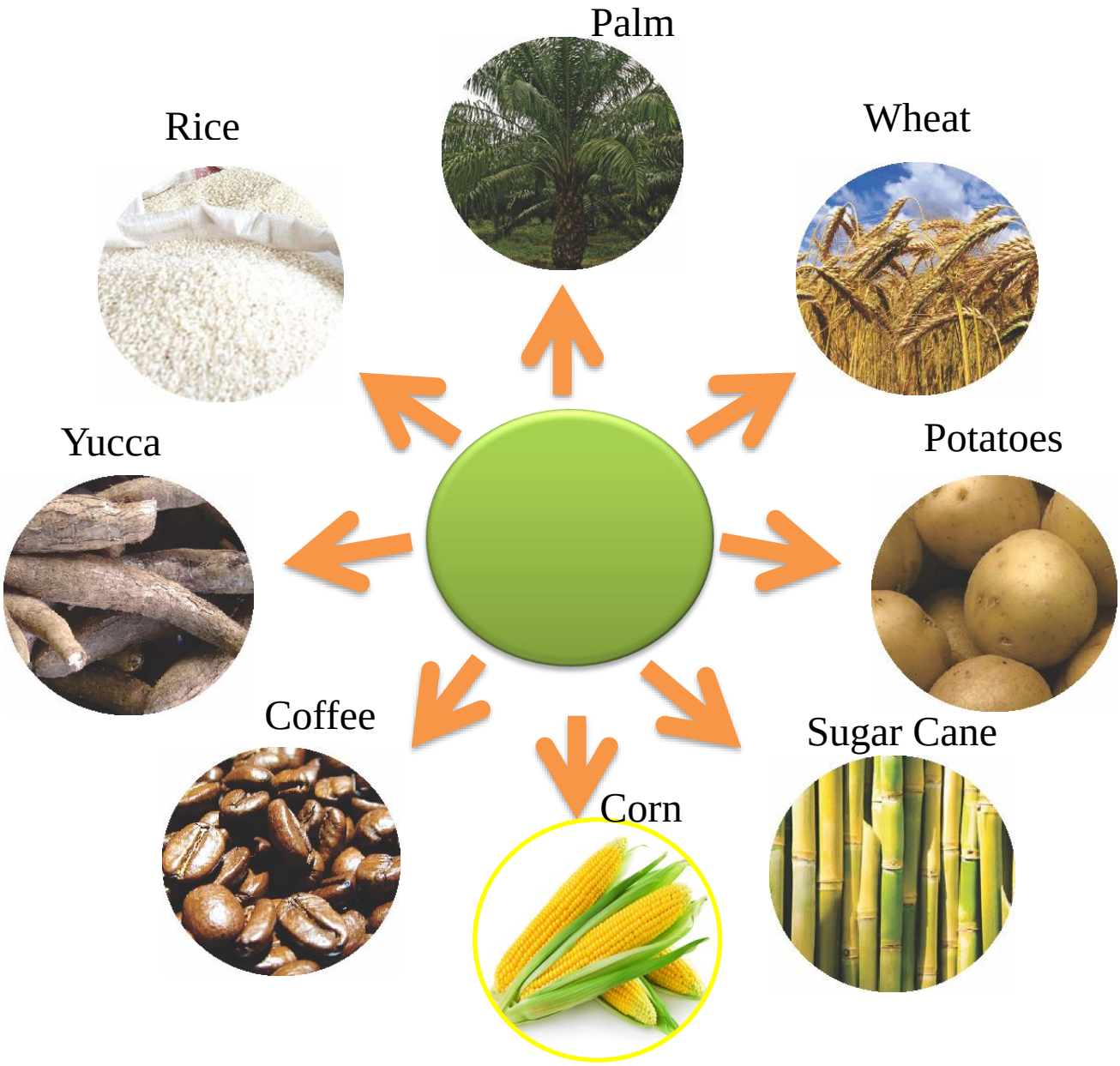
Bioethanol production Plant

Technology To Replace Fossil Fuels

LT-PE-01



- ✓ *Ethanol from biomass*
- ✓ *Research on other cellulose alternatives.*
- ✓ *Learn all the processes involved on biofuel production*

