

## IN VITRO ENZYMATIC CHOLINERGIC ACTIVITY OF PHENOLIC COMPOUNDS EXTRACTED FROM BAMBOO LEAVES

**Autores:** Larissa Schröder Paula\*; Carolaine Nascimento Santana; Sabrina Fontana Belinazo\*; Fabrício do Nascimento Jardim; Andreara Rodrigues dos Reis; Milene Teixeira Barcia<sup>1</sup>; Rafael Porto Ineu<sup>1</sup>

<sup>1</sup>Professor at Department of Food Technology and Science, Federal University of Santa Maria.

Federal University of Santa Maria - Santa Maria - Rio Grande do Sul.

**INTRODUCTION:** Bamboo is a widely used plant due to its nutritional and bioactive properties. Its leaves contain various secondary metabolites, such as phenolic compounds, which can influence biological processes, including enzymatic modulation. Acetylcholinesterase (AChE) is an essential enzyme in the nervous system, responsible for degrading acetylcholine (ACh), a key neurotransmitter in synaptic transmission. Inhibiting this enzyme is a therapeutic strategy for neurodegenerative diseases such as Alzheimer's.

**OBJECTIVE:** This study aims to evaluate *in vitro* the effects of phenolic compounds extracted from bamboo leaves on acetylcholinesterase activity.

**MATERIALS AND METHODS:** *In vitro* AChE activity was assessed using colorimetric assay based on the DTNB reaction, with absorbance detection at 412 nm. The bamboo leaf extract was dried and resuspended in Milli-Q water (1,000 µL dry extract in 100 µL water, 10x concentrated). The isolated enzyme from *Electrophorus electricus* was diluted in Tris-HCl buffer to a final 10x concentration. Experiments included a blank control (without extract) and experimental groups with different extract final concentrations (0,039; 0,088; 0,158 and 0,246ug of GA). The microplate reader temperature was set to 30°C. Each sample was treated with potassium phosphate buffer (TFK), Milli-Q water, and the enzyme, followed by incubation for 5 minutes. DTNB and the substrate were then added, and absorbance readings were taken six times at one-minute intervals.

**RESULTS:** The bamboo extract significantly inhibited AChE activity at all tested concentrations ( $p < 0.001$ ). The inhibition was concentration-dependent, increasing up to 0,158ug of GA, where the greatest reduction in enzymatic activity was observed. However, at 0,246ug of GA, the effect stabilized, suggesting saturation of enzyme binding sites by active compounds in the extract. This plateau effect indicates that further increases in extract concentration do not enhance inhibition, likely due to complete occupation of AChE active sites.

**CONCLUSION:** Phenolic compounds from bamboo leaves exhibited inhibitory potential against AChE, suggesting a neuroprotective effect. The inhibition was concentration-dependent up to 0,158ug of GA. These findings highlight the potential of natural compounds as modulators of cholinergic activity, with possible pharmacological applications in neurodegenerative diseases.

**Keywords:** Toxicity; Enzymes; Bioactives; AChE

**Funding:** CNPq/MCTI/FNDCT No. 18/2021- Universal Process: 409428/2021-3; CNPq/PQ2 - Process: 307668/2022-3.

\*Scholarship holders through the UFSM Post-Graduate Program Strengthening and Asymmetry Reduction Initiative – PRPGP/UFSM Notice No. 50/2024.