

CINNAMALDEHYDE DECREASES INTESTINAL COLONIZATION OF ANIMALS INFECTED BY PATHOGENIC *Escherichia coli*

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Escherichia coli is responsible for numerous cases of diarrhea around the world, and several studies have shown the benefits of essential oils, such as Cinnamaldehyde, in the treatment of bacterial disease. Therefore, the objective of this study was to evaluate the effects of Cinnamaldehyde in mice colonized by pathogenic *E. coli*, as well as to provide more insights into its antimicrobial action mechanism. After determination of minimum inhibitory (MIC) and minimum bactericidal (MBC) concentrations, the interference of Cinnamaldehyde in macromolecular pathways (synthesis of DNA, RNA, protein and cell wall) were measured by incorporation of radioisotopes. Following, the anti-adhesive properties of Cinnamaldehyde towards *E. coli* 042 were evaluated using HEp-2 cells. The toxicity of Cinnamaldehyde was also analyzed on *Tenebrio molitor* larvae. Subsequently, Swiss mice were treated with *ad libitum* water containing streptomycin (5 mg/mL). *E. coli* 042 suspension (200 µL; 5x10³ CFU/mL) were orally administered, and the colonization was confirmed by PCR. The animals were daily treated with 200 µL of Cinnamaldehyde (0.8, 3.0 and 6.0 mg/mL) via gavage. Fresh feces of each animal were collected daily for 15 days, serially diluted and plated on MacConkey agar supplemented with streptomycin (100 µg/mL) for CFU count. Cinnamaldehyde showed MIC and MBC values of 0.8 mg/mL and 1.6 mg/mL, respectively. It was able to affect all synthetic pathways evaluated. However, it did not induce the expression of genes related to SOS pathway (*sulA* and *dinB1*), suggesting that cinnamaldehyde impairs the membrane/cell wall structure leading bacteria to total collapse. Cinnamaldehyde reduced the adhesion of *E. coli* 042 on HEp-2 cells. Furthermore, cinnamaldehyde-treated animals exhibited lower levels of colonization by *E. coli* 042 than untreated group. Therefore, the results show that cinnamaldehyde is effective in treating the pathogenic *E. coli* strain 042 and confirm it's as a promising lead molecule for the development of new drugs.

Keywords: mechanism of action; intestinal colonization; Natural products; Diarrhea.

Dvelopment Agency: Fundação de Amparo á Pesquisa e Desenvolvimento Científico e Tecnológico do Maranhão