

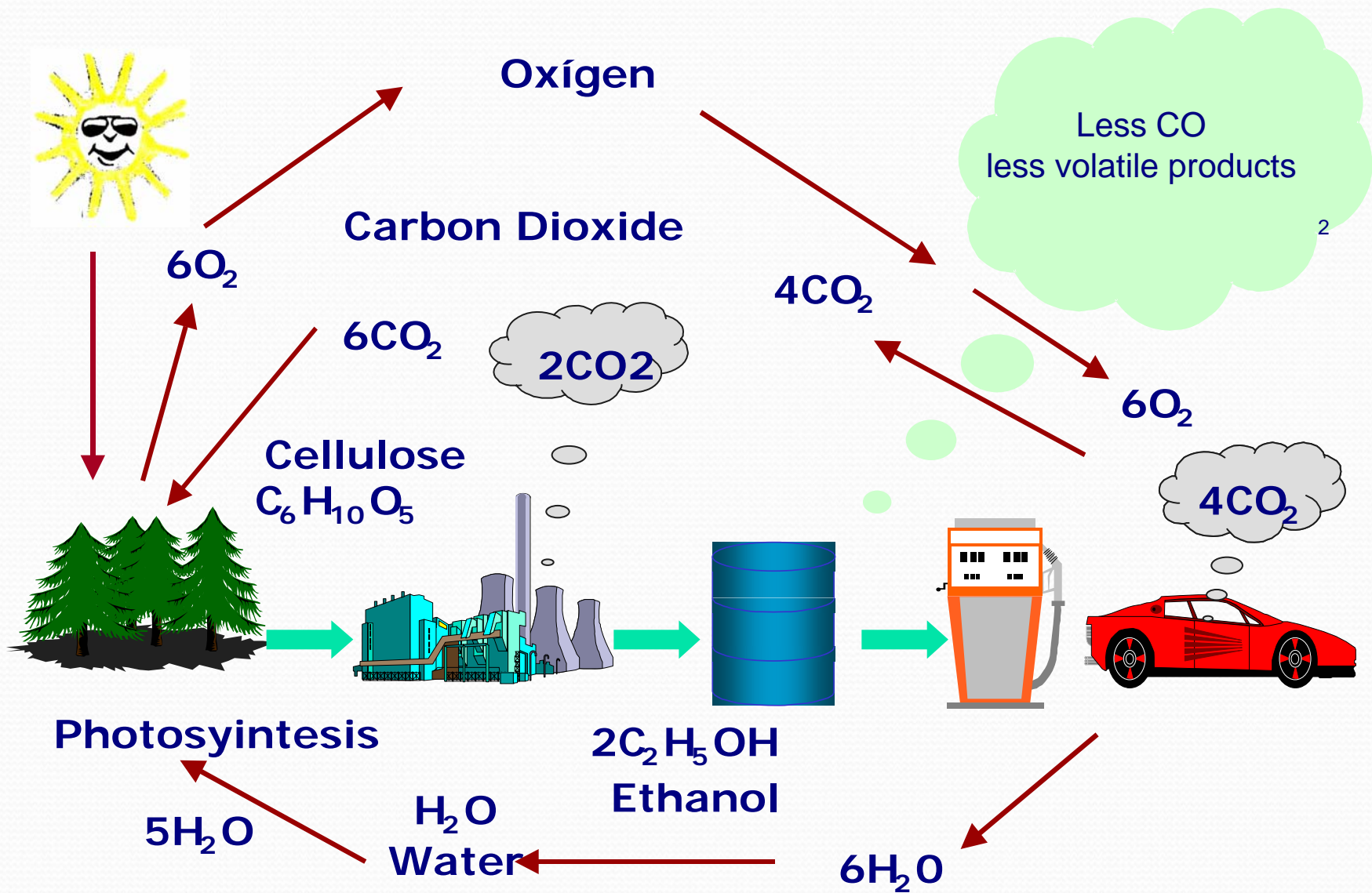
Ethanol Project



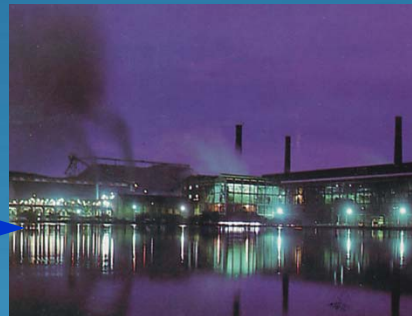
Mauricio Guevara S.

