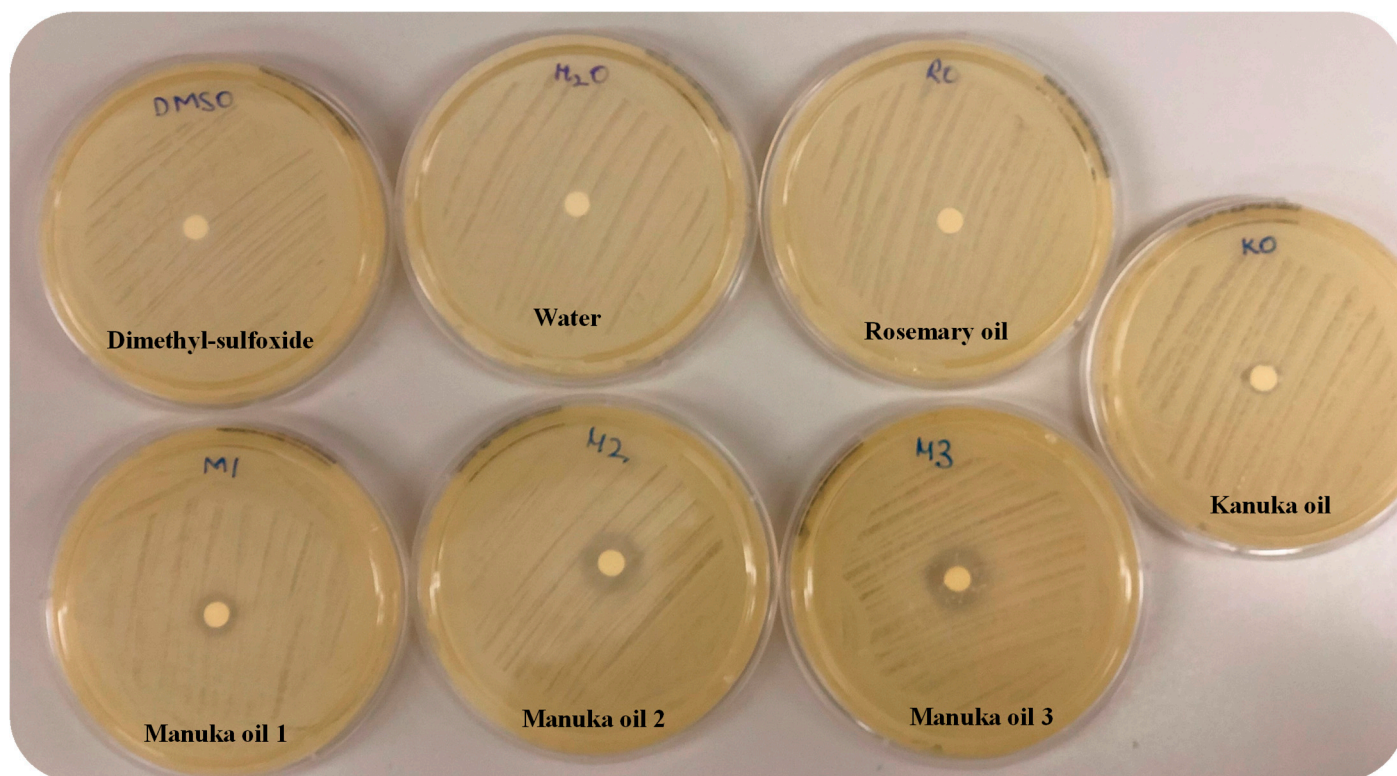


Figure S2. Zone of inhibition formed by mānuka (1,2 and 3 with 5, 25 and 40 % triketones, respectively), kānuka and rosemary oils against *Listeria monocytogenes*.

Activity against targeted microbial species.

