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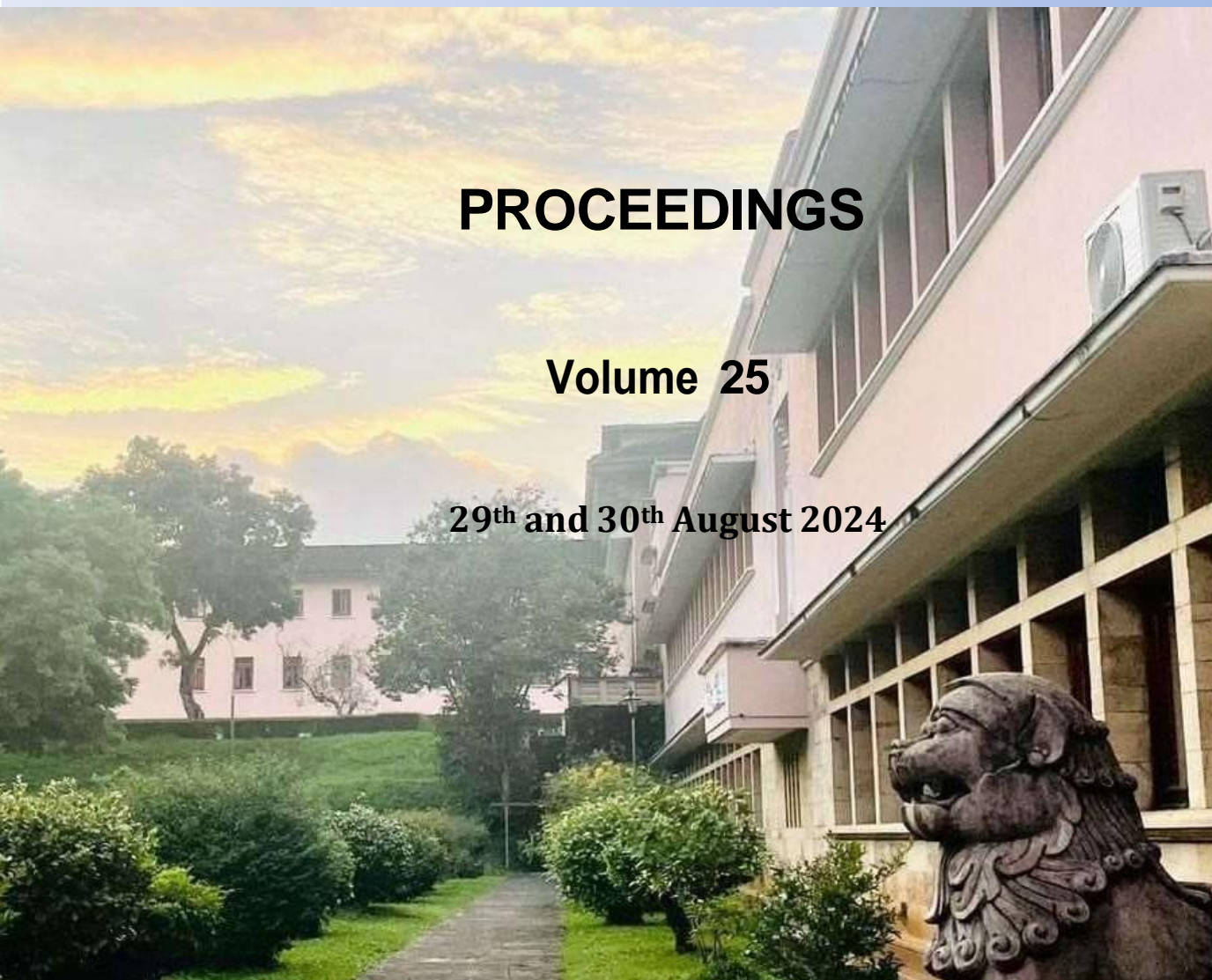
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Anti-Diabetic and Anti-Obesity Properties of Locally Available Four Duckweed Varieties in Sri Lanka

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The WHO emphasizes addressing diabetes and obesity for global health equity, highlighting plant-based traditional medicine as a low-risk, effective alternative to modern pharmaceuticals. This study aimed to evaluate the α -amylase and lipase inhibition activity (IC_{50}) of four duckweed varieties; *Spirodella polyrriza* (SP), *Lemna cf. minor* (LM), *Lemna perpusilla* (LP), and *Landoltia punctata* (LaP) extracted from Water, 70% EtOH and 60% EtOH. The assessment evaluated their potential effectiveness in combating diabetes and obesity by targeting α -amylase, lipase enzymes respectively. Acarbose (anti-diabetic) and Orlistat (anti-obesity) drugs were utilized as standards. The SPSS MANOVA analysis showed significant differences ($P < 0.05$) in the inhibition of α -amylase and lipase enzymes among solvent extractions and duckweed varieties. 70% EtOH extract showed the highest ($P < 0.05$) α -amylase inhibition activity for both SP ($0.14 \pm 0.00 \mu\text{g/mL}$) and LaP ($0.14 \pm 0.00 \mu\text{g/mL}$). Water extract exhibited the greatest inhibition ($P < 0.05$) for both LM ($0.19 \pm 0.00 \mu\text{g/mL}$) and LP ($0.54 \pm 0.05 \mu\text{g/mL}$). The study shows that four duckweed varieties demonstrated stronger α -amylase inhibitory activity ($P < 0.05$) compared to the Acarbose ($12.16 \pm 0.10 \mu\text{g/mL}$). The 60% EtOH extract of SP showed the highest inhibition of lipase activity ($P < 0.05$), with an ($IC_{50} = 1.39 \pm 0.02 \mu\text{g/mL}$). The 70% EtOH extracts of LM, LP and LaP also exhibited significant inhibition of lipase activity, with IC_{50} value of $1.75 \pm 0.01 \mu\text{g/mL}$, $2.86 \pm 0.02 \mu\text{g/mL}$, and $2.62 \pm 0.12 \mu\text{g/mL}$, respectively. The inhibitory effect of the 60% EtOH extract of SP on lipase activity is comparable efficacy to Orlistat, with ($IC_{50} = 1.33 \pm 0.44 \mu\text{g/mL}$). The results reveal that all examined duckweed varieties exhibit potential for diabetes management, and the 60% ethanol extract of SP has shown promise for obesity management, indicating their possible therapeutic applications. Exploring duckweed's bioactive compounds offers a promising approach to tackling global health issues related to diabetes and obesity.

Keywords: Anti-diabetic, Anti-obesity, Duckweeds, Traditional medicine, α -amylase Inhibition, Pancreatic Lipase Inhibition