31 7 2002

Clean Enviromental Tecnology

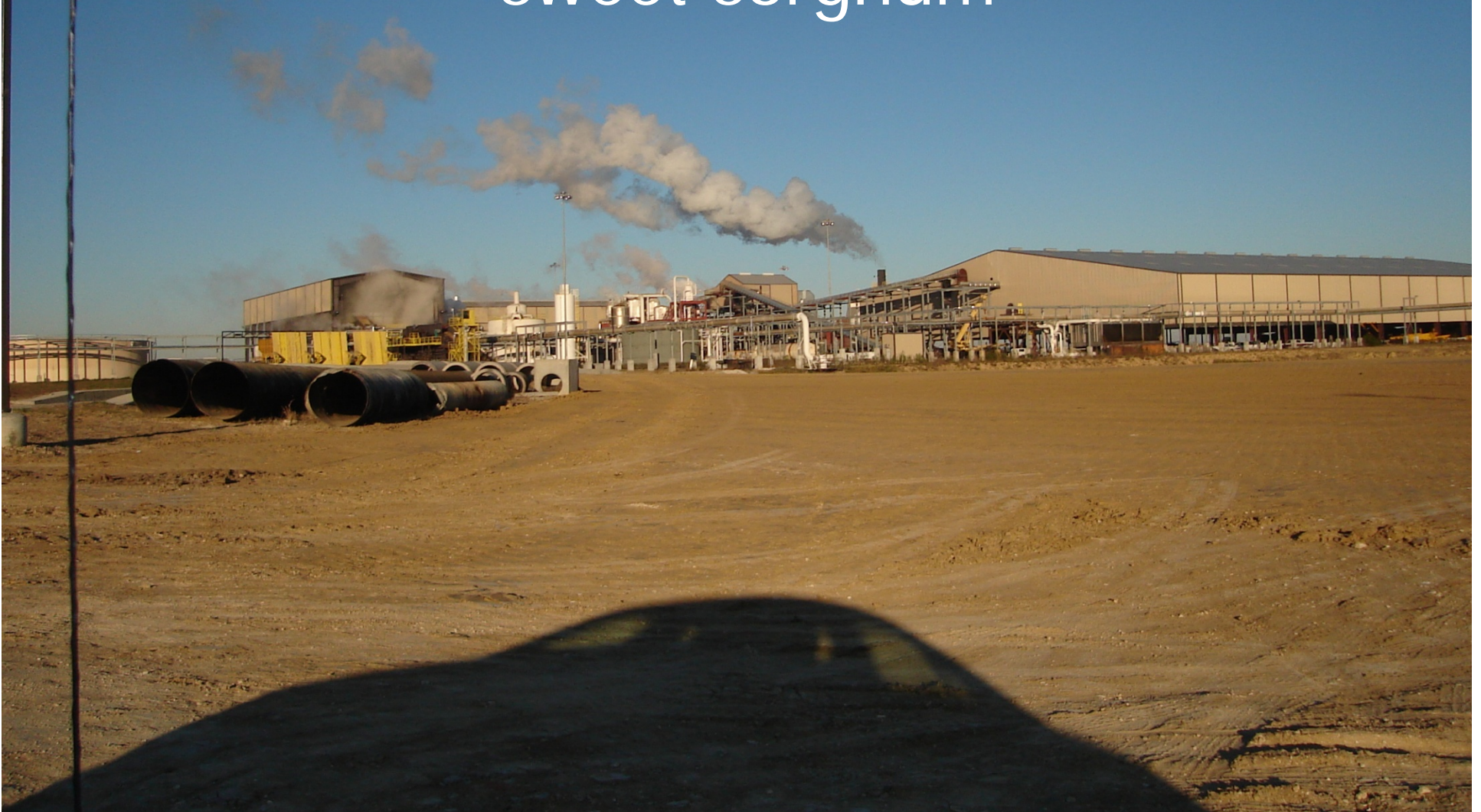


INTEGRAL SYSTEM



LACASSINE EXISTING FACILITIES

for the processing of sugar cane and
sweet sorghum



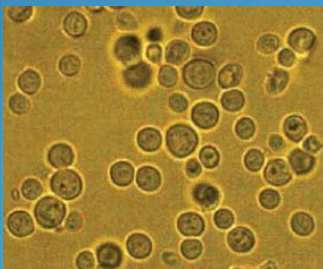
