

Considering the Antimicrobial Effects of Aquatic-Alcoholic *Calendula Officinalis* Extract Against *Salmonella Typhymurium*, *Staphylococcus Aureus* and *Klebsiella Pneumoniae* Invitro

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Background & Objectives: As cause of rapid extent of drugs resistance and side effect of drug uses, need to new antimicrobial agents that has no deficiency of previous drugs, therefore there is an increased tendency for use of therapeutic herbs recently. The aim of this study was to determine antimicrobial effects of aquatic-alcoholic *Calendula officinalis* extract against *Salmonella typhymurium*, *Staphylococcus aureus* and *Klebsiella pneumoniae* invitro.

Methods: This study was performed on 3 standard strains of *Salmonella typhymurium* (ATCC14028), *Staphylococcus aureus* (ATCC25923) and *Klebsiella pneumoniae* (ATCC700721) and 3 clinical isolates from each strains that obtained from nosocomial infections. In this experiment, cold maceration methods by ethanol and water was use for extraction of *Calendula officinalis* flowers. Then we used of serial dilution in tube methods in Mueller Hinton broth for evaluation (MIC) of the extracts. Then we used of Mueller Hinton agar for evaluation (MBC) of the extracts and in both of (MIC & MBC tests) positive and negative control, were used.

Results: In this study we observed MIC of watery and ethanolic extracts of *Calendula officinalis*: *Salmonella typhymurium*: 31µg/ml and 125µg/ml, *Staphylococcus aureus*: 8/7 µg/ml and 5/62 µg/ml, *Klebsiella pneumoniae*: 5/62 µg/ml and 125µg/ml, and results of MBC of watery and ethanolic extracts of *Calendula officinalis*: *Salmonella typhymurium*: 31µg/ml and 250µg/ml, *Staphylococcus aureus*: 31 µg/ml and 125 µg/ml, *Klebsiella pneumoniae*: 5/62 µg/ml and 250µg/ml, and results of MBC of watery and ethanolic extracts of *Calendula officinalis*.

Conclusion: We observed the best antibacterial effects about watery extract of *Calendula officinalis*. Also Ethanolic extract of *Calendula officinalis*, has more antibacterial effect on *Staphylococcus aureus* it seems this extract Can be use as antibacterial agents against in the developmet of new drugs for the treatment of infection disease.

Keywords: Antibacterial; *Calendula officinalis*; *Salmonella Typhymurium*; *Staphylococcus Aureus*; *Klebsiella Pneumoniae*