

Developing a Sulfur-based Antifungal Solution for Dermatophytosis and Assessment of its Antifungal Activity *in-vitro* against *Microsporum canis* – A Pilot Study from Sri Lanka

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Abstract

Dermatophytosis is a skin condition affecting the cosmetic appearance and the quality of life of people. This is caused by many species of dermatophytes, among them is *Microsporum canis*, a fungus in canine and feline skin. Thus, treating infected animals minimizes the risk of zoonotic infection. However, topical solutions to treat affected canines are scarce in the local market. Thus, this study was executed aiming to develop an antifungal solution containing sulphur against *Microsporum canis*. Using calcium oxide, sulfur and distilled water a calcium polysulfide solution was prepared using a modified protocol. The presence of calcium was confirmed by simple flame test and sulfide ions by adding 10% cadmium chloride solution. Sulfide ion concentration was determined by modified titrimetric and novel spectrophotometric methods. The antifungal activity was assessed by an *in-vitro* antifungal assay using Diameter of the Zone of Inhibition (DIZ) of disc diffusion method and Percentage Inhibition of Diameter Growth (PIDG). The solution was reddish brown colour and had a characteristic odour of rotten eggs. It produced an orange-color flame and a yellow-color precipitate indicating the presence of calcium and sulfide ions. Titrimetric and novel spectrophotometric studies revealed that the formula was $\text{CaS}_{5.5}$. The solution exhibited significantly higher antifungal activity against *Microsporum canis* compared to the positive control ($p < 0.05$). The lowest concentration had 117.5% PIDG and the highest had 168.5% PIDG. This preliminary evidence showed that $\text{CaS}_{5.5}$ is a suitable formula to develop an efficacious, safe and a cheap topical antifungal solution to treat canines affected with dermatophytosis.

Keywords: *Dermatophytes, Lime-sulphur, Ring worm, Sri Lanka*