LACASSINE ETHANOL PLANT

Production Of Ethanol From Sugar Cane and Sweet Sorghum

**INDIAN TECHNOLOGY MORE THAN 300
ETHANOL PLANT OPERATING**

CAPACITY 22.4 Million Gls/year fuel Alcohol

START UP TARGET: 2009



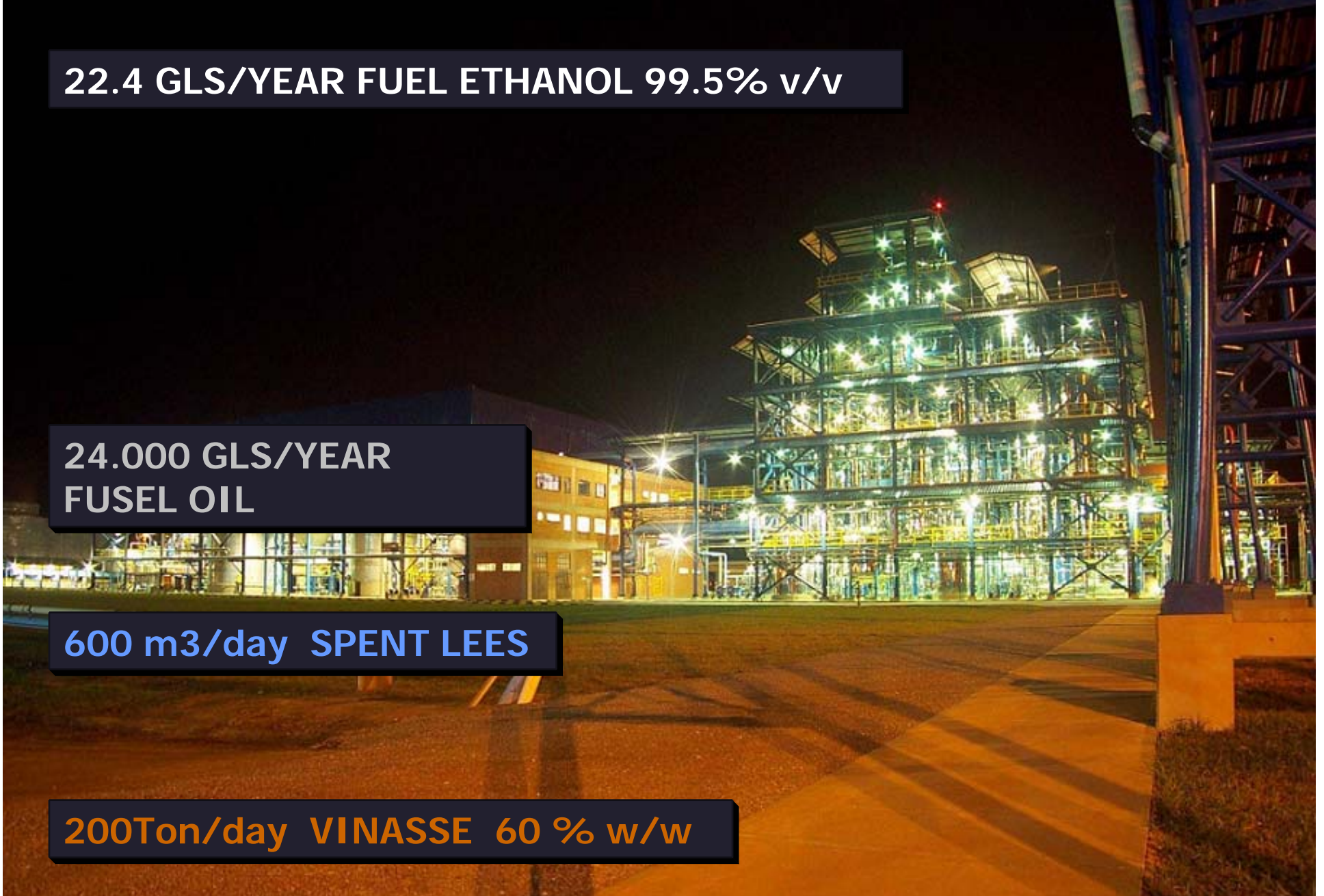
