

Antibacterial and antioxidant activities of phenolic compounds extracted from autumn fruits by-products

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Introduction

In the last few decades there has been a dramatic increase in antibiotic resistant bacteria, particularly methicillin-resistant *Staphylococcus aureus* (MRSA), that not respond to conventional treatments. In this study, the antioxidant and antibacterial activities of phenolic compounds extracted from by-products resulting from the autumn fruit industry were evaluated.





Material and Methods

Extraction of phenolic compounds from pomegranate, quince, loquat and persimmon industry by-products was performed using a mixture of ethanol/water (80:20). Antimicrobial susceptibility was tested against 10 MRSA strains: 5 MRSA isolated from human diabetic foot ulcers, 3 from healthy wild hares and 2 from consumption rabbits. Minimum inhibitory concentrations were determined by disc diffusion method using different concentrations of extracts (100, 75, 50, 25 and 10 mg/mL). Antioxidant activity was performed using the DPPH, CUPRAC and FRAP methods. Each determination was performed in triplicate.

Results

Most of the extracts had an inhibitory effect on the growth of MRSA strains from all origins except for quince seed and peel extracts and pomegranate seed extracts. Pomegranate peel extracts had the highest inhibitory effect on all MRSA strains presenting halos with diameter around 18mm followed by persimmon calyx extracts (Table 1). Regarding the antioxidant activity, the extracts with the highest antioxidant power were pomegranate leaf extract, followed by persimmon calyx extracts, quince leaf and loquat flower.

Table 1. Inhibition zones (mm) of autumn fruits by-products against 10 multidrug resistant MRSA strains.

Fruit	Fruit component	Inhibition zone (mm)									
		strain 1	strain 2	strain 3	strain 4	strain 5	strain 6	strain 7	strain 8	strain 9	strain 10
	leaf	12	17	12	13	15	17	12	15	14	12
	peel	18	17	17	18	19	15	20	19	19	17
	seed	7	0	0	0	0	0	0	0	0	0
	leaf	10	12	10	10	9	14	13	12	14	10
	peel	0	8	0	0	0	10	11	9	0	0
	seed	0	0	0	0	0	0	0	0	0	0
	calyx	12	16	11	15	17	17	16	16	14	12
	leaf	10	14	10	11	12	16	15	12	16	11
	peel	0	8	7	0	0	10	10	9	0	0
	seed	10	15	10	10	10	-	-	-	-	-
	Leaf	10	11	11	12	9	13	14	14	13	10
	flower	8	11	9	9	11	12	11	11	10	10

Conclusions

Extracts from by-products of several autumn fruits revealed a high antibacterial and antioxidant activities. These compounds may be used as antibiotic substitutes or adjuvants to combat antibiotic resistant bacteria or in food industry as food preservers.

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