



**Australian Government**  
**Rural Industries Research and  
Development Corporation**

# **Pilot study of tea tree oil in the decolonisation of MRSA positive wounds**

by CF Carson<sup>1</sup>, M Edmondson<sup>2</sup>, K Carville<sup>2,3</sup>, N Newall<sup>2,3</sup>, J Smith<sup>2</sup> & TV Riley<sup>1,4</sup>

<sup>1</sup>Discipline of Microbiology & Immunology, School of Biomedical, Biomolecular & Chemical Sciences,  
The University of Western Australia, 35 Stirling Hwy, Crawley WA 6009

<sup>2</sup>Silver Chain Nursing Association, Silver Chain House,  
6 Sundercombe Street, Osborne Park WA 6017

<sup>3</sup> School of Nursing and Midwifery, Curtin University of Technology, Kent St, Bentley WA 6102

<sup>4</sup>PathWest Laboratory Medicine WA, Queen Elizabeth II Medical Centre, Hospital Ave, Nedlands WA  
6009

August 2008

RIRDC Project No UWA-93A

© 2008 Rural Industries Research and Development Corporation.  
All rights reserved.

ISSN 1440-6845

*Pilot study of tea tree oil in the decolonisation of MRSA positive wounds*  
Project No. UWA-93A

The information contained in this publication is intended for general use to assist public knowledge and discussion and to help improve the development of sustainable regions. You must not rely on any information contained in this publication without taking specialist advice relevant to your particular circumstances.

While reasonable care has been taken in preparing this publication to ensure that information is true and correct, the Commonwealth of Australia gives no assurance as to the accuracy of any information in this publication.

The Commonwealth of Australia, the Rural Industries Research and Development Corporation (RIRDC), the authors or contributors expressly disclaim, to the maximum extent permitted by law, all responsibility and liability to any person, arising directly or indirectly from any act or omission, or for any consequences of any such act or omission, made in reliance on the contents of this publication, whether or not caused by any negligence on the part of the Commonwealth of Australia, RIRDC, the authors or contributors.

The Commonwealth of Australia does not necessarily endorse the views in this publication.

This publication is copyright. Apart from any use as permitted under the *Copyright Act 1968*, all other rights are reserved. However, wide dissemination is encouraged. Requests and inquiries concerning reproduction and rights should be addressed to the RIRDC Publications Manager on phone 02 6271 4165

### **Researcher Contact Details**

Name: Dr Christine Carson  
Address: Microbiology & Immunology (M502),  
School of Biomedical, Biomolecular & Chemical  
Sciences, 35 Stirling Hwy, Crawley WA 6009

Email: ccarson@cyllene.uwa.edu.au

In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

### **RIRDC Contact Details**

Rural Industries Research and Development Corporation  
Level 2, 15 National Circuit  
BARTON ACT 2600

PO Box 4776  
KINGSTON ACT 2604

Phone: 02 6271 4100  
Fax: 02 6271 4199  
Email: rirdc@rirdc.gov.au.  
Web: <http://www.rirdc.gov.au>

# Foreword

Tea tree oil, the essential oil of the native Australian plant *Melaleuca alternifolia*, is widely promoted for a variety of properties including its benefits as a wound care agent. In this context its wound healing and antimicrobial properties, particularly its activity against methicillin-resistant *Staphylococcus aureus*, are frequently touted. While substantial data on the antimicrobial properties of the oil are available detailed information on the effects of tea tree oil on wounds is limited and this study was designed to provide preliminary data on two important outcomes in wound care.

The primary aim of this pilot study was to determine if tea tree oil applied at a low concentration for a brief period of time in the form of a wound irrigant could decolonise wounds colonised with methicillin-resistant *Staphylococcus aureus* (MRSA). The results show that this product when diluted in water to a concentration of 3.3% and used to briefly irrigate and cleanse wounds was unable to decolonise MRSA-positive wounds. The secondary aim of this study was to examine the influence of tea tree oil on wound healing. Tea tree oil applied as part of the wound cleansing procedure had a positive influence on wound healing with many chronic wounds beginning to heal after application of the tea tree oil product. The importance of this report is that it provides preliminary evidence that tea tree oil may promote the healing of chronic wounds. This has not previously been shown before.

As a result of the positive effects seen in this pilot study, tea tree oil producers and product manufacturers should continue to develop and promote tea tree oil products suitable for wound care. More detailed investigations of the effects of tea tree oil on wound healing should be conducted.

This project was funded from industry revenue provided by Novasel Australia Pty. Ltd which was matched by funds provided by the Australian Government through RIRDC's Tea Tree Oil R&D Program.

