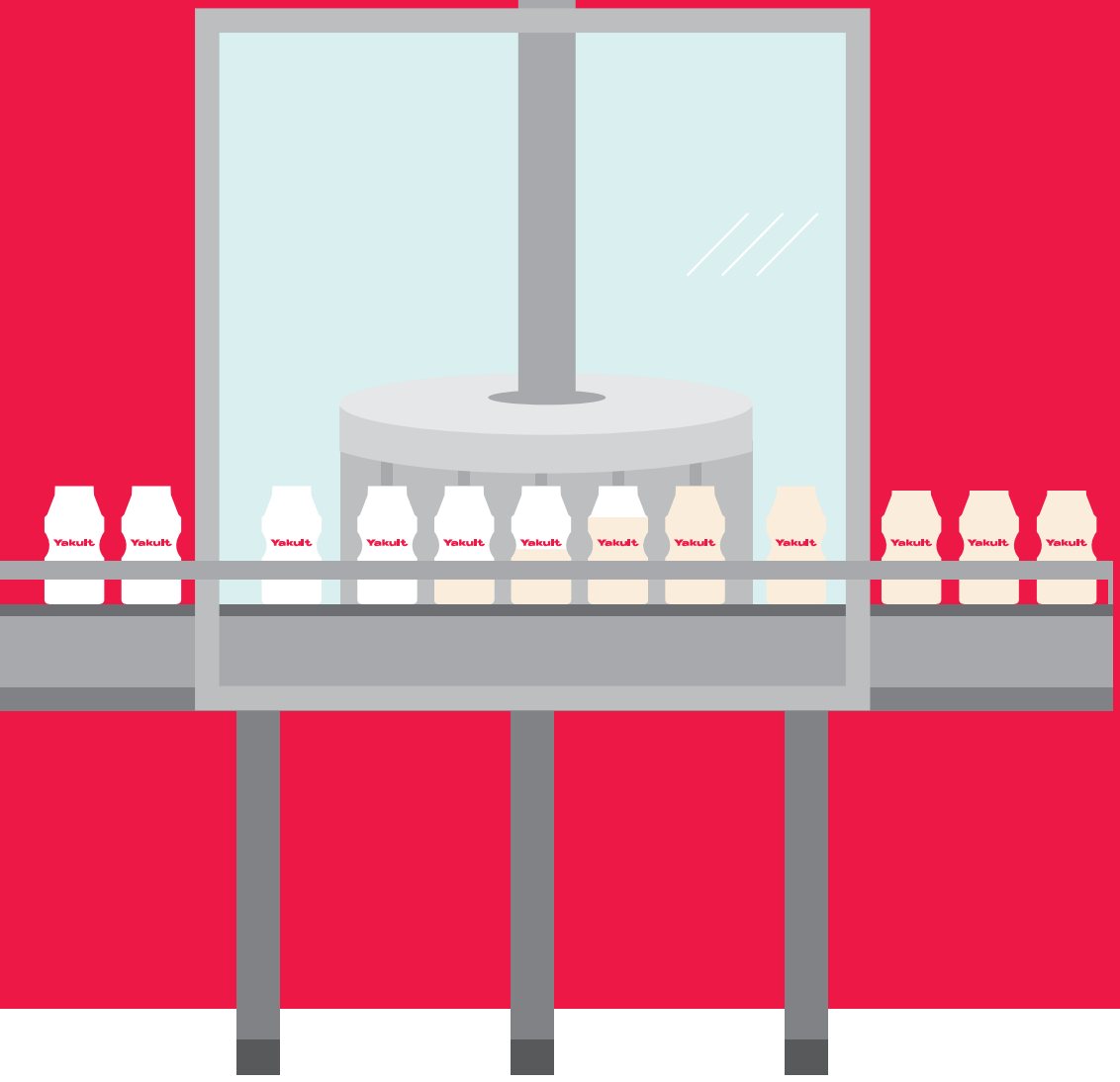
Made fresh for you

Manufacturing process of **Yakult**



Every body.
Every day.

Yakult®

What is Yakult?

Yakult is a fermented milk drink containing our unique probiotic bacteria, the *Lactobacillus casei* Shirota strain.

www.yakult.com.au

How Yakult is Made

- Yakult is produced in a purpose built factory incorporating the latest state-of-the-art manufacturing processes, equipment and on-site Quality Control Laboratory.
- Production of Yakult is managed using the just in time (JIT) system.
- The method of making Yakult uses an automated one way process to transfer Yakult through a closed system of pipes, valves and filters. This provides protection from potential contaminants.
- Strict sterility and hygiene controls apply for the factory and staff.
- More than 300,000 bottles are produced daily to supply both Australian and New Zealand markets.

