



# Mango Agribusiness Research Program

## **Session 1: Public sector & policy trends**

Factors & challenges influencing fruit processing developments

**Innovation, technology and functional foods**

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*19-20 February 2019*

Information  
Markets  
Biosecurity  
Quality

Implementing Agency



Funding Agency





# F&V processing sector overview

Fruit and Vegetable Processing in 2018-19

## Key statistics

Key Statistics Snapshot

Revenue

**\$6.1bn**

Annual Growth 14-19

**1.0%**

Annual Growth 19-24

**-0.6%**

Profit

**\$288.7m**

Exports

**\$2.6bn**

Businesses

**561**

## Industry structure

Life Cycle Stage

Decline

Revenue Volatility

High

Capital Intensity

Medium

Industry Assistance

Low

Concentration Level

Low

Regulation Level

Medium

Technology Change

Medium

Barriers to Entry

Medium

Industry Globalization

High

Competition Level

High


www.ibisworld.com.au –F&V processing in Australia – Sep 2018

# F&V processing sector overview

- 
- ▶ Fruit processing industry in Australia
  - ▶ F&V categories
    - ▶ bottled, canned, preserve
    - ▶ quick-dry F&V (except sundried products)
    - ▶ quick-frozen
  - ▶ Demand for processed F&V categories – shelf stable & frozen
  - ▶ Competitive landscape
  - ▶ Competing industries
    - ▶ F&V wholesaling
    - ▶ F&V retailing
    - ▶ Soft drink manufacture
    - ▶ Fruit juice manufacture

<https://www.reportlinker.com/p04639851/Fruit-and-Vegetable-Processing-in-Australia-Industry-Market-Research-Report.html>

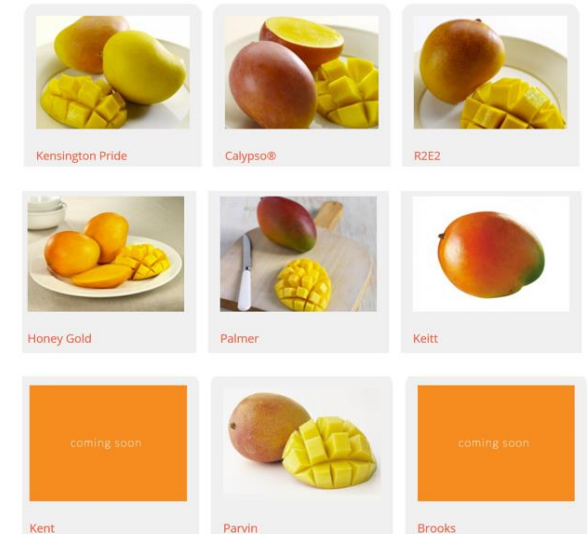
# Policy / Trends

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- ▶ **Sales and margin growth for the processed food sector**
    - ▶ Retail and wholesale sector
    - ▶ Pressure from other sectors – fruit juice - food innovations
    - ▶ Policies on sourcing processed products globally
    - ▶ Competition between companies - through price – innovation of new products - to suit mega trends
    - ▶ Value of Australian \$ (TWI) - when increasing the industry growth decline
  - ▶ **Packaging –**
    - ▶ Minimising packaging use – tin, plastics and cardboard
    - ▶ Using bio-degradable packaging
  - ▶ **Nutrition**
    - ▶ Acrylamide levels in some heat processed products
    - ▶ Nutrient retention after processing – Vitamin C / carotene / anthocyanin
    - ▶ Nutrient availability

# Factors influencing processing

- ▶ Tropical fruit – seasonal /climacteric fruits / short storage time
- ▶ Microbiology – pH and Total Soluble Solids
  - Natural microbial flora - spoilage
  - Food safety risks - raw material handling and processing
- ▶ Quality – colour/ texture/ flavour – enzyme inactivation
- ▶ Varieties – suitability to process ..... e.g. mango - 9 varieties

Australian Mango Varieties





# Conventional processing methods

## ► Freezing

- IQF - ingredient market (ice cream /yoghurt) / food service/

## ► Heat processing

- pasteurised – juices
- sterilised - canned pieces in syrup/ preserves, jams, pickles & chutneys

## ► Dehydration

- hot air / osmotic / freeze drying / refractive index drying ?