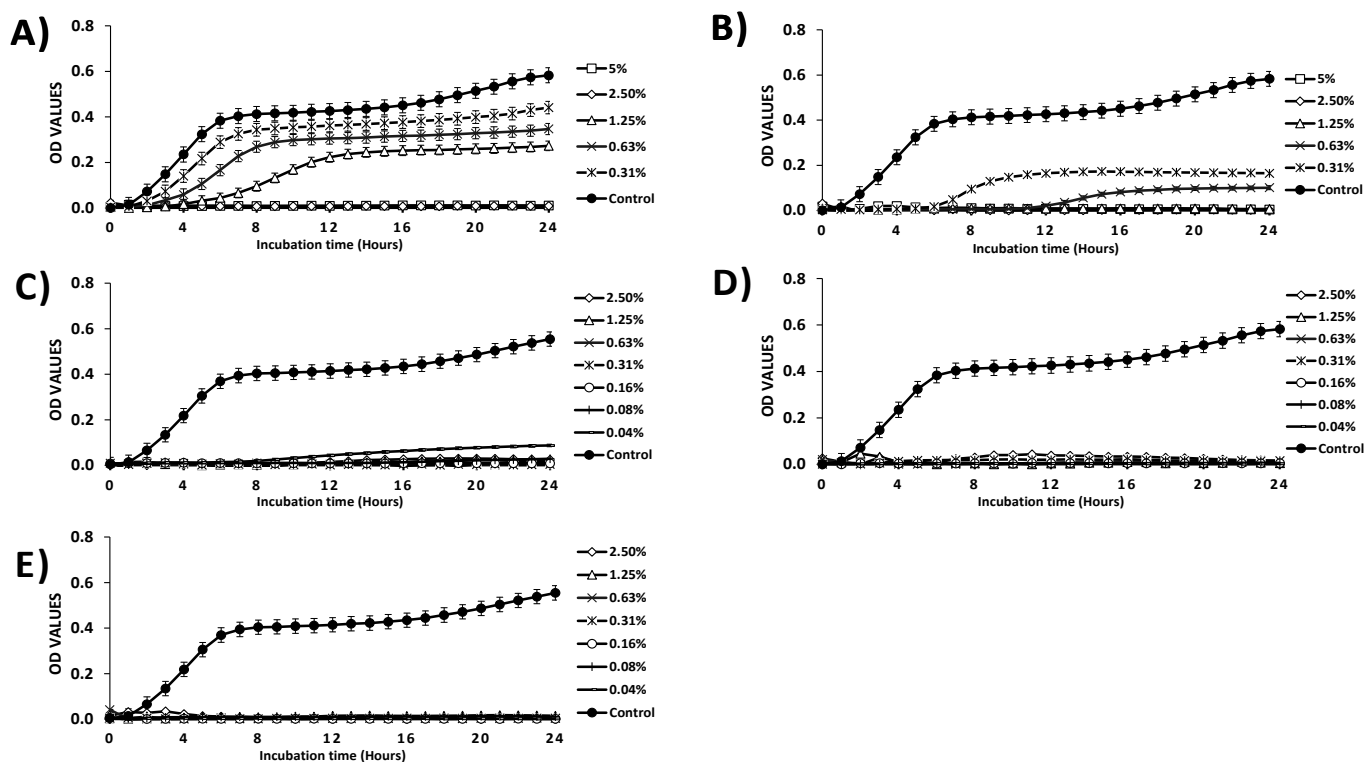


Figure S3 *Staphylococcus aureus* growth curves for A) rosemary oil; B) kānuka oil; C) mānuka oil 1 (5 % triketone content); D) mānuka oil 2 (25 % triketone content); and E) mānuka oil 3 (40 % triketone content) at different concentrations. (The control sample contained no preservatives, but the test organism *Staphylococcus aureus* in Mueller-Hinton broth). The control sample contained no preservative but the test organism, *Staphylococcus aureus*. The antimicrobial effects of all essential oils were determined at concentrations ranging from 5 to 0.04 %. However, only selected concentrations showing major differences are presented in Figures 3, 4, 5 and 6.

