



Natural Evolution



Sustainable Manufacturing in Action

- 250-300 tonnes per year of green banana waste processed into saleable product
- Innovative and efficient process design
- Efficient drying process
- Recyclable packaging
- Educating customers on benefits of healthy eating

Natural Evolution is a family owned farming and manufacturing company situated in the Atherton Tablelands, North Queensland. It is an innovative company in every sense of the word.

The company produces a range of biomedical ointments, health supplements, food and beauty products using waste bananas previously sent to landfill.

The products are made using banana flour or extract as the essential ingredient. Led by award winning farmer and inventor, Robert Watkins, Natural Evolution has a long history of developing and commercialising new manufacturing techniques and business processes to further enhance the company's sustainability.

Company history:

- **2008** - Designed the fully recyclable packaging system known as "Banana Blankey".
- **2009** – Banana Blankey is episode winner of ABC's new inventors.
- **2010** – Robert crowned Young Farmer of the Year for the design of Banana Blankey and machinery designed specifically for banana harvesting and maintenance.
- **2010** – Began early manufacture of banana flour with partially manual processes.
- **2012** – Designed and installed peeling machine, increasing processing capacity to 300 kg of green bananas per week.
- **2014** – Building commences on the first pharmaceutical grade banana flour factory.
- **2017** – Producing 100 tonnes per year of banana flour and extract. Extensive social media presence and customer education.

In 2015/16, The Queensland banana industry produced around 370,000 tonnes with on-farm waste ranging between 5-30% due to factors such as weather impacts, quality (size, shape, discolouration), price and other.



Design



The factory was designed in 2014 with sustainability in mind and includes:

- A north facing pitched roof ready to receive a 20 kW solar Photovoltaic (PV) system.
- A ducted air-conditioning system which features economy settings that draws in cool external air when the external air is cooler than the internal temperature thereby reducing energy consumption and operating costs.
- Insulated factory walls to reduce the load on the air conditioning system.
- The installation of energy efficient 150 watt high bay LEDs lights.
- Wastewater (banana washwater) irrigated onto the nearby banana paddock via a drainage system that negates the need for pumping thereby saving on energy.

Packaging design reduces waste during transport

The Banana Blankey is a fully recyclable polypropylene carton insert for packing and transporting bananas which minimises bruising and skin damage to the fruit. The material 'breathes' allowing the fruit to ripen naturally via the ethylene gas the bananas naturally give off.

An advantage of The Banana Blankey is that banana layers in the carton can be readily checked thereby reducing the potential of further bruising of banana product and less chance of waste at the retail sale stage. The Banana Blankey was episode winner of the ABC series, New Inventors.



'If you can't find an answer to a question, create one'

**Robert Watkins, Director,
Natural Evolution**

Manufacturing

Natural Evolution has a trademarked and patent pending technology, NutroLock™, which produces 1 tonne of banana flour from 10 tonne of waste product. Green bananas undergo a cold extraction process where bananas are washed, graded, peeled, dried, milled and packed to produce high quality green banana flour.

The NutroLock process is Hazard Analysis Critical Control Point (HACCP) Certified.

The process produces food grade banana flour in under 10 minutes. Banana skins are processed offsite to produce natural banana extract used for biomedical

ointments. Eco-efficient features of banana flour manufacture include:

- A fast but low-speed, low energy, cold processing method which prevents degradation to the starch granule.
- An efficient drying process which uses substantially lower gas volumes and so less energy compared with banana drying processes used internationally.
- The use of variable speed drives on the motors of processing equipment minimises electricity use.
- The use of high pressure, low flow hot water hoses for cleaning purposes.
- The use of bananas that would have otherwise been sent to compost or landfill.
- The use of waste banana skins to produce natural banana extract.
- Excess waste banana skins are composted and used to fertilise the banana farm.

Green bananas are transported to the factory in reusable plastic crates and the retail packaging is made from recyclable high density polyethylene (HDPE).





Natural Evolution Products

Natural Evolution has undertaken extensive research and development to produce a range of healthy and innovative green banana products. They are also trialling the NutroLock™ process on other waste products including sweet potato, apple pulp, blueberries and cassava.

The green banana products include:

- Green banana resistant starch
- Skin care products
- Probiotic and prebiotic supplements
- Equine supplements
- Smoothie mix
- Banana ointment
- Gluten free banana flour



Social Responsibility

Natural Evolution has an extensive social media presence with almost 20,000 followers. They take pride in educating their customers and local community on the benefits of healthy eating. They are supportive of their local community through donations to local groups and by hosting tours of their farm and processing

plant.

Natural Evolutions Founder, Robert Watkins, lives by the philosophy to generally 'be good neighbours' meaning to look after their local community and to respect the environment in which they live.



The Future

Robert has extensive plans to continue to build and improve the sustainability of their farm and manufacturing plant. This includes:

- The installation of solar PV.
- Investigating biological breakdown (through the use of micro-organisms) and biogas production from banana waste so that the factory can reduce its dependence on grid electricity.
- Launching a range of prebiotic and probiotic health products specifically for indigenous and remote communities to help with nutrition.
- Further developing the manufacturing site to attract and educate greater numbers of visitors.

This case study has been prepared by The Ecoefficiency Group Pty Ltd for the Queensland Department of State Development in 2017.