Business Area
Biomass Chemicals

BIOSTIL® 2000 – Sugar

Chematur
Engineering Group

BIOSTIL® 2000

The New Recycling Concept

Low environmental impact

Due to the unique combination of high dry solids fermentation and water recycle, Biostil produces only one fourth (1/4) the stillage volume compared with batch or cascade systems.

The concentrated Biostil stillage (30-35% by weight) does not cause any odour and can be easily converted into a valuable liquid fertilizer, compost additive or animal feed.

Through addition of nutrients such as nitrogen and trace elements to the potassium rich Biostil stillage, a tailor made fertilizer can be produced. By spreading this liquid fertilizer back on the sugar cane fields, ethanol production is combined with maximum recycle. Based on actual plant experience, it is feasible to transport this Biostil liquid fertilizer up to a distance of 300 km. This converts a previous environmental liability into a plant asset improving the profitability.

High resistance to contaminations

The Biostil design incorporates features that inhibit contaminations due to:

Low content of residual sugars in the fermenter

The continuously added sugar is immediately converted to ethanol due to high yeast cell concentration in the fermenter.

Internal pasteurisation

The ethanol is continuously stripped off in the primary distillation column, while the alcohol depleted mash is pasteurised in the column prior to being recycled back to the fermenter.

High osmotic pressure

High osmotic pressure inhibits microorganisms growth. Biostil utilises a special yeast strain, which is tolerant to high osmotic pressure. The Biostil process takes advantage of this by operating the fermentation at a high dissolved solids concentration, which creates higher osmotic pressure and inhibits contaminations.

High plant performance

Compared with batch and cascade systems for molasses feedstocks, Biostil offers:

Higher Ethanol yield

Biostil plants are designed as an industrial unit, with special attention to efficient control of process parameters. The operation maintains close to zero concentration of sugars and a constant ethanol concentration in the fermenter. These conditions result in lower formation of by-products, hence increasing the ethanol yield.

Lower water consumption

In batch and cascade systems the ethanol concentration in the fermenter is controlled by dilution of the molasses feed. In Biostil the ethanol concentration is controlled by continuous removal of the produced ethanol.

Easier process control

Due to the unique integration between the fermentation and distillation sections and the steady state operation it is possible to operate the plant with one operator per shift. In addition, less cleaning is required as the plant operates continuously.

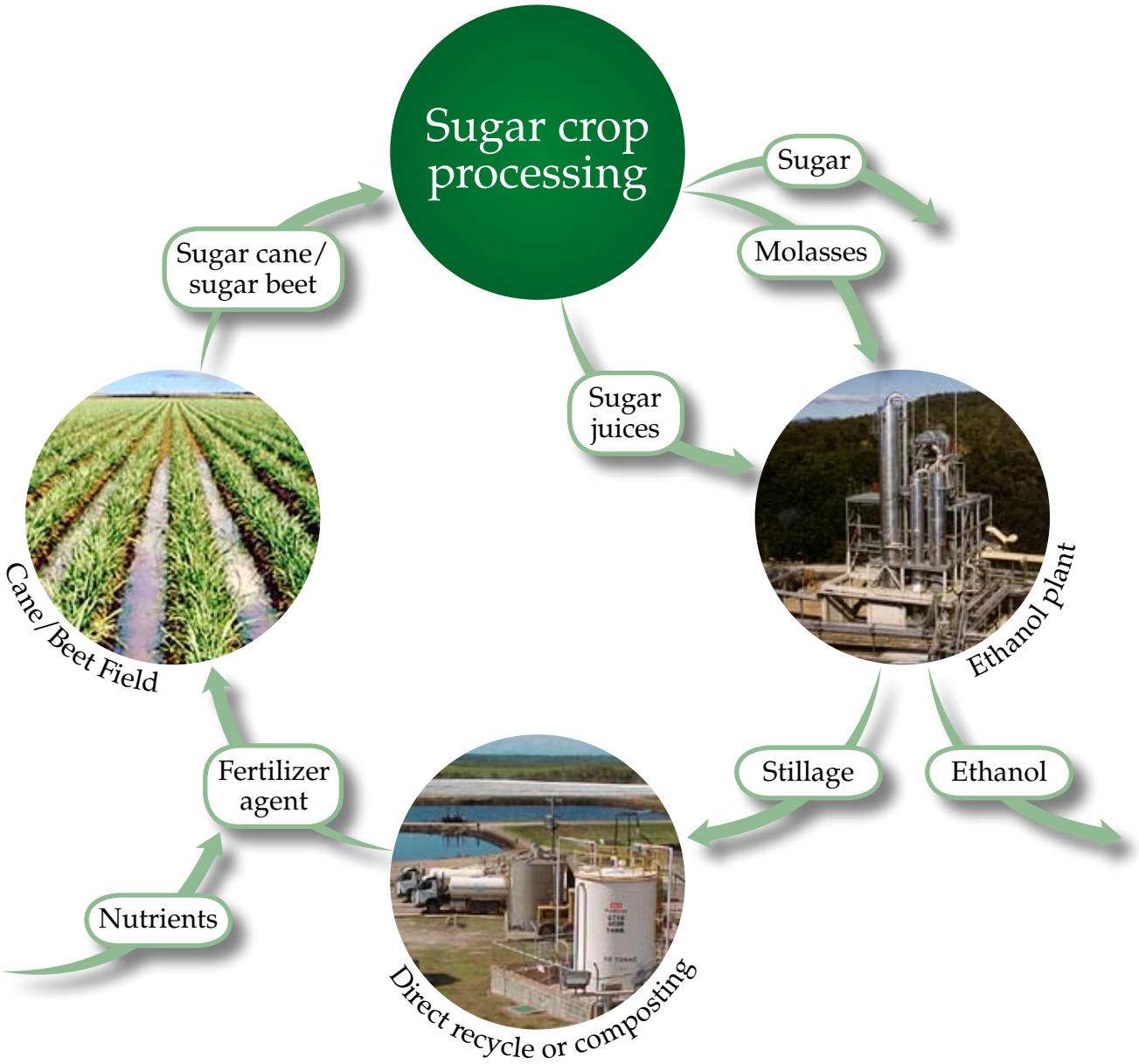
Compact layout

Smaller fermentation volume, resulting in less plant area.

