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**THE EFFECTS OF DEBARKING AND SEASONAL VARIATIONS
ON PHYSICAL STRUCTURE; PHENOLIC CONTENT AND
BIOLOGICAL ACTIVITIES OF *SCLEROCARYA BIRREA* IN THE
NYLSVLEY NATURE RESERVE**

BY

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Abstract

Tree barks are widely used for medicinal purposes in village communities and therefore, the use of barks is fundamental to the traditional health care in South Africa. The study aims to evaluate the effects of debarking and seasonal variations on physical structure, phenolic content and biological activities of *Sclerocarya birrea* collected at different seasons. It was conducted at the Nylsvley Nature Reserve in Limpopo Province, South Africa. The methanol extracts were used to determine the total phenolic content using folin – ciocalteu method while total flavonoids content was determined using aluminum chloride method. The DPPH (2, 2 – diphenyl – 1 – picrylhydrazyl) free radical scavenging and reducing power assays were used to evaluate the antioxidant activities of the extracts. Four different bacterial strains were used to determine antibacterial activity using broth dilution method. The data were analyzed using SPSS for statistically difference. The created scars were observed visually and several changes including dryness of the vascular cambium and callus formation as a result of debarking. Summer season showed the highest total polyphenol, total phenolic content (2.18) expressed in milligram Gallic Acid Equivalent (mg GAE)/ gram of the extract and total flavonoids content (0.39) expressed in milligram Quercetin Equivalent (mg QE)/ gram of extract. Debarking increased polyphenol content in winter compared to summer. The DPPH free radical scavenging activity was highest in spring with an IC₅₀ value of 22.55 µg/ml and the highest reducing power activity was in summer (80.18 µg/ml). The antioxidant activity of extracts with high DPPH free radical scavenging activity and reducing power activity were reduced by debarking. Autumn extracts were potent in inhibiting the growth of bacteria strains. Meanwhile debarking increased the antimicrobial activity of summer extracts. This study has shown that seasonal variations and debarking affect the concentration of the phytochemicals in *Sclerocarya*

birrea stem bark. The more the scars increases in one individual the stress become severe and such affect the plant ability to produce polyphenol compounds.

Key words: Flavonoids; antioxidant activity; antibacterial activity; stress; scar; bark.