This report, an addition to RIRDC's diverse range of over 1800 research publications, forms part of our Tea Tree Oil R&D program which aims to support the continued development of an environmentally sustainable and profitable Australian tea tree oil industry that has established international leadership in marketing, in value-adding, and in product reliability and production. In terms of the key long term strategies for this program, this report addresses the goal of demonstrating proof of concept/efficacy for innovative applications of tea tree oil.

Most of our publications are available for viewing, downloading or purchasing online through our website:

- downloads at [www.rirdc.gov.au/fullreports/index.html](http://www.rirdc.gov.au/fullreports/index.html)
- purchases at [www.rirdc.gov.au/eshop](http://www.rirdc.gov.au/eshop)

**Peter O'Brien**  
Managing Director  
Rural Industries Research and Development Corporation

# Acknowledgments

The generous contributions of Mr Steen Boye Jorsal from Novasel Australia Pty. Ltd in the form of industry funding and the provision of product is gratefully acknowledged as are the substantial contributions of nursing and research staff at Silver Chain.

# Executive Summary

## ***What the report is about***

- This report details the results of a pilot study investigating whether tea tree oil is a useful wound treatment product. It is important because tea tree oil is used widely for this purpose despite a lack of comprehensive evidence that it is beneficial. The results of this study begin to address this knowledge void and further support the use of tea tree oil as a wound care agent. This report also helps to fine tune the study designs most likely to succeed in future work examining the use of tea tree oil in wound care products.

## ***Who is the report targeted at?***

- The report is targeted at product manufacturers who produce and market tea tree oil products, especially those interested in wound care products. It is also targeted at companies that manufacture wound care products and may be interested in developing a range of tea tree oil products. The marked positive effects on wound healing seen in this study are very promising and augur well for the further development of tea tree oil wound care products.

## ***Background***

- Tea tree oil has been promoted as a wound care product since use of the oil was first popularised in Australia in the 1920s. However, scientific data on the benefits of the oil in wound care have not been forthcoming despite its widespread use for this purpose. Several other properties of tea tree oil including its antibacterial and anti-inflammatory properties have been more-well characterised and evidence for these properties lend support to the oil's use as a wound care product.

## ***Aims/objectives***

- This pilot study aimed to determine if tea tree oil can eliminate methicillin-resistant *Staphylococcus aureus* (MRSA) from colonised wounds and to determine if tea tree oil is a beneficial treatment for wounds.

## ***Methods used***

- An uncontrolled, non-randomised, open pilot study design was used to evaluate the efficacy of tea tree oil as means of decolonising methicillin-resistant *Staphylococcus aureus* from acute and chronic wounds and to gain preliminary data on the effects of tea tree oil on wound healing. Participants with acute or chronic wounds colonised but not infected with methicillin-resistant *Staphylococcus aureus* were recruited. Tea tree oil was applied in the form of a wound irrigant during the wound cleansing steps at each dressing change. A proprietary water-miscible product containing 10% tea tree oil was diluted in sterile water for irrigation to a tea tree oil concentration of 3.3% and used for wound irrigation and cleansing. The treatment product was in contact with the wound for a minimum of 5 minutes. Wound size and MRSA status were determined at enrolment and during weeks 4 and 12.

### **Results/key findings**

- Two key findings arose from this study. Firstly, when applied during the wound cleansing step as a wound irrigant, 3.3% tea tree oil was unable to decolonise methicillin-resistant *Staphylococcus aureus* from wounds. Secondly, wounds to which this tea tree oil irrigant was applied began to heal; most wounds (8 of 11) were smaller after the tea tree oil product was used and this included chronic wounds. This is despite most participants being withdrawn from the study before completing the 12 weeks of treatment due to the commencement of antibiotics or other complications.
- An additional finding from this small study was that tea tree oil appeared safe to use and was well-tolerated on open wounds, including some large wounds. Furthermore, there were no irritant or allergic reactions to the tea tree oil product.

### **Implications for relevant stakeholders for:**

- Tea tree oil producers and tea tree oil product manufacturers and marketers can pursue further research on the use of tea tree oil products for wound care and promote another application for tea tree oil.

### **Recommendations**

- Larger, comparative, randomised, controlled clinical trials evaluating the influence of tea tree oil on the healing of chronic wounds should be conducted, preferably evaluating wound care products formulated with tea tree oil and designed to be left in situ as part of the wound dressing. This will require collaboration between tea tree oil producers, wound care product manufacturers, care agencies and researchers.