Transcription details:

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| Date: | 6-Apr-2016 |
| Input sound file: | Biofuels from Sorghum to Ethanol |

Transcription results:

**0:00 (inquisitive music)**

0:08 My name is Kobus,

0:09 and I'm the General Manager

0:12 here at Dalby Bio-Refinery in Dalby.

0:20 The Dalby plant was built in Dalby

0:24 specifically for the reason of the

0:26 abundance of sorghum in the area.

0:29 The plant was commissioned

0:32 in December 2008,

0:36 and it is the first and the only sorghum plant

0:41 in Australia at this stage.

0:45 The advantages of using sorghum is uh,

0:47 cheaper than corn in Australia.

0:49 If we run it about 50 percent of production.

0:53 In a month's time we will use

0:55 between seven and 10,000 tonnes of sorghum.

0:59 From a tonne of sorghum,

1:01 we make between 375 litres

1:05 to 395 litres ethanol.

1:10 Ethanol production is a complex process.

1:14 Primarily what we do, we buy a sorghum.

1:16 We buy a sorghum for one reason,

1:17 and that reason is starch,

1:19 and we convert starch into a glucose,

1:21 and glucose we convert into ethanol.

1:24 Unfortunately there are a lot of steps involved

1:27 from going from raw sorghum to just making ethanol

1:30 inside the fermentation.

1:34 Once we buy the sorghum,

1:35 the first thing we do is we run through that

1:38 to the quality standard of our sorghum.

1:41 Because it's very interesting to know

1:43 how much starch you getting out from the sorghum.

1:47 Once we finish this test,

1:48 that goes into the silo so if you look at it,

1:51 there are a couple of silos here,

1:53 and each silos are holding 1200 tonnes.

1:58 Once we store the sorghum in the silos,

2:01 then it goes into the process.

2:03 Now what we do, we transfer that sorghum

2:05 by different conveyors

2:07 inside the grinding section.

2:10 We do a grinding of the sorghum,

2:13 and we follow a certain criteria

2:15 that how much sorghum is to be going into the powder form.

2:19 So we achieve that by using the hammermill,

2:22 and we convert that sorghum into a powder form.

2:24 Once that convert into a powder form,

2:27 what we do we mix that with the water.

2:30 The main reason we mix it with the water

2:31 is to actually hydrolyse the starch.

2:34 That's why we actually put the 85 degree water

2:37 inside the tank to pretty much kill the bacterias

2:40 that comes with the sorghum,

2:41 and at the same time we hydrolysis the starch.

2:45 The water that we use is all recycled water

2:48 that we get from the Council,

2:50 and then we clean the water up through our

2:54 reverse osmosis plant,

2:56 and we use it in the system in the process.

3:01 So now we went from hydrolysis process

3:03 to enzymatic process.

3:05 We use two enzyme in order to convert that starch

3:09 into simpler form of glucose,

3:11 and then it goes into the fermentation process.

3:15 We have a glucose,

3:17 and what we do we add the yeast

3:19 with the fermentation,

3:20 and yeast converts glucose into CO2 and ethanol.

3:27 So now we have fermentation,

3:28 which has alcohol,

3:31 which we call ethanol,

3:32 and the rest of the things that remain

3:34 or comes out from the sorghum which is the protein,

3:37 fibre, fat, it's all sitting in the dissolved form

3:41 in the fermentation,

3:42 and the husk and the rest of them

3:43 which is in a suspended solid.

3:46 This fermenter will take it into the distillation,

3:48 where we distil the fermenter,

3:52 and convert that into a pure alcohol,

3:55 and we recover the alcohol from there

3:58 at 93 percent strength.

4:01 That alcohol we put it through a dehydration

4:04 where we actually take a water molecule out from ethanol,

4:08 and convert into a hundred percent pure alcohol.

4:11 The rest of the product that comes out from the

4:14 distillation that we run through the decanters

4:18 where we convert that two products into two by-product,

4:21 which one we call as WDGS, and the syrup.

4:24 WDGS is a simpler form,

4:27 the complex form is wet distiller grain with the soluble,

4:31 and syrup is just the dissolved solid

4:33 that we recover from the decanter

4:35 that we concentrate from 10 percent solid

4:38 to 30 percent solid in evaporation

4:42 by using the waste energy that generated into the plant,

4:45 or into the distillation unit.

4:48 We have just installed a dryer

4:50 which dry the product because the wet-cake shelf life

4:55 is about seven days and the dryer reduces

4:58 the water content from 68 percent to 10 percent.

5:03 We use a thousand two hundred gigajoules of gas a day,

5:08 a million litres of water a day,

5:12 two-thousand five hundred

5:15 kilowatt of electricity a day.

5:19 In Australia we haven't actually latched on

5:24 to the importance of ethanol.

5:26 The importance of it is a clean-burning,

5:29 and it's better for the environment,

5:32 it's better for people.

5:34 Efficiency in the motor vehicle,

5:36 if you look at it, it is 95 octane,

5:40 where a normal ULP is 91 octane,

5:44 so you get a better performance out of it.

5:48 On the price-basis and usage,

5:51 it comes out over a long period,

5:54 it's about on par.