

ANTIMICROBIAL EFFECT OF POMEGRANATE PEEL AND CHAMOMILE EXTRACTS

Manuel A. De La Fuente-Alvarado¹, Saúl Ruíz-Cruz, Norma P. Silva-Beltrán, Marco A. López-Mata.

¹ Departamento de Biotecnología y Ciencias Alimentarias. Instituto Tecnológico de Sonora, 5 de Febrero 818 Sur, CP 85000, Cd. Obregón, Sonora, México, Correo: manuel.delafuente@itson.edu.mx

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Introduction. Pomegranate fruit contain a large quantity of bio-active compounds, originating in the peel and entire fruit. The pomegranate peel is rich in polyphenols, such as ellagitannins, gallotannins, ellagic and ferulic acid, catechings, anthocyanins and quercetin (1). These polyphenols are responsible for the biological activities such as the elimination of free radicals, inhibit oxidation and microbial growth, and reduce the risk of cardiovascular disease and cancer (2). Chamomile or Matricaria, is an aromatic plant used in herbal medicine as a component of tea and other foods (3). Aromatic plants are a powerful resource, because they have a lot of compounds like terpenoids, flavonoids and phenols. Chamomile is one of the most historical aromatic plants worldwide (4).

The objective of this study was to evaluate the antimicrobial activity of pomegranate peel and chamomile hydroalcoholic extracts on *E. coli* O157:H7, *Staphylococcus aureus* and *Salmonella choleraesuis*.

Methods. Five gram portions of finely powdered peels were separately blended with solvents having an increasing polarity; the mixtures were left in the dark, at room temperatures for 1 h prior to filtration (Whatman no. 1) and centrifugation at 9000 rpm for 15 minutes at 4°C. The clear extracts were concentrated under reduced pressure at 37°C. Dried extracts were dissolved in DMSO. The agar well-difussion method was conducted to evaluate the inhibitory spectrum of extracts against test microorganisms. Minimum inhibitory concentrations (MICs) were measured by the methods described by Vonn et al (2011) (3). *Escherichia coli* O157:H7 (ATCC 4390), *Salmonella* (ATCC 4028) and *Staphylococcus aureus* (ATCC 65384) were tested.

Results. The antimicrobial activity of extracts obtained from pomegranate peel and chamomile are shown in Figure 1 and Table 1. The MIC_s values for pomegranate peel extracts on *E. coli* O157:H7, *S. aureus* and *Salmonella* were of 19.2, 4.8 and 8.6 mg/mL, respectively. The values for chamomile extracts were 9.37, 2.34 and 4.68 mg/mL, respectively. The extract inhibited the growth of the microorganisms studied giving four values of 17 to 22 mm zone of inhibition for the bacteria tested. Hydroalcoholic extracts obtained from pomegranate peel and chamomile extract showed the higher antimicrobial activity, with the better ethanolic extract. It has been reported that the antimicrobial activities has a strong relation with the total phenol contents in the fruit extracts (5, 3).

Table. 1 Antimicrobial activities expressed as inhibition zone diameter (mm)

Sample	Microorganism	Inhibition zone (mm)±SD
Chamomile	<i>Salmonella choleraesuis</i>	20.6±0.7
	<i>E. coli</i> O157:H7	21±0.7
	<i>Staphylococcus aureus</i>	17.2±0.6
Pomegranate	<i>Salmonella choleraesuis</i>	22±1.7
	<i>E. coli</i> O157:H7	20.3±0.5
	<i>Staphylococcus aureus</i>	22.3±0.9

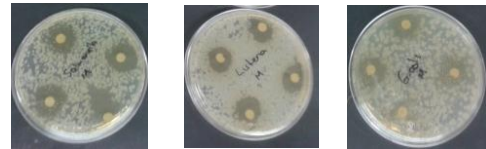


Fig.1 Antimicrobial activity of pomegranate peel and chamomile hydroalcoholic extracts on the bacteria tested

Conclusions. In this study hydroalcoholic extracts obtained from pomegranate peel and chamomile extract showed antimicrobial activity, which tells us that the extract may function as an antimicrobial agent in edible coatings.

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