

Phytochemical Analysis, Isolated Ergosta-5,7,22-triene-3?,14?-diol (22Z) and Antimicrobial Activity of Kenyan *Ganoderma lucidum*

Abstract.

Aims: To screen the Kenyan *Ganoderma lucidum* for phytochemicals, determine the chemical composition and antimicrobial activity.

Study Design: Hexane, ethyl acetate and methanol extraction; phytochemical study and anti-microbial activities were analysed on Kenyan *G. lucidum* mushroom. Structural determination of the isolated compound was done using spectral evidences and in comparison with literature. The antibacterial properties of the compound was done using disc diffusion method.

Place and Duration of Study: Department of Pure and Applied Chemistry, Masinde Muliro University of Science and Technology, between January and November, 2019.

Methodology: Sequential extraction of dried samples of Kenyan *G. lucidum* were done using solvents hexane, ethyl acetate and methanol. Separation of extracts of *Ganoderma lucidum* was done using chromatographic methods and compounds determined using spectroscopic data and in comparison with literature. The crude extracts and compound were assayed against *Escherichia coli*, *Klebsiella pneumoniae*, Methicillin-Resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa*, and *Cryptococcus neoformans* using agar well diffusion method. The compound was assayed against *Escherichia coli*, *Klebsiella pneumoniae*, Methicillin-Resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa* and *Streptococcus pyogenes*. Standard antibiotic namely; ampicillin was used as the control. Disc diffusion method was used and zones of inhibition, after respective incubation periods, were used to quantify antibacterial activity.

Results: The following group of compounds were present in the mushroom; terpenoids, carbohydrates, phenolic compounds, glycosides and polyoses. Hexane and methanol extracts showed significant activity at ($p= 0.022$) against MRSA while ethyl acetate extract was active against *Streptococcus pyogenes* ($p=0.05$). From hexane extract of *Ganoderma lucidum*, Ergosta-5, 7, 22-triene-3?, 14? – diol (22Z) was isolated. Ethylacetate and methanol extracts produced a mixture of complex compounds. Ergosta-5,7,22-triene-3?,14?-diol (22Z) exhibited significant activity against Methicillin-Resistance *Staphylococcus aureus* (MRSA) ($p=0.022$) and *Streptococcus pyogenes* ($p = 0.05$). The most sensitive microbe was *Streptococcus pyogenes*.

Conclusion: Kenyan *Ganoderma lucidum* contains terpenoids, carbohydrates, phenolic compounds, glycosides, flavonoids and phytosterols. Crude extracts (hexane, ethyl acetate and methanol) were active against MRSA and *Streptococcus pyogenes*. One major compound, Ergosta-5, 7, 22-triene-3?, 14? – diol (22Z) was isolated, characterized and antibacterial activity determined.

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