

Acacia pycnantha Gum Exudate Recognised as a Traditional Food in Two Countries May Have Economic Potential

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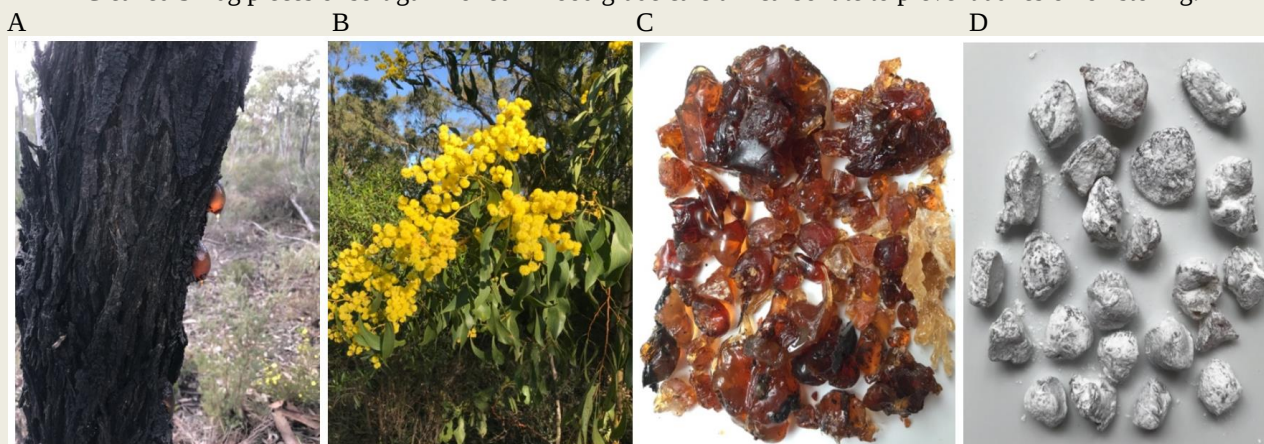
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Abstract

Original Research Article

Acacia pycnantha gum has been recognised as a traditional food in Australia and New Zealand for consumption up to 30g per day. A. Gum on a mature tree. B. In flower. C. Collected gum as 5-20g pieces. D. Cleaned 5-10g pieces of soft gum rolled in food grade calcium carbonate to prevent adhesion on storing.



Graphical abstract

Acacia pycnantha is a native tree growing in the southern regions of Australia, including South Australia. The tree trunk and branches exude gum during March - May (autumn) which can be collected by simply pulling or cutting from the tree. It was found approximately 60-70% of trees have no gum, 30-40% of trees have some gum yielding on average approximately 10-20g per tree per year and 1-2% of trees, being either mature, damaged or appearing stressed, having significantly greater amounts, yielding over 50-100g per tree per year. An application to Food Standards Australia and New Zealand resulted in a view being formed that *Acacia pycnantha* gum be recognised as a traditional food for consumption up to 30g per day in these countries. The economic potential of *Acacia pycnantha* gum as a food, food additive or for medical uses, as is being developed for gum Arabic, requires further research, including how to increase the yield of gum per tree and to create demand.

Keywords: *Acacia pycnantha*, gum, gastroesophageal reflux, GERD, golden wattle, gum Arabic, laryngopharyngeal reflux, mucosa.

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INTRODUCTION

Acacia pycnantha (AP) trees are also known as the golden wattle with the flowers being the floral emblem of Australia. *Acacia pycnantha* trees naturally produce exudative gum that can be pulled or cut from the

trunk and branches, but there is no commercial industry for the production and sale specifically for this gum.

Exudative gums from other *Acacias* like *Acacia senegal* and *Acacia seyal* or other closely related species, collectively termed gum Arabic (GA) or *Acacia* gum

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grown in Northern Africa, are sold worldwide, as part of a multimillion-dollar industry [1-4]. Gum Arabic is used mainly as a food additive with a European food safety code E414 [5]. Gum Arabic does not require a numerical acceptable daily intake limit (ADI) and is permissible for use as an additive in the United States of America up to a maximum level of 85% [5]. Gum Arabic can also be used as a binder for paints or glue for example on envelopes for sealing [6,7].

