TRANSFORM

Transformation of surplus tomatoes and capsicums

The challenge

Tomato and capsicum are the two major horticultural crops in Australia, particularly in Queensland. Australia produces around 480,000 tonnes of tomatoes and 76,000 tonnes of capsicums per year, of which Queensland contributes 50 - 65% of the total production.

Bowen Gumlu Growers Association contributes to the Australian horticulture industry producing around $190m of tomatoes and $77m of capsicums (~42% of national production) each year.

Unfortunately, about 30-40% of the total produce, worth ~$300m, is lost or wasted due to various reasons.

"Surplus fruit and vegetables contain valuable resources that can be recovered and used to create new product lines and income streams."

Our plan

Instead of giving this surplus produce away for free to cattle feed or to be left on the ground, the Bowen Gumlu Growers Association wants to utilise these surplus tomatoes and capsicums. Processing the raw material into high value nutritional and bio-actives rich products can then be used in feed, food, nutraceutical, and complementary health care.

Queensland Department of Agriculture and Fisheries offered to explore ways to process and produce value-added products from the surplus. The industry participants agreed to develop this research project to use existing and new processing technologies such as membrane separation and freeze-drying to create new commodities.

This TRANSFORM project with industry partners Bowen Gumlu Growers Association and the Whitsundays Regional Council has three stages:

- Stage one: designed to establish proof of concept protocols
- Stage two: further development of processes
- Stage three: potential scale-up and full-scale commercialisation of technologies (subject to results from stages one and two).

FIGHT FOOD WASTE
Cooperative Research Centre
REDUCE - TRANSFORM - ENGAGE

Australian Government
Department of Industry, Science, Energy and Resources

Business
Cooperative Research Centres Program

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Achievements

Stage one has been successfully achieved! As of December 2020:

1. Quality assessment of produce, development of processing protocols, and preliminary pilot-scale trialling of tomatoes and red capsicums is complete.
2. Analysis of nutritional and bio-active contents of all the product streams from tomato and capsicum processing is complete.

Researchers used 500kg tomatoes and 200kg red capsicums in the major trials of stage one. Freeze and air-dried powder samples of the tomatoes and capsicums and a pro-biotic tomato juice product were developed, tested and analysed for nutritional composition and major bioactive compounds.

Testing found the tomato samples contained good amounts of the antioxidant lycopene. The capsicum powders contained good amounts of carotene. This has positive nutritional qualities and a possible role in the prevention and protection against degenerative diseases.

Encouragingly, testing also found pro-biotic tomato juice maintained consistently high good bacterial counts during its storage for over 90 days at 4ºC, which is positive for juice quality. These samples were also found to be rich in food fibre and minerals such as potassium and magnesium.

Impacts

The successful completion and commercialisation of all stages of this project are expected to reduce this sector's waste by at least 70%. This waste reduction will also save resources and generate additional revenue for the growers, resulting in a more sustainable industry with new jobs in the sector and creating new regional industries..

Our industry participants are pleased with stage one results. They will progress to stage two to confirm if different varieties have different nutritional and bioactive benefits. This includes the extraction of the antioxidant lycopene from tomatoes, and carotenoids and natural red colour from capsicum.

Using the results from stages one and two together with a cost-benefit analysis, the Bowen Gumlu Growers Association will determine whether or not to scale-up production as a part of an anticipated stage three. These growers are keen and can commercialise the solutions developed through this project when fully completed.

Project Leader

Dr Ram Mereddy
Queensland Department of Agriculture and Fisheries

Above: tomato solid

Above: capsicum extract

Participants

BOWEN GUMLU GROWERS ASSOCIATION INC. *Collectively we grow*

Whitsunday Regional Council

Queensland Government

www.fightfoodwastecrc.com.au