

Antimicrobial, Cytotoxicity, Acute Oral Toxicity and Qualitative Phytochemical Screening of the Aqueous and Methanolic Extracts of *Physalis peruviana* L (Solanaceae)

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Pathogenic microbes are the major causes of morbidity and mortality globally, especially in children and in immunocompromised individuals. Despite the successes of antimicrobial therapy, various challenges, including antimicrobial resistance, therapeutic failure, deleterious side effects, high costs, and inaccessibility, hinder health and wellbeing, necessitating the need for alternative and complementary approaches. Medicinal plants have, for a long time, played an integral role in meeting the primary healthcare needs of over 80% of the global population, especially in low- and middle-income countries. However, despite the rich ethnomedical evidence of utilization there are insufficient empirical scientific data to validate and authenticate the therapeutic potential of medicinal plants. *Physalis peruviana* (Solanaceae) is used by the Agikuyu community of Kenya to treat malaria, pneumonia, typhoid, among other health conditions. Even though this plant has been used since antiquity to treat microbial-associated infections, there is no enough scientific proof of its pharmacologic efficacy against microbial infections. Moreover, the safety levels and toxicity profiles of herbal preparations of *P. Peruviana* are not adequately demystified scientifically. As a result, the current study investigated the antimicrobial, cytotoxicity, acute oral toxicity, and qualitative phytochemical composition of the aqueous and methanolic bark extracts of *P. Peruviana* and potential sources of alternative, efficacious, safe, and affordable antimicrobials. The disc diffusion and the Broth microdilution techniques were used to evaluate the antimicrobial activity of the studied plant extracts on selected microbial strains (*Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhimurium*,

and *Candida albicans*). The brine shrimp lethality test was used to determine the cytotoxicity of the studied plant extracts. At the same time, the acute oral toxicity effects were investigated as per the guidelines of the Organization for Economic Co-operation and Development (OECD) outlined in document number 425. Qualitative phytochemical screening was performed using standard procedures. The aqueous bark extract of *P. Peruviana* exhibited slight antimicrobial activity against *S. Typhimurium* and *E. coli*, slight to moderate activity against *S. Aureus*, and moderate to high activity against *C. Albicans*, in a concentration-dependent manner. Besides, the methanolic bark extract of *P. Peruviana* showed slight antimicrobial activity against *S. Typhimurium* and slight to moderate activities against *E. coli*, *S. Aureus*, and *C. Albicans* microbial strains. Moreover, both of the studied plant extracts did not show any observable signs of acute oral toxicity effects in Wistar rats, and cytotoxicity in brine shrimp Nauplii. The studied plant extracts showed the presence of antimicrobial-associated phytochemicals. Further studies to establish specific mode(s) through which the studied plant extracts exert their antimicrobial activity should be done. Moreover, the antimicrobial effects of the studied plant extracts on other microbial strains of clinical significance should be evaluated. Additionally, extensive safety and toxicity evaluation of the studied plant extracts should be undertaken. Quantitative phytochemical evaluation, isolation, characterization and development of antimicrobial compounds from the studied plant extracts should also be done in future studies.