At a commercial level to increase GA production, *Acacia* trees in Northern Africa can be deliberately cut or wounded to cause more gum to exude [4,6]. An approximately 60 cm incision can be made on the tree bark in summer and dry season yielding 20g – 2kg GA per tree after 1-2 months [4]. The average yield of GA was reported to be approximately 250g per tree per year, depending on the rainfall during the growing seasons, with each piece being hand-picked from the tree, sorted and cleaned [4].

Acacia gums including AP and the main components of GA (*Acacia senegal* and *Acacia seyal*), have been characterised finding AP and GA gums are mainly composed of carbohydrates with molecular weights depending on the location and age of the *Acacia* trees, with the gums sticky when wet but not oily [2,7]. Extensive reviews of the chemistry of GA, including uses for medical applications including renal function, blood glucose, immunomodulation, inflammatory diseases, cancer, as dietary fibre and gastroprotective activity are available [1,2,4,7-11].

Acacia pycnantha gum has been reported as a possible alternative to antacids and proton pump inhibitors bringing relief for gastroesophageal reflux disease (GERD) and laryngopharyngeal reflux (LPR) in a case report, possibly providing topical protection of esophageal mucosa as has been found for other tree gums [11,12]. Angico gum (*Anadenanthera colubria* var. *Cebil* [Griseb]) grown in Brazil has been found to be effective for the topical protection of esophageal mucosa from in vitro studies of esophageal mucosa biopsies from patients with erosive and non-erosive esophagitis [12]. The potential value of AP gum as a natural mucoadhesive in providing topical protection to gastric mucosa and to reduce the symptom for gastric diseases like GERD or LPR has not been investigated [2,11,12].

AP trees are reported to be invasive in South Africa and several other countries and considered to have limited or no commercial value however with further research, gum from the AP tree may have a value for use in the health and medical industries [13].

MATERIALS AND METHODS

Acacia pycnantha gum was collected on private property, as it is not permitted to collect the gum from trees growing on public land in South Australia. The site

for AP gum collection consisted of native scrub or woodland, typically a mix of eucalyptus trees and shrubs together with young and old AP trees. The site had approximately the same distribution or density of trees per unit area, as found on other sites within the Mount Lofty Ranges, near Adelaide in South Australia. Seasonal rainfall and location were found to influence gum production, with significantly reduced quantities of gum in the dry and hotter years. Rain in autumn or winter was found to wash the exposed water-soluble gum from the trunk and branches, removing all traces, except when located under branches and kept dry. Gum that was not exposed to rain and had remained on the tree until late winter or early summer, was still found edible but had become hard, brittle and difficult to remove. Other sites in the Mount Lofty Ranges that had experienced bushfire activity in the last 5 years had only young AP trees with little or no AP gum visible, with all pre-existing trees burnt to such a degree that they could not regrow.

Soft AP exudates were pulled or cut from the tree trunk and branches in April and were best collected during March - May (autumn). Collected pieces weighed between 5-30g and could be eaten directly or cleaned of bark or cut into smaller 5-10g pieces ready to eat or store. It was found approximately 60-70% of trees have no gum, 30-40% of trees have some gum yielding on average approximately 10-20g per tree per year and 1-2% of trees, being either mature, damaged or appearing stressed, having significantly greater amounts, yielding approximately 50-100g per tree per year, Fig.1.

Approximately 500g of AP gum was collected per hour in the one location from 20-30 trees, with approximately 30g lost on cutting by hand when removing bark that had adhered to the edges of some pieces, requiring a further 20-30 minutes for processing. The gum was usually lighter in colour when first collected, becoming hard, brittle, dryer and darker over time, possibly due to the drying out and oxidation of the contents. The collected gum could be stored without refrigeration for months or even years, showing no signs of decay and with unaltered flavour but increasing in hardness to become almost glass like, in the lump form. The hard gum required several hours to dissolve in water to make a dark brown soothing drink.

