Antimicrobial Properties and Phenolic Compounds in Commercially Grown Native Australian Herbs

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Introduction

Although a number of Native Australian herbs have been commercialized, information on their antimicrobial properties is limited. In this study inhibitory activities of polyphenol-rich fractions from three native herbs: Tasmannia pepper leaf (Tasmania lanceolata), anise myrtle (Syzygium anisatum) and lemon myrtle (Leptospermum citratus) (figure 1) against selected food spoilage/pathogenic organisms were evaluated.

Method

Antimicrobial activity of extracts was measured using a microtitre plate assay and the inhibition (%) determined at concentrations ranging from 0.25 – 0.75 μg/ml. The fractions were re-dissolved in sterile water and diluted before testing against the following food spoilage and pathogenic organisms: Escherichia coli, Staphylococcus aureus, Listeria monocytogenes, Shewanella putrefaciens, Acinetobacter baumannii, Enterobacter aerogenes, Pseudomonas aeruginosa, Proteus vulgaris and Geotrichum candidum.

Figure 1: Fresh leaves of the three native Australian herbs under study, [A] Tasmannia pepper leaves, [B] Anise Myrtle and [C] Lemon Myrtle.

Conclusions

- Anise myrtle and lemon myrtle fractions, evaluated at a concentration of 0.75 μg/ml, exhibited the highest growth inhibition of the tested microorganisms (26-100%) and were followed by Tasmannia pepper leaf and Bay leaf extracts (5 - 52% and 3 - 58%, respectively) (figure 3).
- The high levels of ellagic acid, ellagic acid derivatives and quercetin in anise and lemon myrtle and the chlorogenic acid, quercetin and quercetin 3-rutinoside in Tasmannia pepper leaf could be the sources of antimicrobial activities.
- Native Australian herbs are a potential source of natural antimicrobials and further research is needed to determine their application in food.