Not Just for Cooking: Effects of Turmeric and Neem on Chlamydia in a Cell Culture Model

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Chlamydia trachomatis is the most common sexually transmitted bacterial infection in the United States. It is frequently asymptomatic, yet can result in severe reproductive complications. While antibiotics are effective, concerns regarding antimicrobial resistance and accessibility highlight the need for alternative or complementary methods. This study evaluates the effects of neem (Azadirachta indica) and turmeric (Curcuma longa) extracts on chlamydial infection using Chlamydia muridarum as a model organism. McCoy cells were cultured to 70-80% confluence and pretreated for 48 hours with neem or turmeric extracts prepared in methanol or ethanol at concentrations ranging from 10 to 200 µg/mL. Solvent-only controls were included. Following pretreatment, cells were infected with C. muridarum at a multiplicity of infection of 5:1 and incubated for 24 hours. Chlamydial infection burden was assessed by immunofluorescent staining using a fluorescein-conjugated anti-Chlamydia antibody, and inclusion counts were quantified by fluorescence microscopy. Statistical significance was determined using one-way ANOVA with $p < 0.05$. Ethanolic neem extract significantly reduced chlamydial infectivity at concentrations of 50 µg/mL and 100 µg/mL. Methanolic neem extract produced the lowest inclusion-forming units at 50 µg/mL within its treatment group. However, methanolic turmeric extract exhibits the greatest reduction in chlamydial burden at 10 µg/mL, indicating increased efficacy at lower concentrations. These results demonstrate that neem and turmeric extracts possess anti-chlamydial activity in vitro. Identifying the bioactive compounds responsible for this effect may contribute to the development of alternative non-antibiotic and accessible approaches for chlamydial infections.

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