To prevent the soft sticky gum pieces from adhering together and forming a solid mass, particularly for the softer regions that originally were adhered to the tree, pieces were rolled in food grade powdered calcium carbonate. The calcium carbonate coating gives the pieces a white appearance and prevented adhesion, making them dry to touch and easy to store and consume. The 5-10g pieces can be sucked like a lozenge with a soothing mild flavour but in the past, traditionally, could also be cooked [14]. For those with gastric reflux, GERD or LPR, the calcium carbonate (used in antacid tablets) coating could also provide a possible benefit by reducing pain associated with gastric reflux symptoms [11].

As a result of the potential for AP gum to have a role in reducing the symptoms of gastric reflux, GERD and LPR and the ready availability of the gum exudate in southern Australian regions, an application in 2022 was made to Food Standards Australia and New Zealand to recognise AP gum as a traditional food. Publications submitted for consideration included the traditional use of AP gums as well other Australian *Acacia* gums that have been considered edible, include *Acacia acuminata* and *Acacia mearnsii* (black wattle) [14-21]. In addition, the bark of AP (not the gum) has been used as a decoction for mouth ulcers by traditional healers in India [22]. *Acacia pycnantha* gum and many other *Acacia* gums have also been reported to have a role in diets of marsupials [23]. The digestive properties of AP gum have been compared to GA in murine models, with no

toxicity observed [24]. The safety or toxicity of some products from different varieties of *Acacia* trees were also included [25,26].

As a result, the Food Standards Australia and New Zealand group formed a view in response to the inquiry that AP gum be given traditional food status, due to a history of use in Australia, for consumption up to 30g per day [27]. Australia and New Zealand may be the only 2 countries in the world to permit AP gum to be sold as food for human consumption. It is possible AP gum may already be a minor component of the different edible *acacia* gums that form GA, as the tree is now invasive in some regions of South Africa and several other countries [2,9,13].



Figure 1: Gum exudates from four different *Acacia pycnantha* trees. The three young trees of trunk diameter approximately 5-8 cm at 0.5 metre from ground level, appear damaged or stressed and show significant quantities of gum production. The mature tree of trunk diameter approximately 25 cm at 0.5 metre from ground level, can also produce significant amounts of gum. AP gum pieces are usually 1-4 cm in length and lighter in colour when first collected

RESULTS AND DISCUSSION

The collection of the AP gum from native trees was approximately 500g per hour from approximately 20-30 trees estimated to be at an average of 10-20g per tree per year with much higher yields from some trees. This yield was much lower than the yield of GA reported to be approximately 250g per tree per year from the Northern Africa *Acacia* but those trees may have been stressed to increase production [4]. The retail price (2025) for GA from *Acacia seyal* trees, as a fine water-soluble white to light yellow powder for consumption and meeting E414 food standard in Australia is currently AUD \$28-50 per kg depending on the quantity purchased [28].

Pure *Acacia pycnantha* gum is not currently grown commercially and is not available for sale at

present as far as is known. *Acacia pycnantha* gum was once collected and marketed in Western Australia in 1836, but collection was labour intensive, could not compete on the price or quality with the African gums that were widely available and so was unsuccessful [19]. The award rates for labour in Australia (2025) are approximately AUD \$20-30 per hour at present, likely preventing any commercial development of the resource unless the yield per tree could be improved and demand for the gum established.

CONCLUSION

Acacia pycnantha gum has been recognised as a traditional food for consumption at up to 30g per day in Australia and New Zealand.

Acacia pycnantha gum may have potential as a treatment for gastric reflux diseases and as a mucoadhesive to provide topical protection to the esophageal mucosa of patients with esophagitis, as reported for Angico gum.

The economic potential of *Acacia pycnantha* gum as a food, food additive or for medical uses, as is being developed for gum Arabic, requires further research including how to increase the yield of gum per tree and to create demand.

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