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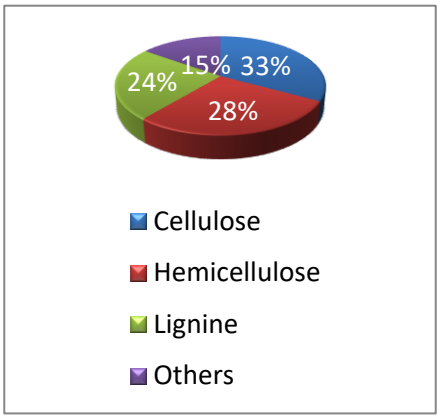
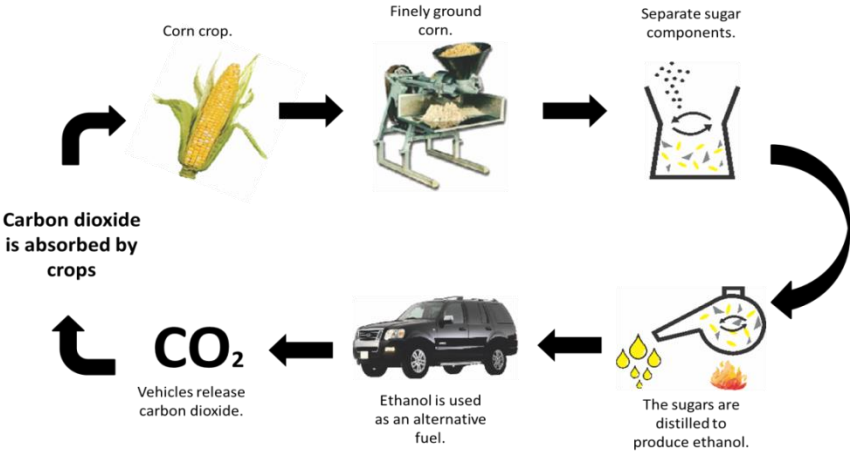
Bioethanol production Plant



Biomass is the organic matter which can be obtained from any living organism, but specially plants. Vegetable food waste and vegetable which comes from plant dry mass, can be used in bio-ethanol production.

Biofuels from biomass have several advantages compared to fossil fuels not only in usage but in renewable production of raw materials.

The world currently needs a change to improve the sustainability conditions. In the quest for oil's substitutes, researchers have been exploring renewables materials like wheat, sugar cane and oil plant which can be used and its effects on food security. Recently a new trend has increased interest: biofuel from algae (See our biofuel from algae pilot plant).



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Bioethanol production Plant

Excellent for Research and Education.

Our bioethanol production plant is the ideal match for any research on biofuel production from biodegradable material (Biomass) or cellulose in general, allowing you experimentation at several levels:

Research

This Bioethanol production plant is able to produce small batches of ethanol from different vegetable raw material, to allow the experimentation and research on efficiency, production, materials, processes and yields.

Researchers will find a lot of powerful tools in this plant, since several technical features allows them to save time, collect data, monitor remotely and control the process in a fully automated way.

Simple commands and settings are made though a Touch screen panel, making the work of production easier. Students not familiar with control but with the process can learn about bioethanol production form different stages.

Education

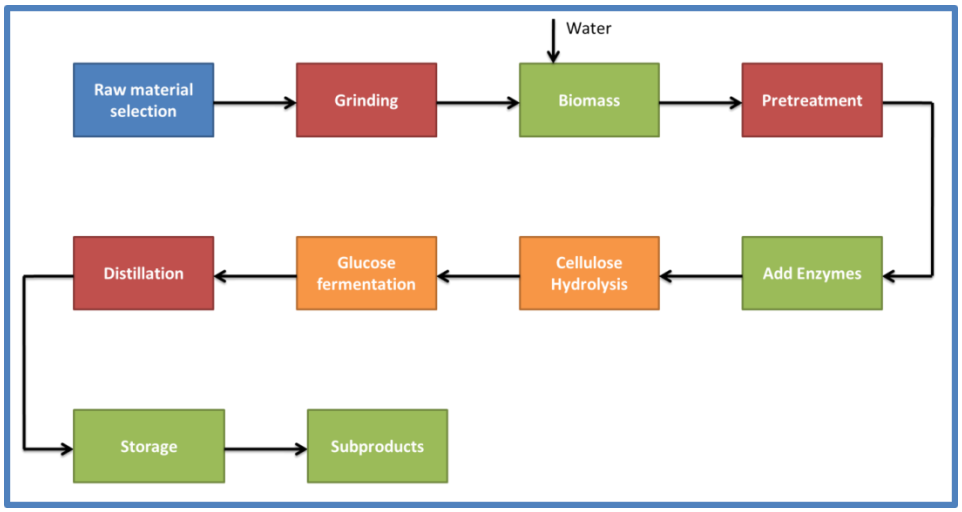
This production plant can be adapted according to the education curriculum to train on multivariable control in technical disciplines related to chemical, mechatronic, electrical, electronic or industrial engineering.

