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Preliminary studies of antibacterial and antifungal properties of typical Sri Lankan curry powder

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Curry powder is a mixture of ground spices that are typically used to enhance flavour, aroma, colour, and consistency in curries. The common Sri Lankan curry powder consists of coriander seeds (*Coriandrum sativum L.*), cumin seeds (*Cuminum cyminum*), fennel seeds (*Foeniculum vulgare Mill.*), cinnamon sticks (*Cinnamomum zeylanicum*) and curry leaves (*Murraya koenigii*) as main five ingredients. Mostly, these ingredients are used according to a suitable ratio (coriander: cumin: fennel: cinnamon: curry leaves, 16: 8: 4: 2: 1, respectively) in the mixture. This study evaluates antibacterial activity of common Sri Lankan curry powder against *Escherichia coli***,** *Staphylococcus aureus*, and *Klebsiella pneumoniae* and antifungal activity of common Sri Lankan curry powder against *Candida albicans* and *Aspergillus welwitschiae*. The agar disk diffusion method was used to determine the antibacterial effect of curry powder and each of the spices in curry powder individually on microbial growth of *S. aureus, E. coli,* and *K. pneumoniae* bacterial strains. Aqueous extracts of the spices were used for the study. Similarly, the agar disk diffusion method was done for both *C. albicans* and *A. welwitschiae* and the spore germination inhibition analysis was done for *A. welwitschiae* to determine the antifungal activity. Bacterial strains with different OD_{600} values (*E. coli, S. aureus, K. pneumoniae,* and *C. albicans,* with OD_{600} values of 0.3, 0.4, 0.2, and 0.4, respectively) were used in the agar disk diffusion method. Distilled water was used as the negative control for both bacterial and fungal strains. Amoxicillin was used as the positive control for all bacterial strains and carbendazim was used as the positive control for fungal strains. The spore suspension of *A. welwitschiae* was used for spore germination inhibition analysis. *A. welwitschiae* growth was observed through phase contrast microscope with distilled water as the negative control and curry powder mixture as the test sample. It was observed that coriander showed antibacterial activity against *E. coli* (0.7 0 cm) and *K. pneumoniae* (0.7 0 cm). Cinnamon showed antibacterial activity against *E. coli* (0.8 0.1 cm) and *K. pneumoniae* (0.7 0 cm). Curry leaves showed antibacterial activity against *E. coli* (0.7 0.1 cm) and *S. aureus* (0.7 0 cm). Cumin showed antibacterial activity against *K. pneumoniae* (0.7 0 cm). Fennel did not show antibacterial activity for any test strains studied. The curry powder mixture showed antibacterial activity against *E. coli* (0.7 0.1 cm) and *K. pneumoniae* (0.7 0.1 cm). Cinnamon (0.7 0.1 cm), curry leaves (0.8 0.1 cm), and curry powder mixture (0.7 0.1 cm) showed antifungal activity against *C. albicans*. There was no antifungal activity against *A. welwitschiae* in both the agar disk diffusion and slide culture method by curry powder mixture. Cinnamon was found to be the most effective spice against tested microorganisms. The weakest antimicrobial activity was displayed by the fennel. From the results obtained in this study, it could be concluded that even though laboratory-prepared, unroasted curry powder mixture has antibacterial and antifungal activity, it is less effective than its individual unroasted ingredients, which gave better inhibition results.

Keywords: Agar disk diffusion, Antibacterial activity, Antifungal activity, Spore germination inhibition