

BUSH MEDICINE FOR A GERM-KILLING, heart-saving gargle

STORY BY Rebecca Thyer

WHEN SPRING COMES to Australia's outback, so too do the red tubal flowers of the emu bush (*Eremophila longifolia*). Tolerant to the desert's harsh environmental conditions, the plant has for many thousands of years been used by Australia's Indigenous people in traditional medicines. Now, with 'bio-discovery' work showing it has promising antibacterial properties, it could one day find its way into more modern products, such as toothpaste or mouthwash.

Extracts from this native Australian plant can inhibit the growth of oral bacteria, reduce dental plaque development and stop bacteria from sticking to tooth surfaces, Swinburne University of Technology student Elisa Hayhoe has found.

Through the university's Faculty of Life and Social Sciences' Environment and Biotechnology Centre, Miss Hayhoe investigated the plant's antibacterial potential for her biotechnology honours project.

Emu bush was chosen because the *Eremophila* genus to which it belongs has been shown to work well against *Staphylococcus aureus*. More commonly known as 'golden staph', this bacterium is related to some dental bacteria.

Although oral bacteria may sound more benign than golden staph, the tooth decay and loss it causes affects quality of life and has links to chronic conditions and systemic diseases. For example, periodontal diseases, where the tissue and bone supporting the teeth erode, have recently been linked to heart disease – several species of bacteria that cause periodontitis have been found in the plaque clogging up arteries in the heart.

Oral bacteria become problematic when exposed to sugar. When this occurs they produce acid, which starts to dissolve teeth. Yet like bacteria in the gut, there are 'good' and 'bad' oral bacteria. So Miss Hayhoe set out to explore if emu bush could be used not to kill oral bacteria, but prevent these micro-organisms from producing acid.

Testing various concentrates of emu bush extract in isolation and in the presence of saliva, she found that this Australian native plant could stop the two main bacteria involved in tooth decay – *Streptococcus mutans* and *Streptococcus sobrinus* – from producing acid. It could also prevent bacteria



PHOTO: BRAD COLLIS

from sticking to teeth to create plaque and cut through existing plaque to prevent further build up. "It works as well as commercial and medicated mouthwashes at removing bacteria," she says.

Emu bush is found across inland Australia, which could explain why pharmaceutical research company Canopus BioPharma Inc. noticed it. The American company's Australian base is pretty much at 'the back of Bourke' – in the small township of Byrock, just south of Bourke, and about 700 kilometres north-west of Sydney.

Having previously worked with Swinburne's Environment and Biotechnology Centre director Associate Professor Enzo Palombo before – including on an existing project to study another natural product – the company again approached him, asking him to investigate the potential of the plant it had growing on its property.

Associate Professor Palombo says the centre has had a decade-long program investigating traditional Aboriginal medicines and the plants associated with them. "These medicines have been used for centuries, so we start out by thinking that they are most likely safe and they must have some activity against bacteria or micro-organisms."

He says Swinburne's program addresses two goals: the need to find new antibacterial

agents, given bacterial resistance to existing agents; and the desire for alternatives, or natural alternatives, to those agents.

In the fight against tooth decay, an alternative antibacterial agent could reduce existing medicines' side-effects, such as vomiting and tooth staining, and provide a cost-effective option for developing countries.

Although the World Health Organization estimates that 60 to 90 per cent of school-aged children across the globe have dental cavities, Associate Professor Palombo says emu bush could have other medical uses, such as an antimicrobial coating agent for plastics used in hospital procedures.

He says Miss Hayhoe's work, which wrapped up in June giving her some time to rest before starting her PhD, is the first step in the bio-discovery process necessary to develop new antibacterial alternatives.

For Canopus BioPharma, the work has answered its initial questions about the red-flowered plant growing on and near its facility. The company will now carry out chemical and clinical evaluations before seeking commercial partners. ■

The emu bush (*Eremophila longifolia*): this Australian native plant's antibacterial properties could one day help prevent tooth decay.



CONTACT

Swinburne University of Technology
1300 275 788
magazine@swinburne.edu.au

www.swinburne.edu.au/magazine