The neuroprotective activity of phenolic compounds from Philippine oregano *(Coleus amboinicus)* against cognitive impairment in mice *(Mus musculus)*

Tiamzon SMP, Abad MALD, Beltran AJM, Biglang-awa EADL, Escalona DMA, So KMC, Villalobos OA, Torio CM

University of Santo Tomas, Metro Manila, Philippines

ABSTRACT

Introduction: Cognitive impairment affects an individual's memory, comprehension, reasoning, judgment, and visual-spatial perception. A well-known and used medicinal plant in the Philippines, the Philippine oregano *(Coleus amboinicus)* is abundant in the phenolic compounds carvacrol, and thymol used in culinary and pharmaceutical applications. With the rising prevalence of cognitive impairment among the aging Filipino population, there is a greater need for better awareness, prevention, and treatment options. **Materials and Methods:** The mice underwent a habituation period, acquisition trial, and retention trial. The parameters measured were the latency to reach the target location and the number of errors made. Scopolamine-induced cognitive impairment was done in Groups 2, 3, 4, and 5 followed by the administration of treatments including the extract and donepezil as the standard drug for Group 2. These were all subjected to histopathological testing through H&E staining and microscopic examination. **Results:** The results showed the presence of phenolic contents of the Coleus amboinicus extract based on the Ferric chloride test and TLC. Total Phenolic Content and Total Flavonoid Content were determined (422.9 ± 0.02108 ppm GAE/µL and 91.40 ± 0.01127 ppm QE/µL) that indicated the abundance of the compounds, respectively. Statistical analysis using Analysis of Variance (ANOVA) and Student's t-test were performed to summarize and compare the data collected. Results from the acquisition trial showed a significant difference ($F > 2.32$), indicating mice could distinguish baited arms, while the retention trial ($t = 4.77 > 3.182$) showed reduced movement with longer acquisition times. Histopathological testing revealed the presence of suspected amyloid-β (Aβ) plaques in Group 2 (positive control), Group 3 (low concentration), Group 4 (medium concentration), and Group 5 (high concentration) wherein Group 3 exhibited fewer amyloid-β (Aβ) plaques. **Conclusion:** The *Coleus amboinicus* extract showed no significant neuroprotective effects in scopolamine-induced cognitively impaired mice. However, low-concentration oregano extract showed potential benefits, with fewer Amyloid-β (Aβ) plaques.