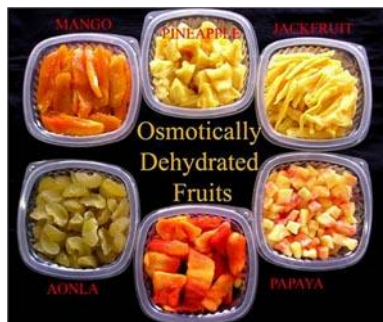


**FRUTEX**  
AUSTRALIA

**Speedy Berry**  
THE BERRY CORPORATION

**Spice  
Masters**

**WINDSOR FARM**



**Nutradry**  
AUSTRALIA'S REAL NUTRITION





# Premium value-added processed products

- ▶ HPP
  - ▶ Juice/pulp/pieces and restructured products – need refrigeration
- ▶ EPT™
  - ▶ Mango powders – for instant juice or as ingredients – shelf stable
- ▶ Extrusion
  - ▶ Snack pellet market - shelf stable
- ▶ Drying
  - ▶ Ultrasound assisted hot air /osmotic / freeze drying - shelf stable
- ▶ Forward osmosis
  - ▶ high quality juice concentrates – need refrigeration

# Healthy functional ingredients

## ▶ Healthy functional ingredients

- ▶ Fibre - peel and processing residues (tomato)
- ▶ Protein – seed kernel (mango, avocado)
- ▶ Oils - seed kernel (mango, avocado)
- ▶ Pigments - carotene / anthocyanin - low grades/ processing waste
- ▶ Antioxidants - seed kernel (mango) / phenolic compounds





# Current challenges

- Unique geography
  - Scattered production areas
  - Disconnect between producers and processors
  - High transport costs
  - Poor cold chain management
- High proportion of SMEs
  - Losses are higher than 30%
  - Most SMEs are small or micro
  - Difficult to generate scale
- Global mindset of the industry
  - Exposure to global fluctuations
  - Complex regulatory issues
  - Trade agreements
- Losses needs to be quantified at different points in value chains



<https://www.csiro.au/en/Do-business/Futures/Reports/Food-and-Agribusiness-Roadmap>



# Innovative & sustainable processing approaches

## Proposed approaches

- ▶ Mobile stabilisation units – developing countries & Australia
- ▶ Centralised processing hubs - developing countries & Australia

## Mobile processing

- ▶ Product stabilisation before processing
- ▶ Suitability of technologies - countries / products
- ▶ Best routes / locations for mobile units

## Profitability of central processing (hubs)

- ▶ Transport of raw material – best routes / locations
- ▶ Low utilisation of equipment during off peak season
- ▶ Need of power / portable water / labour
- ▶ Capital expenditure on equipment processing and storage facilities

# Summary

- ▶ Fruit and vegetable sector overview
- ▶ Policy and trends
- ▶ Factors influencing processing
- ▶ Current challenges
- ▶ Innovative sustainable processing approaches

# References



- ▶ <https://www.clextral.com/technologies-and-lines/technologies-et-procedes/twin-screw-extrusion-technology/>
- ▶ [www.IBISWORLD.com.au](http://www.IBISWORLD.com.au)
- ▶ <https://www.reportlinker.com/p04639851/Fruit-and-Vegetable-Processing-in-Australia-Industry-Market-Research-Report.html>
- ▶ **Die-face technology:** <https://www.reportlinker.com/p04639851/Fruit-and-Vegetable-Processing-in-Australia-Industry-Market-Research-Report.html>
- ▶ <https://www.reportlinker.com/p04639851/Fruit-and-Vegetable>
- ▶ [http://www.agriculture.gov.au/ag-farm-food/hort-policy/horticulture\\_fact\\_sheet](http://www.agriculture.gov.au/ag-farm-food/hort-policy/horticulture_fact_sheet)
- ▶ <https://mangoes.net.au/about-australian-mangoes/australian-mango-varieties/>
- ▶ <https://icar.org.in/hi/%E0%A4%AC%E0%A4%BE%E0%A4%97%E0%A4%B5%E0%A4%BE%E0%A4%A8%E0%A5%80>
- ▶ The fading distinctions between classical patterns of ripening in climacteric and non-climacteric fruit and the ubiquity of ethylene-An overview DOI: 10.1007/s13197-011-0293-4