1 Quality Control (QC)

- QC activities involve sampling, testing and inspection of the product, bottles and packaging - confirming that the Quality Assurance (QA) measures have been effective.
- Individual bottles are routinely inspected along the production line to check for incorrect printing, undesirable markings and lid sealing.
- More than 100 tests are conducted for every batch of Yakult created.
- Raw ingredient samples are tested for quality prior to purchasing a batch.
- The high quality of Yakult is ensured through an extensive variety of tests that include microbiological quality, composition and taste. Once approved, the product is ready to be released to stores.

QC testing is conducted throughout products' shelf life, including:

1. Specific Gravity – measures the density of ingredients in Yakult throughout production.
2. Brix – measures the total soluble solid content (i.e. sugars in Yakult) using a refractometer.
3. Titratable Acidity – measures the level of acid development in the product and is used to monitor growth conditions of *Lactobacillus casei* Shirota Strain.
4. Microbiological tests – measures the number of the *Lactobacillus casei* Shirota strain within the samples and ensures negligible to zero levels of contaminating bacteria.

2 Dissolving and Sterilisation

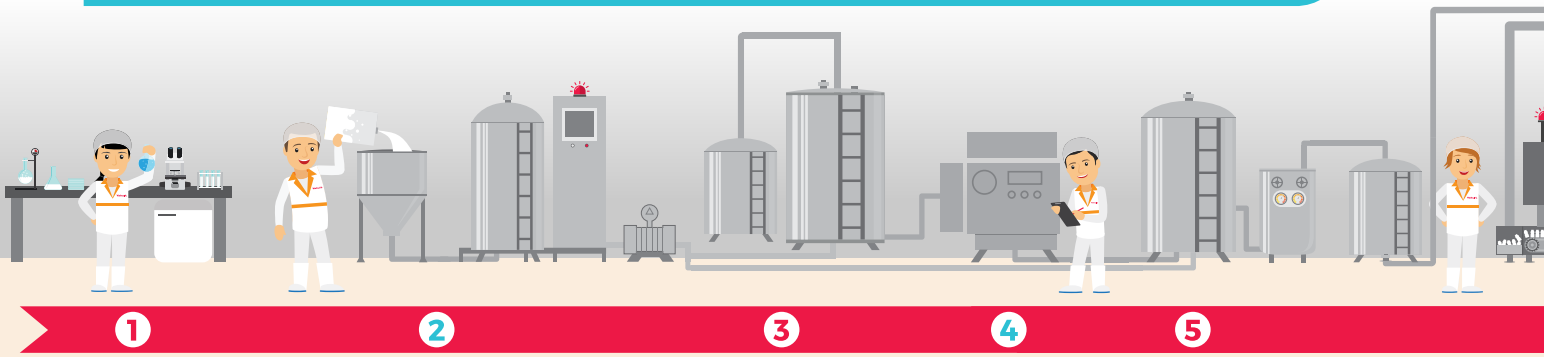
- Water used is filtered by reverse osmosis to remove the trace components.
- Skim milk powder, sucrose and dextrose are blended with the filtered water and produce a batch of milk which is then sterilised using High Temperature Short Time (HTST).
- HTST takes place at a high temperature for a short time and kills any bacteria potentially present.
- The high temperature used for sterilisation also produces Yakult's natural colour as milk proteins and sugars undergo Maillard reaction.

Raw Ingredients

Each 65ml bottle of Yakult contains:

- 6.5 billion live *Lactobacillus casei* Shirota strain
- Skim milk powder
- Sugars – sucrose and dextrose
- Flavouring
- Water

Yakult LIGHT contains less sugar than Yakult Original. Yakult LIGHT is bottled and packaged on the same production line at a different time or day to Yakult Original.



3 Yakult Culturing and Fermentation

- The milk solution is transferred via a closed system of pipes and valves to a fermentation tank where the temperature is decreased to an appropriate level.
- A starter culture of the *Lactobacillus casei* Shirota strain is inoculated into the milk solution. The bacteria multiples during the fermentation process.
- Fermentation is a chemical reaction which bacteria perform to break down carbohydrates, in order to gain energy. In this process the *Lactobacillus casei* Shirota strain produces lactic acid from the breakdown of lactose, the predominant form of carbohydrate in milk.

