

# Serotonin and Cortisol Response in Relation to Ashwagandha Root Treatment in *C. elegans*: A Model Organism for Antidepressant Studies

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This study will evaluate the efficacy of the herbal supplement *Withania somnifera* (Ashwagandha root) for treatment of depression, anxiety and stress. The American Psychological Association states, in any given year, 6.7% of adults suffer from depression, 18.1% suffer from anxiety and 3 of 4 adults experience at least one stress symptom per month. Selective Serotonin Reuptake Inhibitors (SSRIs) prescriptions for these disorders have increased 64% in the past 20 years; however, 15 million Americans every year turn to herbal supplement remedies to minimize the side effects and reliance on SSRI pharmaceuticals. This study aims to: 1) Verify *Withania somnifera* in a commercially available Ashwagandha root tea. 2) Study the effect of Ashwagandha root tea on *Caenorhabditis elegans*, a model organism supported in SSRI research. In this research, qPCR, gel electrophoresis and genetic sequencing show *Withania somnifera* as a major component of Ashwagandha root tea. Following exposure of *C.elegans* to Ashwagandha root tea, nose contraction, locomotion and egg-laying patterns show similarity to previous studies on *C.elegans* given Prozac (fluoxetine). Live fluorescence imaging of *C.elegans* genotype *bqSi294 II*; *bqSi488 IV* show a significant increase in serotonin expression in the body and head of *C.elegans* after Ashwagandha root tea exposure while ELISA tests evaluate cortisol expression. Altogether, this research indicates possible antidepressant activity of Ashwagandha root tea in *C.elegans*. *Withania somnifera* shows potential for adaptogenic activity for individuals struggling with depression, stress and anxiety.