One of the big advantages of our educational plant relies on the fact the several groups of students can work simultaneously on the equipment. Depending on the background. the students can use, operate the plant (pilot) or design and implement the whole control system. The control is not limited to a particular brand so you can use multiple controllers or PLC manufacturers. However, if you use our PTSF1616[*] you will have a versatile and economic solution to perform both: simple and advanced process control.

Bioethanol production Plant

Bioethanol production process

The process of making a fuel depends on several stages, where the control of variables and raw material, are really important to obtain a very good product.

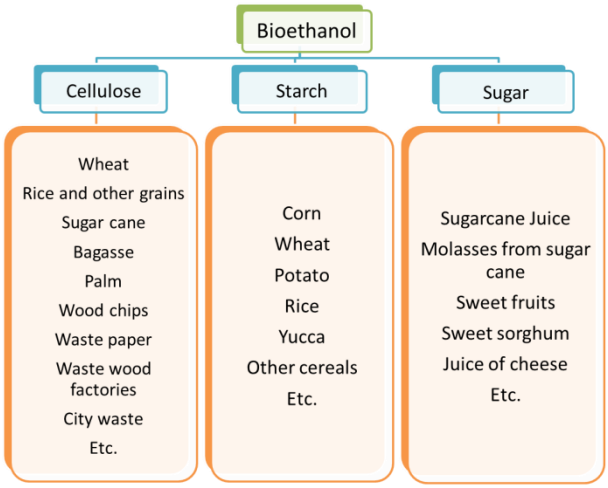


The above figure shows the processes involved on the ethanol production.

You don´t need to use the plant on just on a sequential way. Independent operation of the sub-systems is also possible. This special feature allows the user the better understanding and application of every stage: heating, cooling, mashing, fermenting and distilling.

Raw materials for Bioethanol production

The bioethanol can be obtained trough processing different vegetables; one of them is the cellulose coming derived from grains, sugar cane African oil palm, wood, among other. Another raw material is the starch, which can be obtained from corn, wheat, potatoes, rice, etc. The sugar obtained from the juice of sugar cane, sweet fruits, can also be used as raw material.



Bioethanol production Plant

Statistics and yields of raw material.

Material	Sugar [%PF]	Culture [T/ha]	Ethanol [L/T]	Yiedl [L/ha]
Sugar Beet	16	60	100	400
Jerusalem Artichoke	16	40	90	6000
Potato	20	20	120	3600
Grass		2 - 13(MS)	150	2400
Molasses (40 kg / t beet)	50	(2.4)	300	300 - 1950
Corn	58	8.3	390	720
Wheat	60	5.5	370	3000
Cerum	4.9		23	2040

¿How can you order this production plant?

1. Like a pilot plant.

In this version a control panel handles all the related processes and allows you to make all type of interventions. Trough a touch panel you can perform manual or automatic operation, observing all the production variables, diagnose or stopping of the process.

This production plant is made for all of those research ad education disciplines which want to focus on the process directly and not on the control features of every device used. It's guaranteed to have an easy, safe and reliable operation.

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Bioethanol production Plant

Simple touch operation for the process!

Visors and indicators

2. Like a set of control workstations.

The plant is designed no just like an integral process, but like a group of separated and not wired sub processes which, once connected to control equipment, can be individually operated. The variables of every subsystem, involved in every stage, are channeled toward an individual panel or module where can be connected to our control system PTSF1616[*] or to any other brand controller.

The educational version is made for all those disciplines that have some background on connecting electronic and control devices: process, control, automation, mechatronics, industrial and electronics engineering.

On every workstation, a group of students can develop all kind of control algorithm trough manual, remote or automatic control. Stand-alone or pc control also can be achieved. Every workstation doesn't affect the others. This is very useful to serve a bigger numbers of students simultaneously.