4 Homogenisation

- After the fermentation period, the milk solution undergoes a process known as homogenisation. The fermented milk is placed under high pressure while passing through a structure with small holes creating a smooth consistency.

5 Blending, Mixing and Storage

- The fermented milk solution is then blended with a unique flavour and is transferred to a large storage tank containing sugar syrup, creating Yakult concentrate.
- 'Yakult concentrate' is chilled and is then mixed with filtered, sterilised water.
- The final product of Yakult is now ready to be bottled.

6 Bottle Making and Storage

- Yakult's unique-shaped plastic bottles are produced on-site from triple food grade polystyrene code 6 recyclable pellets using injection blow-moulding machines.
- Pellets are melted and injected under pressure onto 'core' rods.
- Filtered sterile air is blown through each 'core', into the mould creating the bottle's shape.
- Each of our 3 machines can produce 11,000 bottles per hour.
- Air pressure transports the empty bottles to the bottle storage tanks that have the capacity to hold more than one million bottles where they are kept until ready to be labelled, filled, capped and sealed.

7 Bottle Filling, Capping and Sealing

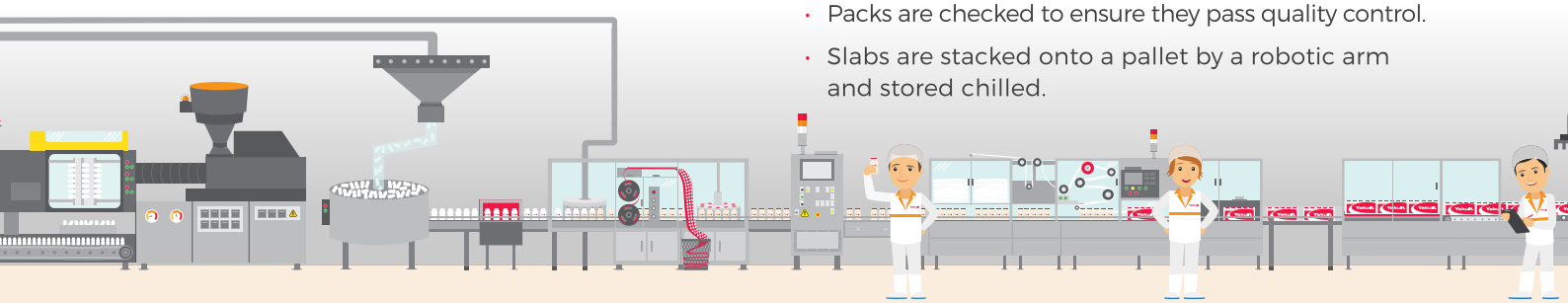
- Empty bottles are released from the storage funnel into a 'selector' machine, which places the bottles in an upright position before being released onto the filling line.
- Bottles travel along in one continuous line and are printed with required label information. A quick drying, non-toxic, red ink is used to label the Yakult Original bottles. Yakult LIGHT has a label film covering the outside of the bottle, which is heated to shrink the film wrap directly onto the bottle.
- The use-by date and batch code is printed on to the waist of the bottle.
- Bottles are filled with 65ml of fresh Yakult, capped with a foil lid which is sealed by high frequency oscillator before travelling via a conveyor belt to the packaging area.
- The bottling line has the capacity to produce 45,000 bottles an hour.

8 Control Panel

- The automated processes and production of Yakult is managed by Computer Integrated Manufacturing (CIM).
- The automated production line is controlled through the control panel.
- Information retrieved from the control panel includes bottle count, capacity and operating time.

9 Packaging

- Two packaging lines sort bottles of Yakult into groups of five or ten, which are wrapped in polypropylene film.
- The bottles quickly pass through a heat tunnel creating a tight wrap around the Yakult packages.
- Packages are then automatically grouped together to form a 'slab' of 50 bottles, wrapped in polyethylene film and heat shrunk.
- Packs are checked to ensure they pass quality control.
- Slabs are stacked onto a pallet by a robotic arm and stored chilled.