Distillery Products

22.4 GLS/YEAR FUEL ETHANOL 99.5% v/v

24.000 GLS/YEAR
FUSEL OIL

600 m³/day SPENT LEES

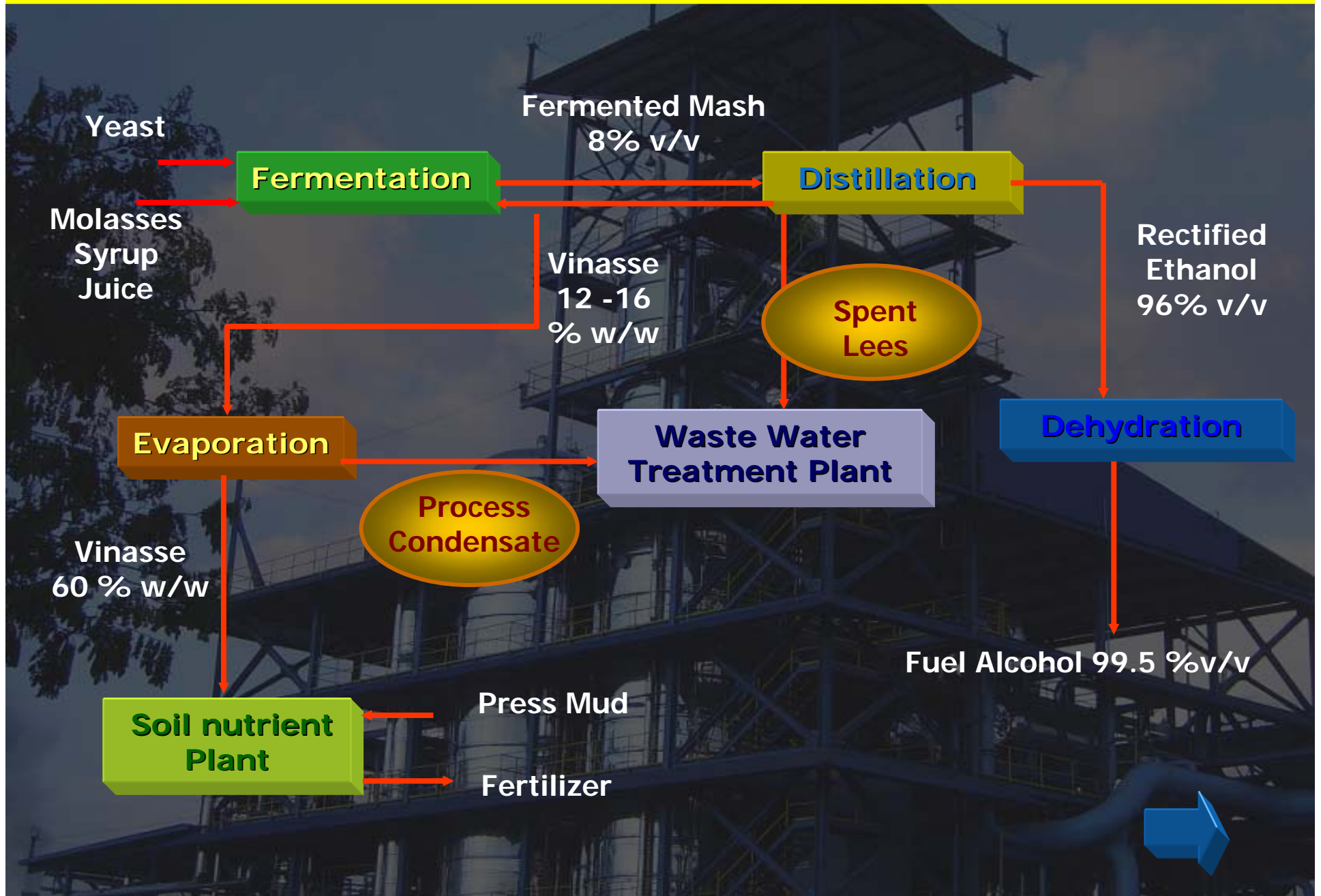
200Ton/day VINASSE 60 % w/w



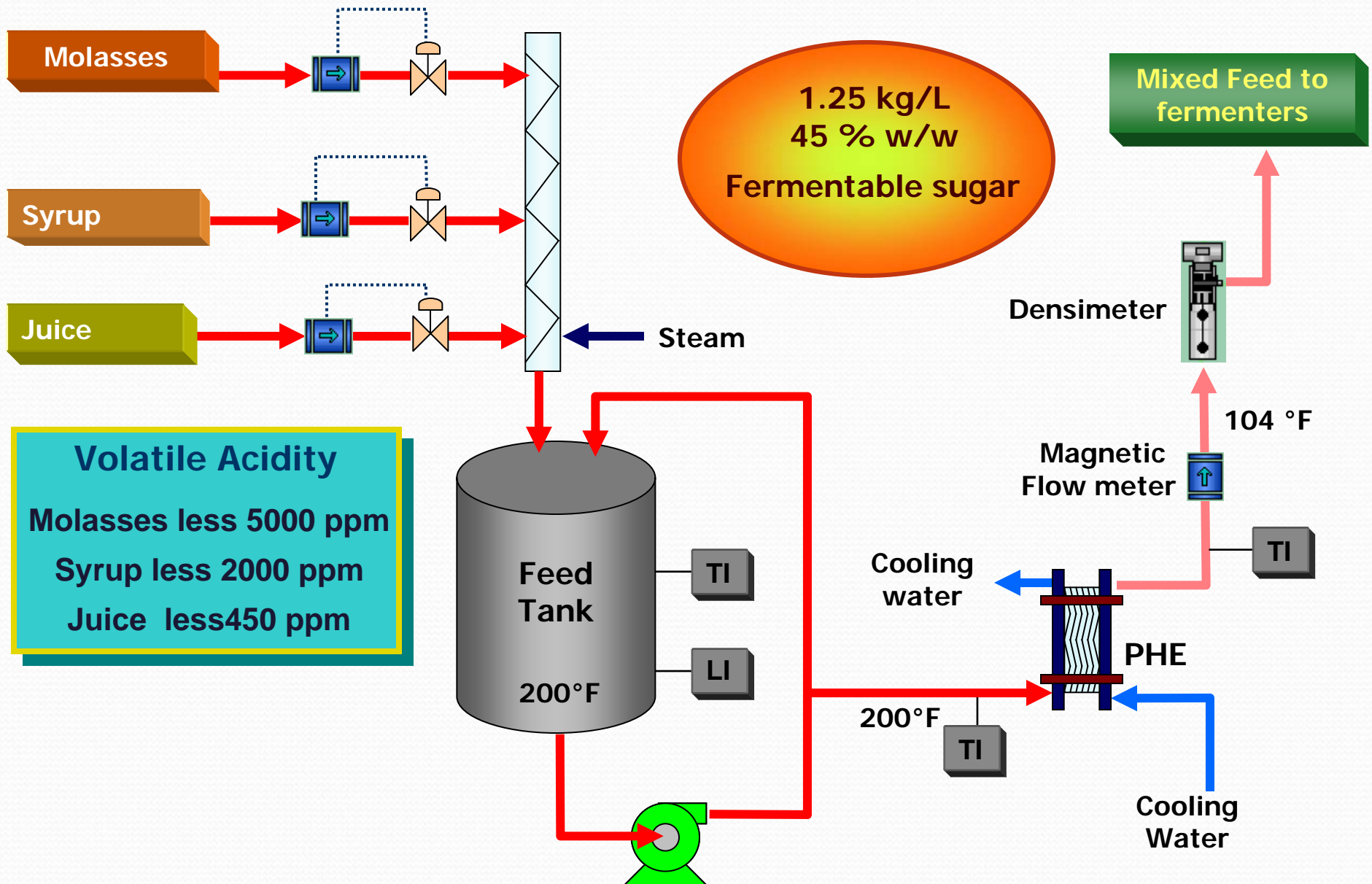
FEEDSTOCK

		Molasses	Syrup	Juice
Fermentable Sugar	% w/w	48	55	13,9
Unfermentable Sugar	% w/w	3	0,6	0,07
Calcium	% w/w	1		
Volatile Acidity	ppm	6000	2000	450
Brix	%	81	57,7	13,5
pH		6	6,2	6,9
	CFU/ml	1×10^3 1×10^4	10-3000	10-1000

