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**TROPICAL BIOESSENCE SDN. BHD.**

## CERTIFICATE OF ANALYSIS

Product : Ginger Essential oil  
Botanical name : Zingiber officinale Oil  
Product Code : GGEO 01  
Mfg Date : May 2025      Exp Date : May 2028      Batch no: 052546B  
Method : Steam Distillation

TEST	RESULT	STANDARD
Appearance	Pale Yellow to Orange Brown	Confirm
Odour	Warm and spicy aroma	Confirm
Refractive index (25°C)	1.484	1.480 - 1.495
Specific gravity (25°C)	0.886	0.865 - 0.894
Optical Rotation	-2.0°	-52.0° - -10.0°
Solubility	Complies	Soluble in Alcohol
<b>Heavy Metals Content</b>		
Arsenic (mg/kg)	N.D (<0.1ppm)	BP 2013, Appendix IID, ICP-AES
Lead (mg/kg)	N.D (<0.5ppm)	BP 2013, Appendix IID, ICP-AES
Cadmium (mg/kg)	N.D (<0.1ppm)	BP 2013, Appendix IID, ICP-AES
Mercury (mg/kg)	N.D (<0.1ppm)	BP 2013, Appendix IID, ICP-AES
<b>Microbial Content</b>		
<i>Pseudomonas aeruginosa</i>	Absent in 1g	BP 2013, Appendix XVIB, 1
<i>Staphylococcus aureus</i>	Absent in 1g	BP 2013, Appendix XVIB, 1
<i>Total Combined Yeast and Mould</i>	ND(<10) CFU/g	BP 2013, Appendix XVIB, 2
<i>Total Aerobic Microbial Count</i>	ND(<10) CFU/g	BP 2013, Appendix XVIB, 2
<b>Assay by GC</b>		
Zingiberene	19.70%	15.00 - 25.00%
β-cedrene	12.80%	10.00 - 15.00%
Farnesene	12.50%	10.00 - 15.00%

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