ETHANOL EXTRACT OF *Solanum campylacanthum* MITIGATES HYPOXIA-INDUCED NEUROBEHAVIOURAL AND BIOCHEMICAL ALTERATIONS IN MALE WISTAR RATS

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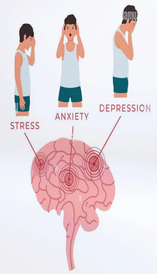
Introduction

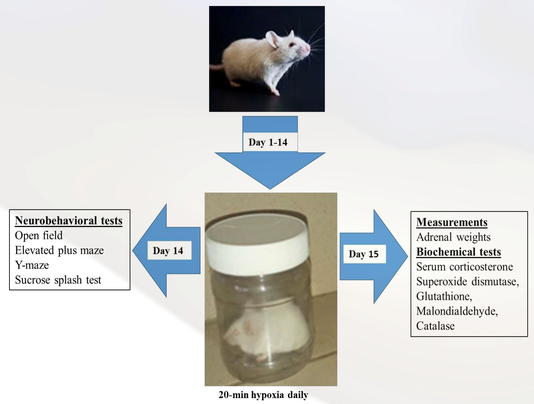
- Hypoxic stress → leads to neuroendocrine disruption and oxidative imbalance (Vanderhaeghen et al., 2021)
- Behavioral alterations, elevated corticosterone & oxidative damage as hallmarks of stress induced pathology
- No definitive drugs for hypoxic stress mitigation
- Plant-based adaptogens are promising
- Solanaceae family: antioxidant, anti-inflammatory properties (Rani et al., 2025)
- **Scientific Gap**: *S. campylacanthum* lacks empirical validation (Kew Science, 2021)
- **Aim**: This study investigates the potential of ethanol extract of *S. campylacanthum* leaves (EESC) to counteract hypoxia-induced neurobehavioral and biochemical disturbances in male Wistar rats



Stress → oxidative damage → behavioural deficits

Methods

- Acute toxicity was evaluated using Lorke's method (1983), revealing an oral LD_{50} exceeding 5000 mg/kg
- **Design**: Groups (n=6): control, hypoxia, Ethanol extract of *Solanum campylacanthum* leaves (EESC) (100, 200, 400 mg/kg)
- **Hypoxia induction**: sealed chamber, 20 min/day × 14 days (Olugbemide et al., 2020) applied one hour post-treatment
- **Assessments**: behaviour (anxiety, depression, memory, locomotion), corticosterone, oxidative markers -superdioxide dismutase (SOD), catalase, glutathione (GSH), and malondialdehyde (MDA), and adrenal weights.



Results

- **Behavioural outcomes**: EESC significantly improved anxiety, depression, memory, and locomotion.
- **Biochemical outcomes**: EESC significantly ↓ corticosterone & MDA; ↑ SOD, catalase, and GSH.
- **Morphological outcome**: EESC prevented adrenal hypertrophy

Results

Table 1. Effects of EESC on Parameters of Anxiety, Exploration, and Motor Function in Hypoxic Rats Using the Elevated plus Maze and Open Field Tests

Treatment groups	Frequency of open arm entry	Duration in open arm	Index of open arm avoidance	Frequency of rearing	Number of line crossing
Control	2.00 ± 0.26	108.30 ± 4.75	51.39 ± 3.06	16.33 ± 0.56	34.17 ± 0.54
Stress-control	1.00 ± 0.00*	41.60 ± 3.25*	76.49 ± 2.33*	9.67 ± 0.42*	25.83 ± 1.85*
EESC (100mg/kg, p.o) + Stress	4.50 ± 0.22#	63.00 ± 1.63#	53.11 ± 1.58#	23.17 ± 1..01#	47.17 ± 0.75#
EESC (200mg/kg, p.o) + Stress	4.17 ± 0.31#	62.67 ± 1.93#	52.89 ± 1.84#	20.00 ± 0.58#	45.83 ± 0.70#
EESC (400mg/kg, p.o) + Stress	2.50 ± 0.22#	100.50 ± 3.03#	52.97 ± 1.46#	17.17 ± 0.48#	34.17 ± 1.01#

*Values are expressed as Mean ± SEM, (n = 6). *P< 0.05 vs control, #p < 0.05 vs stress-control (One- way ANOVA followed by Tukey's Post hoc test).*

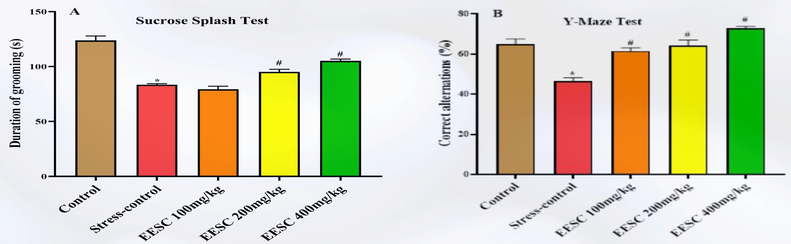


Figure 1. Effects of EESC on Depressive-like Behaviour and Memory Function in Hypoxic Rats. Duration of Grooming (A) and % Correct Alternations (B).