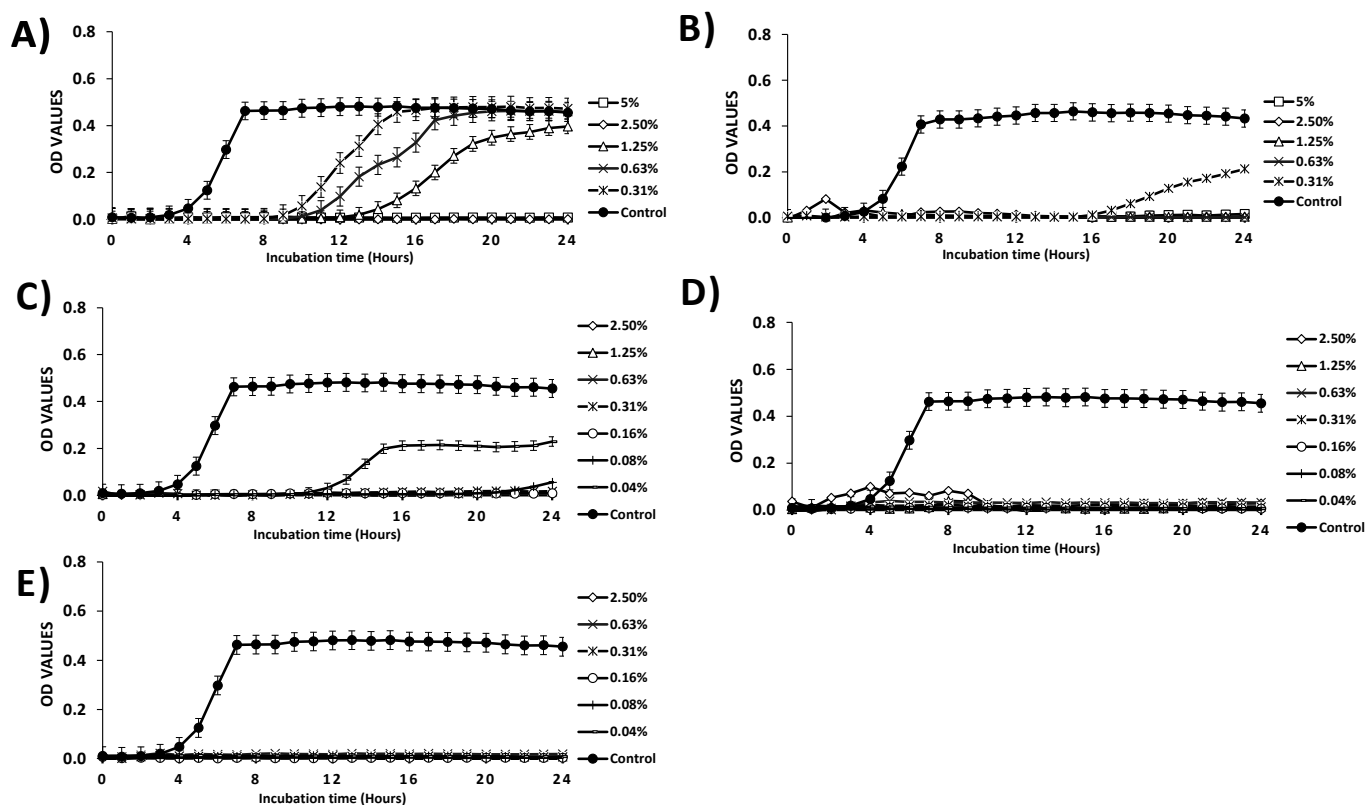


Figure S4 *Listeria monocytogenes* growth curves for a) rosemary oil; b) k nuka oil; c) m nuka oil 1 (5 % triketone content); d) m nuka oil 2 (25 % triketone content); and e) m nuka oil 3 (40 % triketone content) at different concentrations. (The control sample contained no preservative, but the test organism *Listeria monocytogenes* in Mueller-Hinton broth).

