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Antimicrobial activities of glycyrrhizic acid and glycyrrhetinic acid *in vitro*

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Because of antibiotic side effects and the development of antibiotic resistant pathogens, much attention has been paid on isolating active compounds from herbal plants. Glycyrrhizic acid and glycyrrhetinic acid are purified from the roots of Glycyrrhiza, an ancient medicinal herb. Glycyrrhetinic acid is the aglycone form of glycyrrhizic acid. Both of them have been reported to have antiallergic, antiviral, and anti-inflammatory activities. Two antimicrobial assays, the minimum inhibitory concentration (MIC) assay and the minimum bactericidal concentration (MBC) assay, were applied in this study to investigate their antimicrobial activities. Six pathogens were tested, including *Streptococcus agalactiae, Staphylococcus aureus, Bacillus cereus, Escherichia coli, Salmonella enterica* serovar Typhimurium, and *Helicobacter pylori*. Our results showed that glycyrrhizic acid exhibited a bactericidal activity against Gram-positive bacteria (*Streptococcus agalactiae, Staphylococcus aureus*, and *B. cereus*). However, it didn't inhibit Gram-negative bacteria growth (*E. coli* and *S.* Typhimurium), except for *H. pylori***.** In addition, the growth of *B. cereus* and *H. pylori* were suppressed by glycyrrhetinic acid significantly. Further investigation will be held on studying how glycyrrhizic acid and glycyrrhetinic acid modulate inflammatory responses caused by pathogens using macrophage infection model. The aim of our study is to exam the effects of glycyrrhizic acid and glycyrrhetinic acid on anti-infection and evaluating their potential as an alternative therapeutic agent.

Keywords: glycyrrhizic acid, glycyrrhetinic acid, macrophage