Setting of parameters through a control panel!

Panel with process signals… right on your desk!

Bioethanol production Plant

¿What is included along with the plant?

General

- *Mash tun*
- *Fermenter*
- *Distiller*
- *Agitators*
- *Activation Valves.*
- *Manual valves*
- *Pumps*
- *Sensors,*
- *Interconnecting Piping.*
- *Water Supply.*
- *Steam supply*

Pilot

- *Touch Panel.*
- *Control Panel.*
- *Manual*

Optional

- *Data Output Software*
- *Data Acquisition Software*
- *Training courses for researchers.*

Educational

- *Duplicated sensors and tanks*
- *PTSF1616[*1] Control Workstations*
- *Connecting cables.*
- *DAS for every workstation.*
- *Up to Four Workstations.*
- *Training Courses for Professors.*

No major tools are required.. just your hands!

Stainless steel construction!

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Bioethanol production Plant

Our plant offer several advantages for you to consider when making your purchase decision:

- ✓ Simple tools are required. For control or electrical connection of devices just a screwdriver is required. To remove or install mechanical parts like pipes, pumps, tanks, etc you only need your hands.

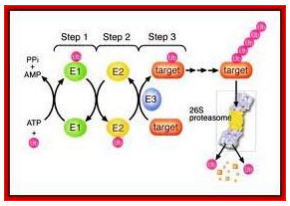
- ✓ No waste of water. For cooling after heating our system saves water by recirculation.

- ✓ No need for compressed air supply! Our plant only requires electricity and if possible water supply.

- ✓ Sanitary construction. We use stainless steel parts to guarantee for tests free of contaminants.

- ✓ Unattended operation! This feature is specially made for researchers so you don´t need to stay in front of the machine controlling the process: manual, semi-automatic, and automatic modes are available.

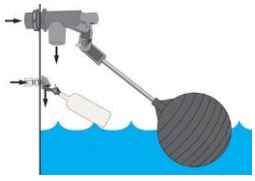
- ✓ Independent operation. Researchers can use every device individually: Mash tun, Fermenter and Distiller. Like having three independent devices.



- ✓ Optional remote control or monitoring. Imagine you monitoring the process from home or receiving email notifications directly to your email!

- ✓ Automatic safety and protections. For risky events safety sensors make the proper disconnection

- ✓ Automatic refilling of water levels. You don´t need to worry in keeping the levels of water of the systems since its control its fully automated.



- ✓ Steam generator for heating is included. For most of the systems you have to order steam generators separately

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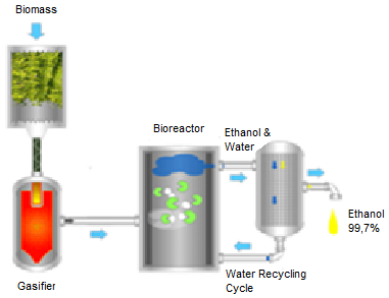
What Control Processes Can You Make?

1. *Level control and measurement.*
2. *Stirring and homogenization.*
3. *Temperature control and measurement.*
4. *Heating and cooling.*
5. *Product doses*
6. *Fermenting.*
7. *Distilling.*
8. *Variable control and measurement.*
9. *PH control and measurement.*
10. *ON/OFF proportional control.*
11. *Variables monitoring.*
12. *Control algorithm.*
13. *SCADA[*2] Supervisory control (Optional).*
14. *Caudal rate.*
15. *Design of safety and intrinsically safe system.*



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Discover and new experience in education and research. More realistic lab practices.

Others Products

- *Climate change Phytotron.*
- *Algae Biofuel Pilot Plant.*
- *Mini-Plant Malt/Beer/Soda production plant.*
- *Inverted Pendulum.*
- *Speed, position and generation plant.*
- *PLC trainer (Generic, AB, Siemens, e.t.c.).*
- *Solar heating system.*
- *Hydrogen cells trainer.*
- *Solar and Eolic energy trainer.*
- *Water supply plant.*
- *Motor-generator plant.*
- *Drives.*
- *SCADA.*

Other educational process (in preparation)

- *Motor-generator group.*
- *Variable Frequency Drive*
- *Step Motors and Servo Motors.*
- *SCADA*