

THE SWEET FACTS ABOUT SUGARCANE

FROM Paddock TO PACKET

What is sugarcane?

Sugarcane is a tall tropical plant that is similar to bamboo. Cane is tall, reaching two to six metres in height. It has strong, jointed, fibrous stalks that store carbohydrates in the form of various sugars.

Sugarcane belongs to the grass family, *Poaceae*, an important plant family that also includes wheat, rice, and sorghum.



Sugar is made in the leaves of the sugarcane plant through a process called photosynthesis and is stored as juice in the stalks.

During photosynthesis a plant uses energy from the sun to transform carbon dioxide (CO₂) and water (H₂O) into oxygen (O₂) and glucose (a type of sugar).

The plant absorbs water through its roots and CO₂ from the air through the pores in its leaves. Chlorophyll (which is the green pigment in leaves) allows the plants to absorb the sun's energy more readily.

In the same way that animals store fat, the sugarcane plant stores energy that it doesn't need. This extra energy is the sweet juice in the plants' stalks.

When ripe, sugarcane stalks are harvested and the juice is extracted and processed into raw sugar crystals.



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DID YOU KNOW?

Sugarcane farms along 2,000 km of Australia's east coast underpin a \$2.5 billion sugar industry, supporting regional communities and economies.



The Australian sugarcane industry is made up of 4,500 farming businesses. They are family farms, partnerships and corporations. The average farm size is 100 hectares.



Sugarcane farming in Queensland provides more than 9,800 direct jobs and more than 23,650 value chain jobs in regional towns and cities.



Around 30 million tonnes of cane is harvested and crushed annually in Australia to produce 4.3 million tonnes of raw sugar.



22 sugar mills process the sugarcane into raw sugar. 85% of the raw sugar is exported from six bulk shipping ports.



Australian sugar is sustainably produced. 80% of the cane farm area is in the best management practice program called Smartcane BMP.



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THE SUGARCANE PROCESS: FROM Paddock TO PACKET



1. Planting

Sugarcane is grown by replanting part of a mature cane stalk. Growers cut some of the fully grown cane stalks into 40 cm lengths called 'setts'.

These setts are planted by special machines, which drop them into furrows, add fertiliser and cover them with soil.



2. Growing

New shoots grow from buds on the joints of the setts. These shoots break through the soil surface between two and four weeks after planting. Each sett can shoot up to 12 stalks, forming what is known as the stool of sugarcane.

In warm and sunny Queensland, it takes nine to 16 months to grow a cane crop. Growth is slower in cooler climates like NSW, where it takes 18 to 24 months to grow a cane crop.

To grow successfully, sugarcane needs strong sunlight; fertile soil; and lots of water (at least 1.5 metres of rain each year or access to irrigation).



3. Harvesting

Heavy-duty machines called cane harvesters cut the cane stalks off at its base. As they move down each row, the cane is collected and cut into shorter 30 cm length pieces known as 'billets'.

A second machine called a cane haulout drives alongside the harvester to collect the billets.

In Australia, sugarcane is harvested annually during the drier months of June through to November. As harvesting cannot be done when the soil is too wet, farmers are very dependant on fine weather.



4. Getting cane to the mill

To minimise sugarcane deterioration and juice evaporation, sugarcane should be transported to a sugar mill within 16 hours of being harvested.

Once full, the cane haulout then drives across the paddock to the road, where it unloads its contents either into a semi truck (for road transport) or mill bins at local sidings on the nearest railway track (for train transport).

The sugarcane industry maintains a network of nearly 4,000 km of narrow-gauge rail lines to get cane from the paddock to the mill quickly and cost effectively.



5. Milling

Sugar mills crush cane to extract and separate the sucrose (sugar) from the water, impurities and plant fibre contained in the billets. Using a computerised scheduling system, the sugarcane is monitored as it moves through a four-step milling process.

• Weigh & Record

Sugarcane is weighed and processed at automatic cane-receiving stations as soon as it arrives at the mill.

• Chop & Shred

The billets are then tipped into a cane carrier and transported to the shredder where they are chopped and shredded into fibrous material. This process ruptures the juice cells.

• Crush

The cane material is then crushed as it is fed through a series of mills. This process separates the juice from the baggasse, which is fibrous material. This is used as fuel to run the mill's boiler furnaces.

• Heat & Cool

The juice is pumped away for processing into raw sugar. It is cleaned to remove impurities and thickened into a syrup by boiling off excess water. It is then seeded with tiny sugar crystals in a vacuum pan and boiled until sugar crystals have formed and grown. These crystals are separated from the molasses around them in centrifuges that are like giant spin dryers. The crystals are then tumble-dried and stored in large bins until they are sent to ports.



