

## Evaluation of the *in vitro* bioactive potential of *Salicornia brachiata* for therapeutic applications in metabolic disorders

Madushantha K. G. S.<sup>1</sup>, Seneviratne K. N.<sup>1</sup>, Jayathilaka N.<sup>1</sup>, Perera D.<sup>2</sup>, Attanayake R. N.<sup>3</sup>,  
and Paranagama P. A.<sup>1\*</sup>

<sup>1</sup> Department of Chemistry, Faculty of Science, University of Kelaniya.

<sup>2</sup> Department of Bioprocess Technology, Rajarata University of Sri Lanka.

<sup>3</sup> Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya, Sri Lanka.

\*priyani@kln.ac.lk

*Salicornia brachiata* belongs to the genus *Salicornia*, which has halophytic characteristics and exhibits important therapeutic potential besides its phytochemical richness. This research aims to evaluate the biological activities of methanolic extract (ME), chloroform extract (CE), and hexane extract (HE) obtained from *S. brachiata* aerial plant parts to evaluate their potential as natural therapeutic agents. Fresh plant materials were collected from salt marshes in the Mannar district, Sri Lanka. Multiple *in vitro* tests showed antihypertensive together with antidiabetic, anti-obesity, antioxidant, and neuroprotective effects through angiotensin-converting enzyme (ACE) inhibition,  $\alpha$ -glucosidase inhibition, pancreatic lipase inhibition, xanthine oxidase inhibition and acetylcholinesterase enzyme inhibition assessments. The inhibitor concentrations of 0.5 mg/mL showed ACE inhibition amounts at 59.24 $\pm$ 0.78% (ME) and 72.87 $\pm$ 1.67% (CE) while HE displayed a lower value of 51.56 $\pm$ 1.37% when compared to captopril with 90.56 $\pm$ 2.77% inhibition. Meanwhile, for  $\alpha$ -glucosidase inhibition tests, ME and HE had inhibition rates of 09.23 $\pm$ 0.76% and 48.97 $\pm$ 3.28% respectively whereas CE exhibited 73.89 $\pm$ 2.69% inhibition alongside acarbose at 71.12 $\pm$ 2.69% inhibition. The extracts inhibited pancreatic lipase to various extents:

58.67 $\pm$ 1.59% inhibition for ME, 18.78 $\pm$ 4.85% for CE and 21.09 $\pm$ 0.85% for HE whereas orlistat showed 88.78 $\pm$ 0.97% inhibition. The xanthine oxidase inhibition assay measured antioxidant activity through inhibitor activity percentages of 22.14 $\pm$ 2.67% (ME), 39.69 $\pm$ 1.73% (CE), and 21.38 $\pm$ 0.97% (HE) while the standard inhibitor allopurinol yielded an inhibitor activity of 79.0 $\pm$ 0.88%. The inhibitory effects on acetylcholinesterase measured 22.98 $\pm$ 1.23% (ME), 35.55 $\pm$ 5.1% (CE) and 38.21 $\pm$ 1.23% (HE). while donepezil displayed 55.91 $\pm$ 0.78% inhibition. These results confirm that *S. brachiata* possesses useful bioactive compounds which show potential for use as antihypertensive and antidiabetic pharmaceutical agents. The research findings support the growing interest in using natural products for disease conditions associated to modern lifestyles.

### Keywords:

Antihypertension, antidiabetic, *in vitro* bioactivity, halophyte, metabolic disorders

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