Energy saving process

The distillation system is operated with pressure/vacuum integration of the columns. This saves energy, and reduces fouling of the mash column. The low water consumption results in a highly concentrated low-volume stillage which requires no additional evaporation.

Zero liquid waste



Recycling as applied to ethanol from sugar crops

No pre-treatment of substrates

As a result of the high resistance to contamination and the high tolerance to non-fermentables, Biostil requires no molasses pre-treatment.

Recycling and Zero Liquid Waste

With the new Biostil Recycle Concept, water effluents can be reduced to zero, while all components in the molasses which are not converted to ethanol can be recycled to the fields.

Facts: BIOSTIL® 2000

Process description

Molasses (40-50% by weight) is continuously fed to one of the fermenters, at a pre set flow rate. The sugars are immediately converted into ethanol and carbon dioxide maintaining close to zero concentration of sugars. The ethanol concentration is kept constant at 4.5% by weight by continuous ethanol removal through the mash (primary) distillation column. Fermented liquid (mash) is fed to centrifugal yeast separators where yeast is separated and returned to the fermenter.

De-yeasted mash (beer) is preheated in a regenerative heat exchanger and enters the vaporisation section of the mash column. About 90% of the ethanol is removed as a 40% by weight ethanol/water vapour, which is sent to the rectification and dehydration section where fuel ethanol is produced. Most of the ethanol depleted beer (weak beer) is pumped through the regenerative heat exchanger and a trim cooler prior to being recycled back to the fermenter. The non-fermentables are drawn off from the bottom of the mash column as a concentrated Biostil stillage (30-35% by weight).

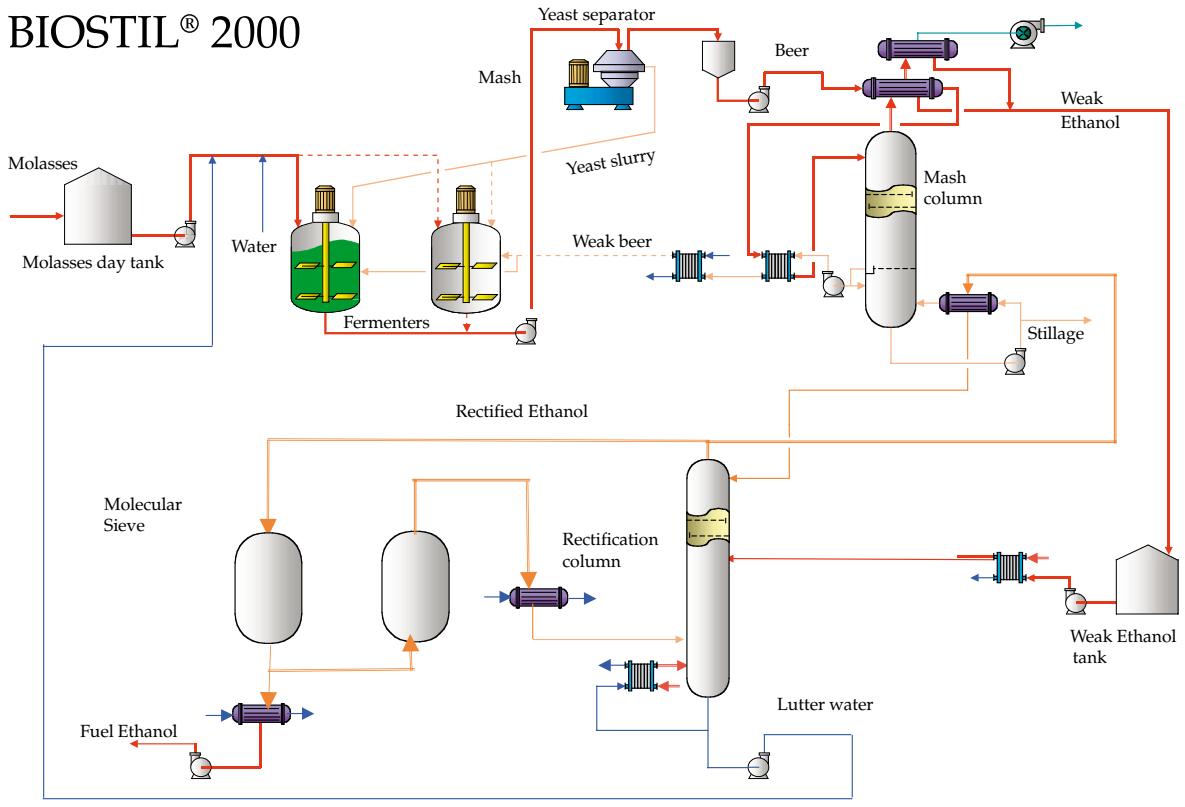
Other alcohol qualities can be produced by alternate distillation arrangements after the mash columns.

Products

Fuel ethanol, (Bioethanol), technical ethanol, potable ethanol and stillage (liquid fertilizer, compost additive or animal feed).

Raw Materials

Cane or beet molasses, sugar juice.



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