Australian Propolis Project

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Abstract

To date, research on propolis produced from Australian flora has demonstrated a clear potential for high antioxidant and diverse phenolic attributes. However, there is still a lack of understanding about the benefits Australian propolis may possess, the ability to commercially produce and process it, and its unique selling proposition to both domestic and international markets.

This project, run in conjunction with the University of the Sunshine Coast’s (USC) Honey Lab, is expanding on existing Australian propolis research and facilitating the start of commercial production and processing trials. The desired outcome is quantification of the beneficial compounds of Australian propolis and progression of a commercial trial to the point where the foundations of an economically viable, world-leading propolis industry are in place.

Objectives

The objective of the project is to determine the potential to develop an additional income stream for Australian beekeepers on a commercial scale. This would help to support their livelihoods and provide productivity during the cooler months when honey supply is at its lowest. This project aims to successfully set the foundations of a sustainable, commercially viable Australian propolis industry and leverage the research in the promotion of unadulterated, true bee propolis.

To achieve the objective, the team is researching and testing samples to quantify the unique properties of propolis, which will further determine the quality, therapeutic potential and marketability aspects of the product. Commercial production and processing trials are also being conducted to investigate and determine feasibility.

Research

Research to date has continued qualifying beneficial chemical compounds within Australian propolis by chemical analyses, including antioxidants, phenolics and yield. This screening will aid the development of a marketing narrative for Australian propolis and inspire consumer demand.

Work is also underway to identify production and quality assurance measures, such as the best storage conditions after extraction, how to best preserve potency, transportation requirements and shelf-life protection. Beekeepers are providing the university with samples for testing of active components and activity.

In addition to qualifying the beneficial compounds in Australian propolis and identifying quality assurance measures, commercial processing methods are also being investigated, testing their practicality as well as the potency of the finished goods. The process involves taking pure propolis resin extract and separating it from the beeswax and other matter. This results in a purified propolis extract that can then be powdered down as a raw material for use in cosmetics, dietary supplements and other finished goods.

Outcomes/key findings

In the first quarter of 2021, 20 Australian propolis were analysed for recovered yield, total phenolic content and antioxidant activity. Six out of 20 samples (30%) had a yield above 23.6%, which is the average yield of nearly 200 propolis samples in our database. Eight out of 20 samples (40%) contained total phenolic content above 75 mg gallic acid equivalents/g propolis extract, which is considered as a relatively high to high phenolic level. Eleven out of 20 samples (55%) showed antioxidant activity with IC50 values ranging from 14 to 84.1 µg/mL.

During the reporting period, we also met a key project milestone, with 10 kg of raw Australian propolis processed. The finished goods are to be investigated by USC to ensure quality and potency.

The next step will be for 50 kg to be processed and the same quality tests executed. The results of these tests will enable the industry to qualify the economics and establish recommended commercial pricing for Australian beekeepers, thus providing proof of concept for commercial production of Australian propolis for use in retail products. Product developers will then be able to evaluate the commercialisation potential of Australian propolis – and thus validate whether a new income stream for beekeepers, and a new beekeeping industry, is possible.

Background

Across the globe, there are a variety of regions with well-established propolis industries. Used in traditional medicines, dietary supplements and cosmetics, authentic propolis is in growing demand – particularly product from pristine environments. Australia boasts a well-renowned pristine environment, largely attributed to our vast stretches of unique and diverse flora. However, no Australian commercial propolis industry currently exists, with only small-scale production occurring.

The Australian Propolis Project began following the release of a comprehensive AgriFutures Australia report, Australian propolis market and production potential, by Michael Clarke, published in January 2019. Following publication of that report, Hive & Wellness Australia (HWA) began conducting market and innovation research to further qualify the potential. This investigation resulted in preliminary research, led by the USC Honey Lab in conjunction with HWA, to properly quantify the yield, antioxidant and phenolic content of Australian propolis.

The continuation of this project is expanding on existing Australian propolis research and facilitating crucial commercial production and processing trials. In addition to demonstrating the potency of Australian propolis, there is also the opportunity to address the issue of adulterated, unnaturally enhanced and faux propolis, and thus produce a superior product – true bee propolis that comes from Australia’s pristine, unique environment and is made by some of the healthiest bees in the world.

Figure 1. Total phenolic content and antioxidant activity of 20 propolis samples. Samples with outer circles had a yield above 23.6%.
Implications for industry

The Australian Propolis Project has indicated a clear opportunity for a new Australian propolis industry, whereby Australian beekeepers can further diversify their businesses and increase income. With ongoing drought and the fallout from the 2019–20 bushfires, there is now an even greater need for new product development to increase profitability avenues for beekeepers.

The annual retail value of products containing propolis sold in Australia is reported to be more than $20 million, although these mostly use imported propolis (Clarke 2019). Australian beekeepers deserve a bigger slice of this market and access to international markets. However, Australian propolis will be more expensive to produce than cheaper overseas propolis, and therefore a premium positioning will need to be established for market success.

Continued testing of Australian propolis, investigation into making production easier for beekeepers, and persisting with onshore processing trials will inform commercial feasibility and enable the delivery of commercial batches for further product trials and sampling. This ongoing work will provide the information required to set the foundations of an Australian propolis market and progress further work with beekeepers and researchers to develop a consistent commercial supply of high-quality Australian propolis.

Recommendations for industry

Continued research quantifying the beneficial compounds of Australian propolis is strongly advised in order to map the entire country and clearly identify high-activity production areas. This investigation is also highly relevant following increased rainfall across many parts of the country and the positive effect rain has on propolis production. A significant number of samples from the current research were produced in drought conditions and may not be truly representative of the potential that Australian propolis presents. The continuation of this research should also focus on ascertaining the origins of high-activity propolis and whether the botanical source is unique to Australia. Pinpointing this would provide another selling proposition for marketers.

Due to the labour-intensive nature of producing propolis, research into making production easier and increasing output volumes is also advised. Propolis collection mats are a simple, low-impact production method. However, commercial-scale international production techniques, such as Brazil’s modified honey super, should be trialled in Australia for suitability. Funding could be provided to beekeeping equipment companies to enable the design, development and trial of new methods for commercial production.

It is also recommended that industry consider investigating honey bee genetics for propolis production. Propolis behavioural traits have been strategically bred out of Australian stock due to preference for cleanliness traits. Therefore, a focus on selectively breeding stock for high propolis production could also improve commercial-scale outputs.

Publications


Acknowledgements

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