Robotic arm

- Pallets of Yakult are stacked in preparation for distribution
- A fully stacked pallet containing 8,400 bottles of Yakult is completed in 15 minutes.
- A forklift then transfers this to the cold storage facility

10 Cold Storage

- Yakult pallets are placed on automated moving racks and are stored below 4˚C.
- The automated moving racks are capable of holding more than 300 pallets of Yakult, while minimising the space between shelving racks until forklift access is required.
- This storage method reduces the energy otherwise required to cool a storage facility of this size.
- Installation of energy efficient LED lighting is integrated and synchronised to turn on and off with the moving racks, therefore only the rows of lights over open aisles turn on when in use.

11 Quality Assurance (QA)

QA measures maintain excellence in:

- Personnel and factory hygiene standards
- Equipment cleaning
- Processing methods
- Product handling
- Purchasing raw materials
- Food hygiene training for staff
- The provision of equipment and premises

QA utilises 'Hazard Analysis and Critical Control Points' (HACCP) principles, an internationally recognised program for achieving food and public health specifications. The entire manufacturing process is controlled to identify possible hazards and to implement hazard prevention measures.

Quality Management System (QMS)

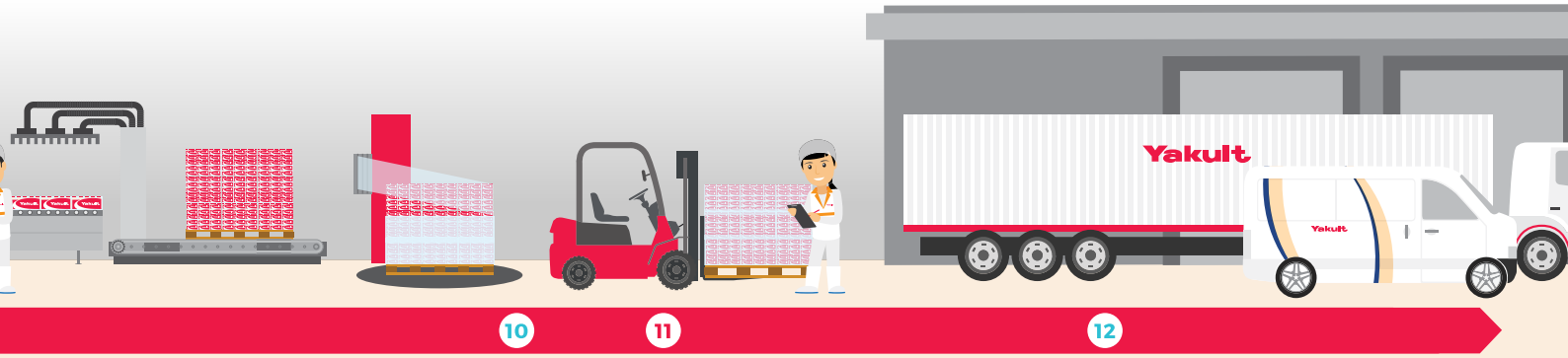
- Yakult's QMS complies with the requirements of the International Organisation for Standardisation (ISO: 9001:2015).
- ISO covers the QMS for the manufacturing, sale and distribution of fermented milk products and ensures our products and services meet the highest international food manufacturing standards.
- To maintain this certification, all company procedures are documented and are subject to routine auditing by external groups.
- 5S - based on 5 Japanese words starting with "S", is a lean manufacturing tool to increase work efficiency. The 5S system is in place to improve quality, safety as well as employees' morale at the production site.

整理 **Seiri** (Sort)	• Separate the necessary and unnecessary items in the workplace. • Remove the unnecessary item.
整頓 **Seiton** (Set in Order)	• Set all necessary items in a neat, orderly fashion so they can be located and retrieved safely and quicky.
清掃 **Seiso** (Shine)	• Shine and clean everything in order to spot hidden potential problems such as water leaks.
清潔 **Seiketsu** (Standardise)	• Make sure all improvements are consistent across the facility and for future reference.
躾 **Shitsuke** (Sustain)	• Sustain the above four actions so that they become part of the daily routine.

12 Cold Chain Distribution

Once Yakult is ready to leave the factory, it is distributed by:

1. Corporate Delivery – refrigerated trucks deliver to major warehouses for Coles, Woolworths and regional areas.
2. Route Delivery – Yakult Sales Consultants deliver Yakult in refrigerated vans directly to independent supermarkets, Asian grocers and other outlets.
3. Refrigerated transportation is used for delivery and distribution interstate and overseas to New Zealand.



