Antimicrobial potential of polyphenols extracted from almond skins.

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Abstract:
Aims: To evaluate the antimicrobial properties of flavonoid-rich fractions derived from natural and blanched almond skins, the latter being a by-product from the almond processing industry. Methods and Results: Almond skin extracts were tested against Gram-negative bacteria (*Escherichia coli, Pseudomonas aeruginosa, Salmonella enterica, Serratia marcescens*), Gram-positive bacteria (*Listeria monocytogenes, Enterococcus hirae, Staphylococcus aureus, Enterococcus durans*) and the yeast *Candida albicans*. Almond skin fractions were found to have antimicrobial activity against *L. monocytogenes* and *Staph. aureus* in the range 250–500 lg ml)1, natural skins showing antimicrobial potential against the Gram-negative *Salm. enterica*. The interactions between three almond skin flavonoids were also evaluated with isobolograms. Conclusions: Pairwise combinations of protocatechuic acid, naringenin and epicatechin showed both synergistic and indifferent interactions against *Salm. enterica* and *Staph. aureus*. Antagonism was observed against *L. monocytogenes* with all combinations tested. Further studies need to be performed to understand the mechanisms responsible for these interactions. Significance and Impact of the Study: Almond skins are a potential source of natural antimicrobials.