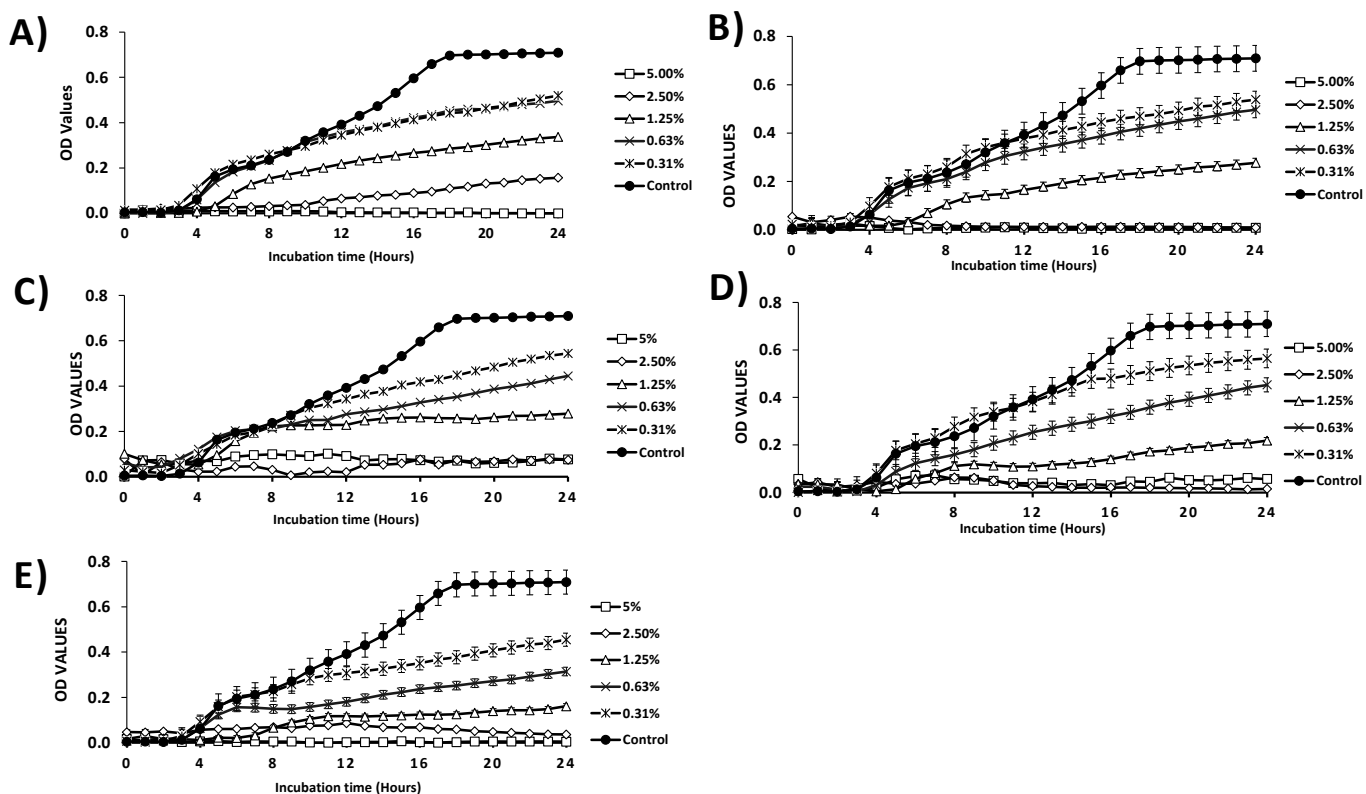


Figure S5 *Salmonella* spp. growth curves for A) rosemary oil; B) kākūka oil; C) mānuka oil 1 (5 % triketone content); D) mānuka oil 2 (25 % triketone content); and E) mānuka oil 3 (40 % triketone content) at different concentrations. (The control sample contained no preservative, but the test organism *Salmonella* spp in Mueller-Hinton broth).

