

Original Paper

## Antimicrobial effect of aqueous extract of orange peel and its effect on the shelf-life of flavored milk

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### Abstract

**Background and Objective:** The adoption of methods for increasing the shelf life of dairy products by using natural preservatives is necessary. This study was done to determine the antimicrobial activity of aqueous extract of orange peel and its effect on the shelf life of flavored milks.

**Methods:** In this descriptive –analytical study the antimicrobial activity of aqueous extract of orange peel was investigated by using disk diffusion method and minimum inhibitory concentration (MIC) by successive dilution of culture broth and then its impact on the shelf life of milk.

**Results:** In disk diffusion method and MIC the antimicrobial effect of aqueous extract of orange peel was more effective against *Staphylococcus aureus* and *Candida albicans* and less effective on *Escherichia coli*. The growth diameter of disk diffusion method in aqueous extract of orange peel was 7.11, 29.06 and 50 mm for *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*, respectively. The inhibitory concentration in the aqueous extract of orange peel was 15, 2 and 2 mg/ml, respectively. Also 0.17 g/ml of aqueous extract of orange peel in milk reduced the growth of microorganisms at the time of 6, 12, 24, 48 and 72 hours. Temperature affected the growth of *Candida albicans* in the milk, so that the growth of microorganisms reduced with decreasing temperature ( $P<0.05$ ). The growth inhibitory activity of the aqueous extract of orange peel on *Staphylococcus aureus* was significantly more than on *Escherichia coli* ( $P<0.05$ ).

**Conclusion:** This study showed that the antimicrobial activity of aqueous extract of orange peel on *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans* in vitro and in the milk.

**Keywords:** Aqueous extract of orange peel, *Staphylococcus aureus*, *Escherichia coli*, *Candida albicans*, Milk

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