

# Antimicrobial Properties and Phenolic Compounds in Commercially Grown Native Australian Herbs

Y. SULTANBAWA<sup>1</sup>, M. CHALIHA<sup>2</sup>, A. CUSACK<sup>2</sup>, M. CURRIE<sup>2</sup>, I. KONCZAK<sup>3</sup>

<sup>1</sup>Centre for Nutrition and Food Science, Queensland Alliance for Agriculture and Food Innovation, University of Queensland, Australia

<sup>2</sup>Innovative Food Solutions & Technologies, Department of Agriculture, Fisheries and Forestry, Queensland, Australia

<sup>3</sup>CSIRO Animal, Food & Health Sciences, North Ryde, New South Wales, Australia

## 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: Tasmania pepper leaf (*Tasmannia lanceolata*), anise myrtle (*Syzygium anisatum*) and lemon myrtle (*Backhousia citriodora*) (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] Tasmania pepper leaves, [B] Anise Myrtle and [C] Lemon Myrtle

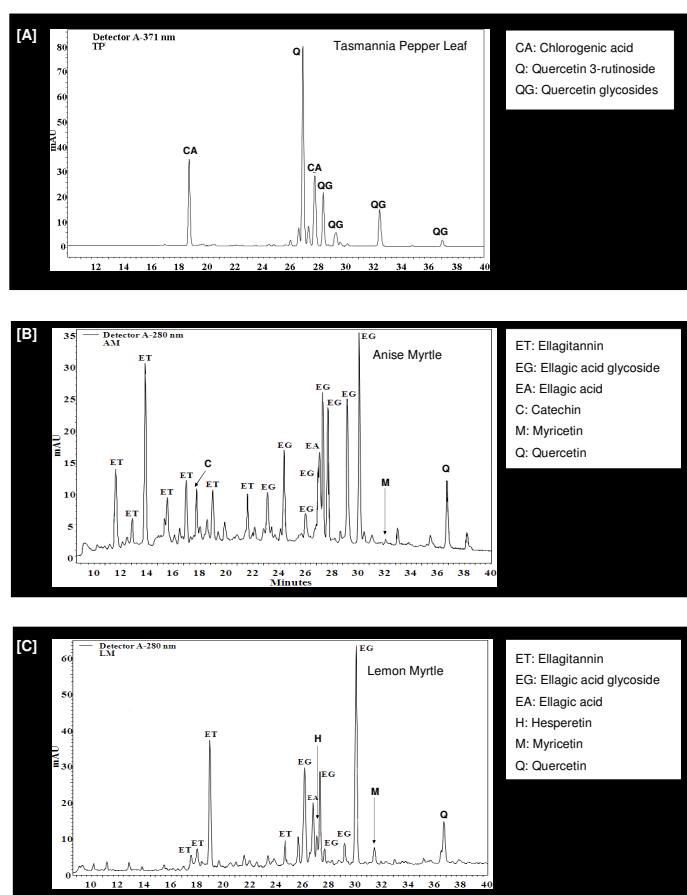


Figure 2: High performance liquid chromatography of polyphenolic-rich fractions obtained from: [A] - Tasmania pepper leaf (TP), [B] -Anise Myrtle and [C] - Lemon Myrtle. Major polyphenols detected are shown in the chromatograms and their names are expanded in the right hand side panel.

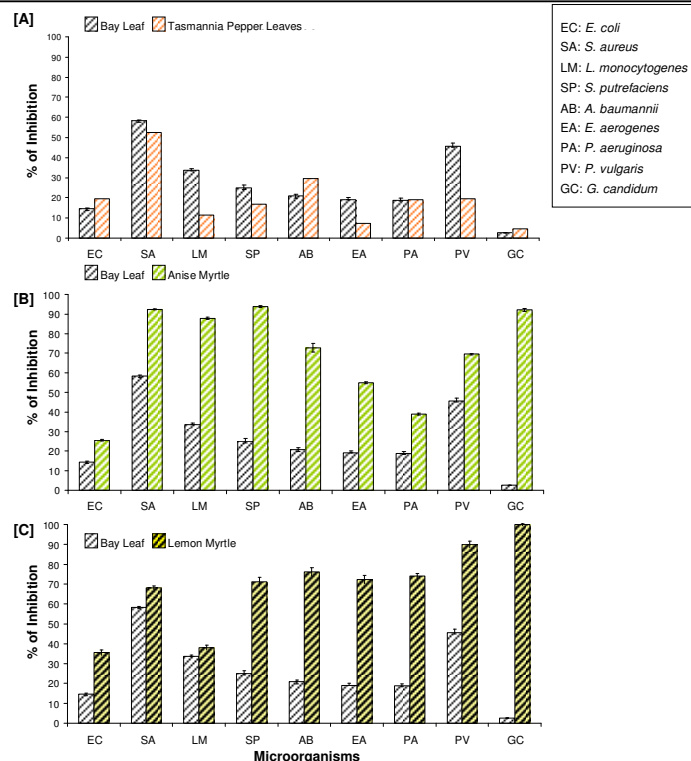


Figure 3: Antimicrobial activity of 0.75 µg/ml polyphenol rich fractions of Australian native herbs [A] Tasmania Pepper leaves, [B] Anise Myrtle and [C] Lemon Myrtle against a range of spoilage and pathogenic organisms. Polyphenol-rich fraction of Bay leaf was used as a reference sample. The data represent an average value of 6 replicates.

## 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 Tasmania 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 Tasmania 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.