FUEL ALCOHOL FLOW CHART



MIXED FEED PREPARATION



COMPONENTS OF VOLATILE ACIDITY

Acetic Acid

Butyric Acid

Propionic Acid

Valeric Acid

Iso Valeric Acid

Destroy yeast cell membrane

Decrease Alcohol Productivity of Yeast

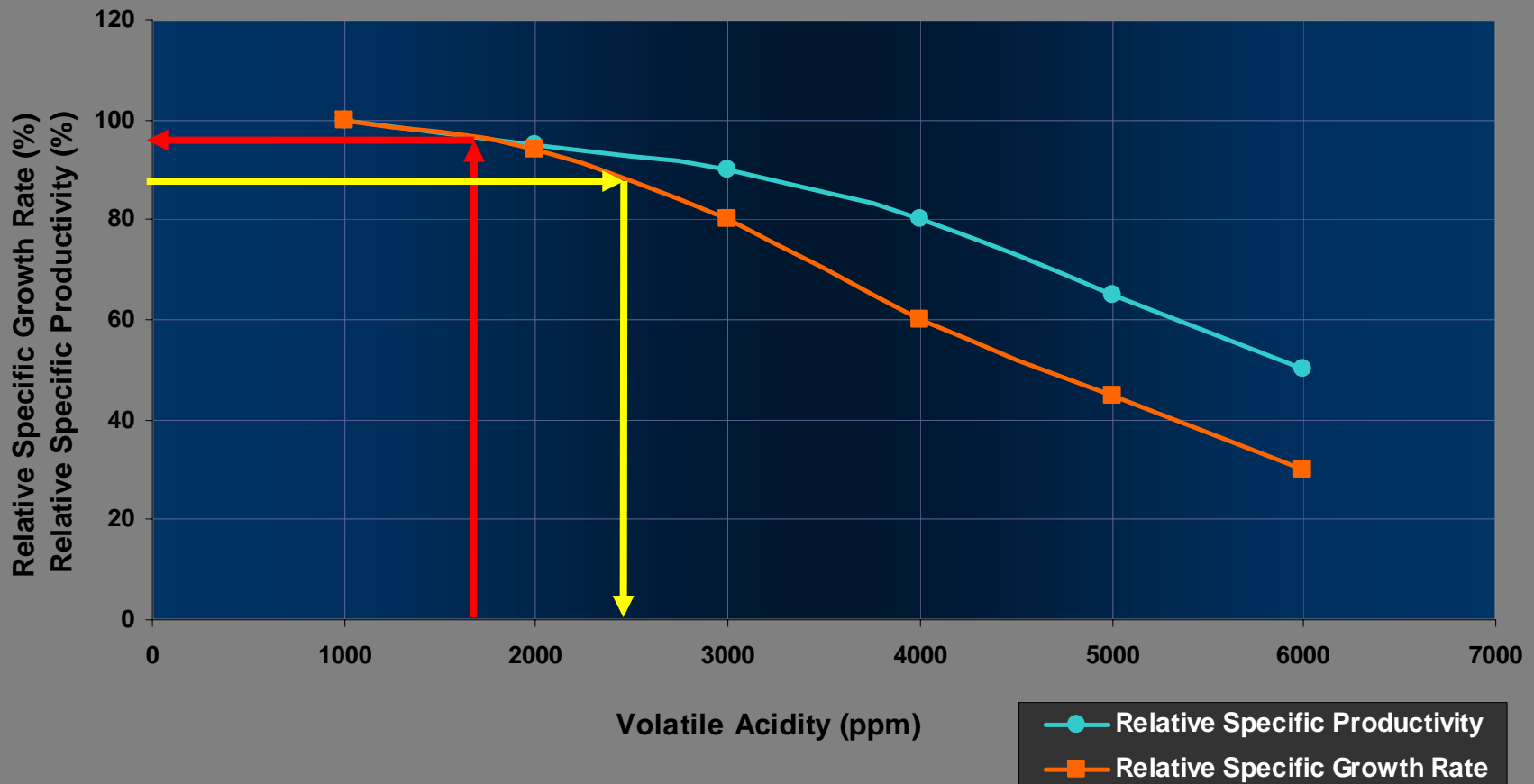
Decrease Yeast Growth

Maximum in the fermenter

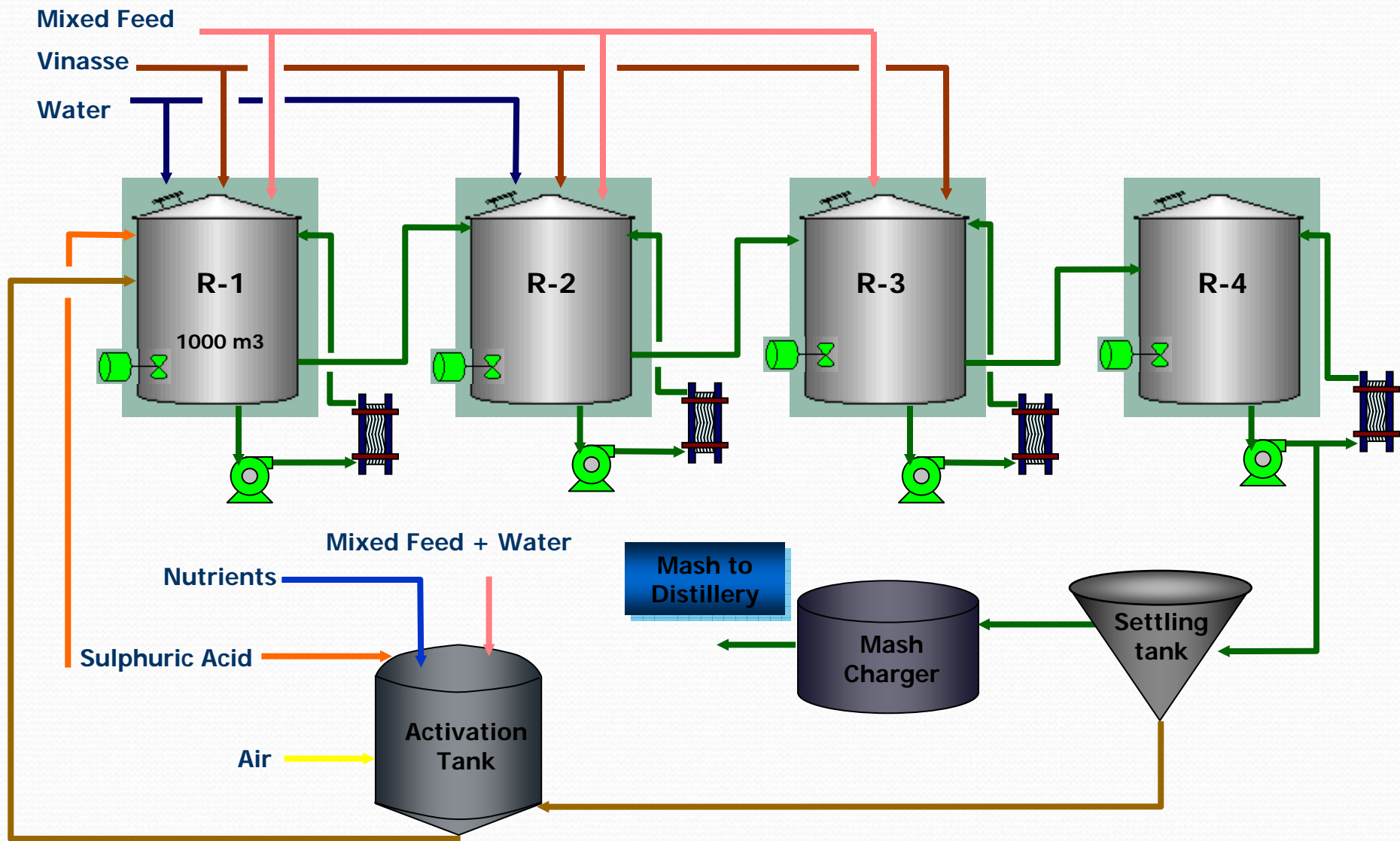
2500 ppm

Effects of Volatile Acidity

Volatile Acidity Effect on Relative Yeast Growth & Productivity