6. Refining

Australian mills produce 'raw' sugar, a product not to be confused with the raw or brown sugar that we use to sweeten hot drinks.

At the refinery, the 'raw' sugar crystals are washed and dissolved in hot water. Carbon dioxide and lime are added to the melted 'raw' sugar to remove molasses. Any remaining colours and impurities are removed as the sugar is filtered through cloth. The now pure sugar is boiled in a vacuum pan and seeded with fine sugar crystals.

When the crystals are large enough, they are tumble dried to remove moisture.

The dried sugar is then graded into sizes and packaged for delivery to customers.

This is the refined sugar suitable for human consumption and for use as an ingredient in the manufacture of food and drinks.

SUGARCANE INNOVATIONS

In Australia, farmers grow sugarcane to extract the sugar. Sugarcane can also be used for purposes including ethanol fuel, paper, plastics, clothing and pharmaceuticals.

What other products can be made with sugarcane?

Although 'raw' sugar is the main product of Australian sugarcane, there are a host of other uses for the plant.

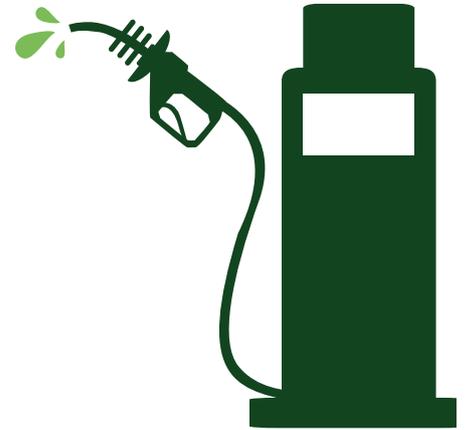
Every single part of the harvested sugarcane is used.

At the sugar mill, the sugar is taken out of the stalk through a crushing process. The left-over fibre from the stalk is called bagasse.

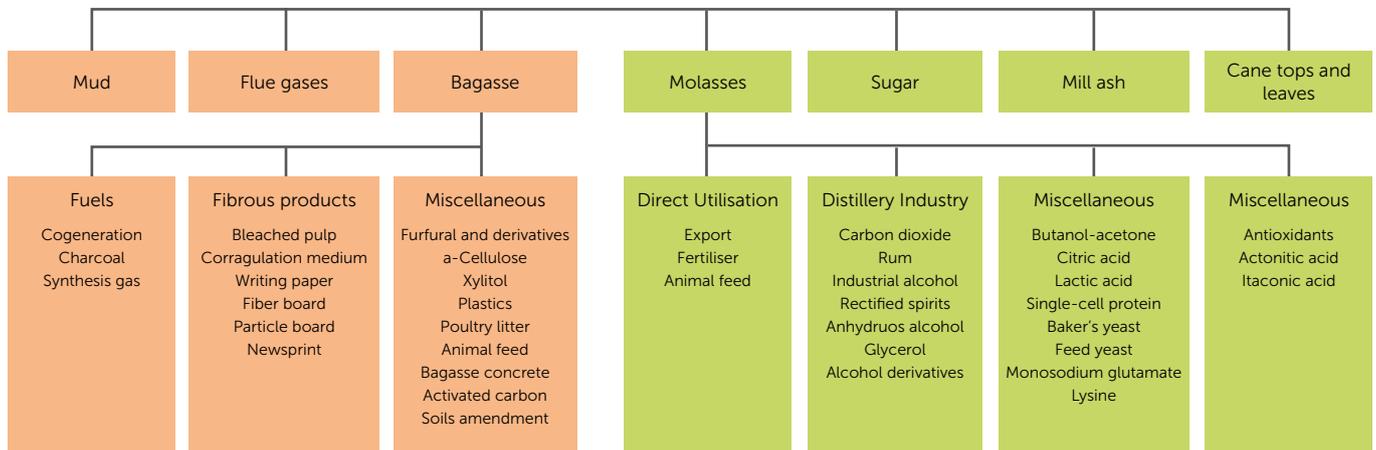
Bagasse is used to generate electricity to power the sugar mill. This means it does not rely on fossil fuels or the electricity grid for power. Sugarcane is the only crop in the world that can provide its own processing energy.

Other by-products include a residue that is used as a fertiliser on cane farms and gardens, and substances which can be made into plastics, clothing and pharmaceuticals.

Molasses is a dark syrup separated from raw sugar crystals during the milling process. It is used as a raw material for ethanol and rum and as an animal feed supplement.



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