

**Thesis Title** Effects of Oral Supplement L-Theanine on Cognitive Functions and Relaxation: An Electroencephalographic Study

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**Degree** Master of Science (Anti-Aging and Regenerative Medicine)

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### **ABSTRACT**

This study investigates the effects of a single 200 mg dose of L-Theanine, an amino acid in green tea, on brain wave activity using electroencephalogram (EEG). The aim was to evaluate if L-Theanine enhances cognitive performance and relaxation by modulating alpha, beta, and theta waves and whether these effects are uniform across the brain. Fifteen healthy middle-aged participants received L-Theanine, with EEGs taken at baseline, 30-, 60-, and 90-minutes post-ingestion.

The results showed non statistically significant but observable trend of increased alpha and beta wave power, particularly in frontal, temporal, and parietal regions at 90 minutes, while theta wave activity generally decreased. Comparison of fast brain waves revealed a relatively greater increase in alpha over beta power while comparing Z-scores, indicating a shift toward a balanced alpha-beta state and suggesting relaxed alertness.

Lateral analysis showed no significant differences between whole brain, left and right hemispheres, implying a uniform effect across the brain. This balanced reduction in beta dominance supports a calm yet alert state.

These trends, although not significant, highlight L-Theanine's potential in modulating brain wave patterns, enhancing cognitive function and relaxation. Further studies with longer observation periods are suggested to confirm these effects and clarify their significance.

**Keywords:** L-Theanine, EEG, Brain Wave Activity, Alpha Waves, Beta Waves, Theta Waves