

Antimicrobial Functions of Some Spice Extracts Such as Sumac, Cumin, Black Pepper and Red Pepper on the Growth of Common Food-Borne Pathogens and Their Biogenic Amine Formation

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Abstract : The impact of diethyl ether extract of spices (sumac, cumin, black pepper and red pepper) on growth of *Staphylococcus aureus*, *Salmonella Paratyphi A*, *Klebsiella pneumoniae*, *Enterococcus faecalis*, *Campylobacter jejuni*, *Aeromonas hydrophila*, *Pseudomonas aeruginosa* and *Yersinia enterocolitica* and their biogenic amine production were investigated in tyrosine decarboxylase broth. Sumac extract generally had the highest activity to inhibit bacterial growth compared to other extracts, although antimicrobial effect of extracts used varied depending on bacterial strains. Sumac extract resulted in 3.34 and 2.54 log reduction for *Y. enterocolitica* and *Camp. jejuni* growth, whilst red pepper extract induced 0.65, 0.41 and 0.34 log reduction for growth of *Y. enterocolitica*, *S. Paratyphi A* and *Staph. aureus*, respectively. Spice extracts significantly inhibited ammonia production by bacteria ($P < 0.05$). Eleven and nine fold reduction on ammonia production by *S. Paratyphi A* and *Staph. aureus* were observed in the presence of sumac extract. Dopamine, agmatine, tyramine, serotonin and TMA were main amines produced by bacteria. Tyramine production by food-borne-pathogens was more than 10 mg/L, whereas histamine accumulated below 52 mg/L. The effect of spice extracts on biogenic amine production varied depending on amino acid decarboxylase broth, spice type, bacterial strains and specific amine, although cumin extract generally increased biogenic amine production by bacteria.

Keywords : antimicrobials, biogenic amines, food-borne pathogens, spice extracts

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