Did you know there are more than 100 trillion bacteria throughout the human digestive system?

Lactic Acid Bacteria (LAB)

LAB are beneficial bacteria associated with digestive balance. LAB utilise lactose to produce lactic acid that:

- Promotes food preservation – lactic acid helps minimise numbers of detrimental bacteria, prolonging shelf life.
- Provides flavour and taste – lactic acid produces the characteristic sour taste of fermented milk drinks, yoghurts and other foods.
- Promotes health – lactic acid assists in preventing the growth of detrimental bacteria and production of damaging substances in the intestines.
- Assists in regulating bowel activity – lactic acid stimulates bowel movement to assist with food digestion and nutrient absorption.

What are Probiotics?

Probiotics are defined as live microorganisms which, when taken in adequate amounts, provide a health benefit to the host. Strains belonging to the Lactobacilli and Bifidobacteria species are the most widely researched probiotics in medicines and foods such as fermented milk drinks and yoghurts. Probiotics are required to be safe for human consumption, be non-pathogenic and have proven health benefits.

What's in Yakult?

Every 65ml bottle of Yakult contains 6.5 billion live ***Lactobacillus casei*** Shirota strain.

The strain is cultured under precise conditions and is rigorously tested to ensure high numbers of 'Colony Forming Units' throughout all stages of manufacture.

What's in a name?

- ***Lacto*** – relating to milk or in chemistry term, lactic acid
- ***bacillus*** – distinctive rod-shape
- ***casei*** – from casein, a protein found in dairy products
- ***Shirota strain*** – discovered by our founder, Dr Minoru Shirota, and named in his honour

Specifically the *Lactobacillus casei* Shirota strain:

- Is highly acid resistant surviving the journey through the digestive system
- Arrives alive in the small intestine
- Helps maintain the balance between other beneficial and potentially harmful bacteria
- Encourages the growth of beneficial bacteria in the intestines such as Lactobacilli and Bifidobacteria
- Suppresses bacteria that produce substances which are detrimental to our health

Cleaning and Sanitising

- Cleaning and sanitising are vital to maintain hygienic manufacturing equipment.
- Yakult follows a comprehensive cleaning program called 'Cleaning in Place' (CIP).
- Cleaning removes visible soiling from surfaces and is performed using biodegradable detergent solutions in conjunction with heat and scrubbing, high flow circulation or foaming.
- Cleaning foam is sprayed on all floor surfaces at the end of each day.
- Sanitising kills any bacteria remaining on surfaces after cleaning.
- Steam is used to sterilise the pipe system and tanks.
- Food grade chemicals are used in particular areas.
- A sanitising spray is used around equipment in the bottling area and for staff hand hygiene.

Waste Management and Recycling

- Effective waste management strategies contribute to a cleaner and less wasteful facility – 99 % of Yakult's raw ingredients end up in the bottle. There are no by-products.
- Cleaning waste is processed in the on-site water treatment facility.
- The acidity/alkalinity of collected water is adjusted, if required, to meet Melbourne Water standards.
- Recycling of packaging materials occurs where it is economically and environmentally viable:
  - Paper products such as skim milk powder bags are recycled.
  - Bottles can be collected for recycling. They are able to be crushed and mixed with other resin to be repurposed into products such as chairs and tables.

Energy Management

Yakult is aware of minimising environmental impact and incorporates energy efficient practices such as:

- Keeping equipment well maintained
- Heating liquids with heat exchange plates so that energy is not lost or wasted
- Not using chlorofluorocarbons (CFC) in cooling or refrigeration
- Using off peak rates for utilities where possible
- Using a natural gas boiler for short periods which does not pollute the air
- Using LED lights

Ethical and Social Responsibilities

- Staff regularly undergo training to ensure appropriate operation of machinery
- Regular hearing checks for production workers
- Community involvement in public education services
- Health professional scientific communication
- Commitment to waste reduction
- A signatory of the Australian Packaging Covenant
- Supporting local Australian industries by sourcing local ingredients
- Corporate sponsorship
- Conducting free of charge educational tours of the factory

Each millilitre of Yakult contains 100,000,000 ***Lactobacillus casei*** Shirota strain bacteria.

Yakult

Yakult Australia Pty Ltd
10 Monterey Rd, Dandenong Victoria 3175
Locked Bag 1403, Dandenong South 3164
Freecall 1800 640 023
NZ 0800 YAKULT (925 858)
www.yakult.com.au