*Each bar indicates the Mean ± SEM (n = 6). *P < 0.05 vs control; #p < 0.05 relative to stress-control (One- way ANOVA followed by Tukey's Post hoc test).*

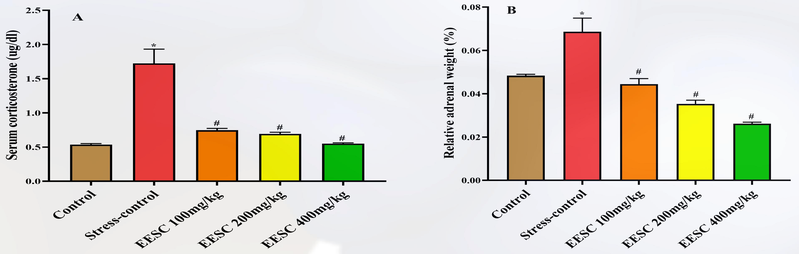


Figure 2. Ethanol Extract of *Solanum campylacanthum* Leaves on Serum Corticosterone Level (A) and % Relative Adrenal Weight (B) In Hypoxic Rats.

*Each bar indicates the Mean ± SEM (n = 3). *P < 0.05 vs control; #p < 0.05 relative to stress-control (One- way ANOVA followed by Tukey's Post hoc test).*

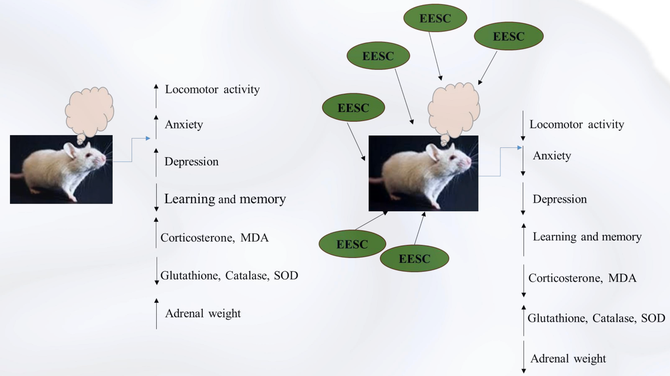
Table 2. Effects of EESC on Stress Biomarkers in Hypoxic Rats

Treatment groups	Stress Biomarkers			
	Malondialdehyde (µmoles/mg protein)	Superoxide dismutase (U/mg protein)	Catalase (µg/mg protein)	Glutathione (ug/mg protein)
Control	44.55 ± 0.63	8.30 ± 4.75	83.76 ± 0.51	1.85 ± 0.03
Stress-control	98.96 ± 0.72*	3.12 ± 0.13*	39.10 ± 0.32*	1.10 ± 0.01*
EESC (100mg/kg, p.o) + Stress	68.73 ± 0.31#	6.75 ± 0.09#	66.60 ± 0.55#	1.29 ± 0.04#
EESC (200mg/kg, p.o) + Stress	53.20 ± 1.68#	7.63 ± 0.09#	79.46 ± 0.25#	1.50 ± 0.03#
EESC (400mg/kg, p.o) + Stress	44.44 ± 0.51#	8.16 ± 0.10#	84.13 ± 0.55#	1.85 ± 0.03#

*Values are expressed as Mean ± SEM, (n = 3). *P< 0.05 vs control, #p < 0.05 vs stress-control (One- way ANOVA followed by Tukey's Post hoc test).*

Discussion and Conclusion

- The EESC mitigates hypoxia-induced neurobehavioral and oxidative pathology.
- Suggests modulation of HPA axis and antioxidant defense.
- Potential translational relevance for stress-related neurodegenerative conditions



Summary of the Effects of EESC on Hypoxic Stress-Induced Neurobehavioural and Biochemical Alterations in Rats

Conflicts of Interest

The authors declare no conflicts of interest

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