IMPACT OF HEAT TREATMENT ON ANTIOXIDANT AND CHOLINESTERASES INHIBITORY ACTIVITIES OF SOME NIGERIAN PLANTS (*Curcuma longa, Piper guineensis* and *Carpolobia lutea*)

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INTRODUCTION

Food processing, particularly heat treatment like steaming, significantly affects the quality, safety, and bioactive properties of plant-based food products. This study investigates the impact of steaming on the antioxidant and cholinesterase inhibitory activities of three Nigerian plants: turmeric (*Curcuma longa*), West African black pepper (*Piper guineensis*), and cattle stick (*Carpolobia lutea*). Turmeric, rich in curcuminoids, is valued for its anti-inflammatory, antioxidant, and anti-neurodegenerative properties. *P. guineensis*, containing piperine, offers thermoregulatory and antimicrobial benefits, while *C. lutea*, known for aphrodisiac effects, exhibits antioxidant and sexual health benefits due to compounds like flavonoids and phenols.

METHODS

Fresh samples were steamed for 5 minutes and oven-dried at 60°C, compared to raw oven-dried controls. Antioxidant activities were assessed via DPPH, ABTS, and FRAP assays, and cholinesterase inhibition (AChE and BChE) was measured colorimetrically.

RESULTS

Results showed steaming enhanced turmeric's DPPH (5.83% to 52.21%) and ABTS (0.00013 to 0.00028) activities and cholinesterase inhibition (AChE: 18.71% to 38.89%; BChE: 8.46% to 28.64%), likely due to increased curcuminoid bioavailability. Conversely, *P. guineensis* exhibited reduced DPPH (40.56% to 13.52%) and ABTS (0.00066 to 0.00048) activities and cholinesterase inhibition (AChE: 32.46% to 23.98%; BChE: 22.21% to 13.73%), though FRAP increased (18.64% to 19.62%), possibly due to heat-sensitive compound degradation. *C. lutea* showed a slight DPPH decrease (26.22% to 16.55%) and reduced cholinesterase inhibition (AChE: 36.55% to 20.76%; BChE: 26.30% to 10.51%), with minor ABTS and FRAP increases, reflecting mixed responses to heat.

CONCLUSION

These findings highlight steaming's variable effects—enhancing turmeric's bioactivity while diminishing that of *P. guineensis* and *C. lutea*—underscoring the need for tailored processing to optimize their therapeutic potential for oxidative stress and neurodegenerative conditions.

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