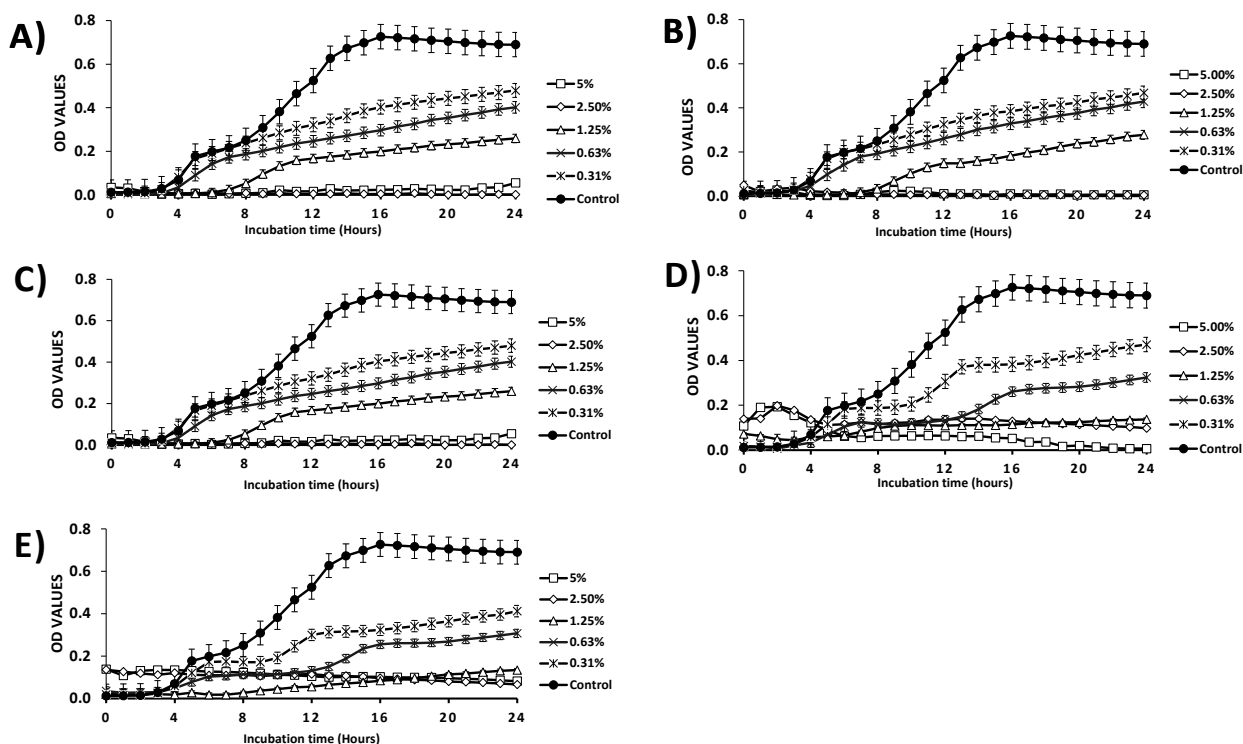


Figure S6 *Escherichia coli* growth curves for a) rosemary oil; b) kākūka oil; c) mānuka oil 1 (5 % triketone content); d) mānuka oil 2 (25 % triketone content); and e) mānuka oil 3 (40 % triketone content) at different concentrations. (The control sample contained no preservatives, but the test organism *Escherichia coli* in Mueller-Hinton broth).

Table S1. Main constituents in mānuka, kākūka and rosemary oil identified through gas chromatography and mass spectrometry analysis.

Sr No	Chemical compound name	Mānuka oil 1 (Area %)	Mānuka oil 2 (Area %)	Mānuka oil 3 (Area %)	Rosemary oil (Area %)	Kākūka oil (Area %)
1.	α -pinene	1.32	1.19	0.92	19.09	64.25
2.	β -Pinene	0.37	0.17	0.15	5.31	0.71
3.	β -Myrcene	0.35	0.3	0.27	3.14	-
4.	Γ -terpinene	0.44	0.15	0.14	2.34	1.52
5.	Limonene	0.7	0.12	0.1	0.2	1.79
6.	linalool	-	-	-	2.91	2.76
7.	α -terpinol	0.21	0.2	0.22	-	-

8.	p- Cymene	0.44	0.08	0.15	-	3.28
9.	1,8 cineole	0.35	0.23	0.22	50.75	6.6
10.	β -Cryophyllene	3.7	2.56	2.4	6.46	-
11.	Aromadendrene	2.51	2.24	1.85	-	-
12.	α -gurjuene	0.32	0.26	0.24	-	-
13.	δ -cardinene	8.26	5.49	6.1	-	-
14.	Alloaromadendrene	1.16	0.96	0.81	-	-
15.	Cardia- 3,9 diene	4.15	4.97	4.67	-	-
16.	B-elemene	0.4	0.39	0.38	-	-
17.	α -farnesene	1.75	2.2	2.04	-	-
18.	α -cedrene	6.05	4.39	4.22	-	-
19.	Calamene or cardia 1,4 dinene	16.42	13.23	11.01	-	3.78
20.	Flavesone	1.89	6.26	8.57	-	-
21.	γ -Elemene	1.73	1.33	1.28	-	-
22.	β -Selinene	5.26	0.08	0.92	-	-
23.	α -Cubebene	4.88	3.59	3.41	-	-
24.	Ylangene	0.36	0.3	0.26	-	-
25.	Copaene	6.01	4.88	4.19	-	-
26.	cubenol	0.65	0.17	0.13	-	-
27.	globulul	0.49	0.28	0.22	-	-
28.	leptospermone	1.09	5.19	4.89	-	-
29.	isoleptospermone	3.89	12.37	18.39	-	-
30.	verdiflorol	2.61	2.41	1.94	-	8
31.	spanthul	1.23	1.24	1.11	-	2.53
32.	Grandiflorone	-	0.23	0.56	-	
33.	aliphatic ester	-	0.23	0.18	-	
34.	n-Amyl isovalerate		0.1	0.3		-
35.	α -thujene	-	-	-	-	0.68

36.	Nerolidol	-	-	-	-	2.53
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