FERMENTATION SECTION



VINASSE RECYCLING 45 - 60%

Fermentation Operation Conditions

Temperature in fermenters: 31 – 32°C

Activation Vessel pH : 3.5 - 4

Antibiotic Addition: 2 – 3 ppm

Operation Volume: 750 m³

Fermenter Yeast Population / Viability : 450-350 million cel/ml ~ 49 % - 60 %

Free Assimilable Nitrogen: 250 ppm

Ethanol Concentration: 7.5 – 8 % v/v

Maximum Sludge: Lower than 16 % w/w

Vinasse Recycled to fermenter: 45 – 60 %

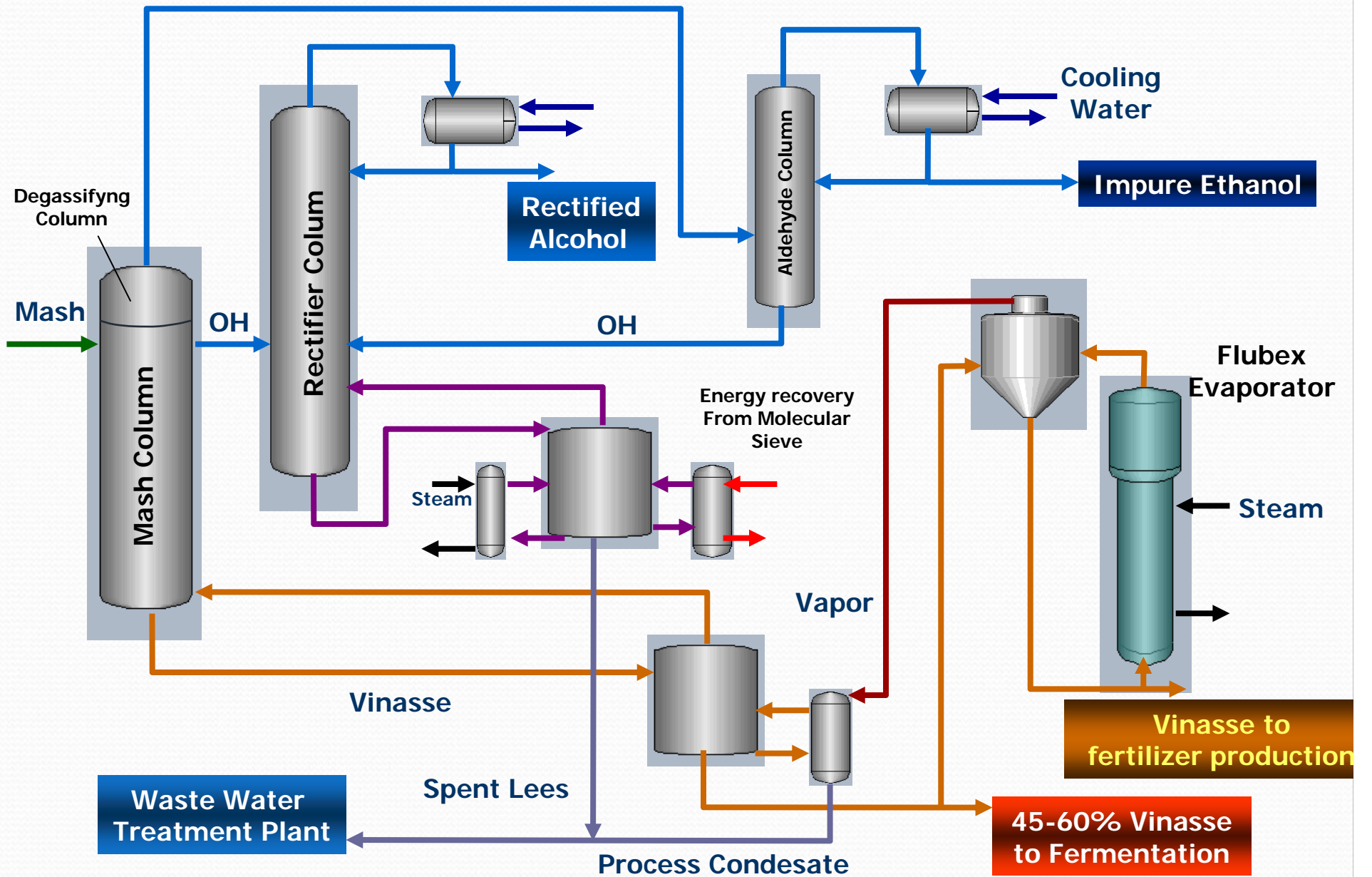
Volatile Acidity: Maximum 3000 ppm

Contamination: Lower than 10⁶ CFU/ml

Last fermenter residual sugar: 0.75 % w/v



DISTILLATION SECTION



RECTIFIER COLUMN 56 BUBBLE CAP TRAYS



DISTILLERY



Rectifier Column – 56 bubble
cap trays - Vacuum

Distillation Efficiency : 99 -99.5%

Dehydration Efficiency : 99.5%

Mash Column – 24
Grid trays -Vacuum

Fermentation Efficiency : 88- 90 %

Steam Consumption : 3.5 – 3.6 kg /liter Ethanol

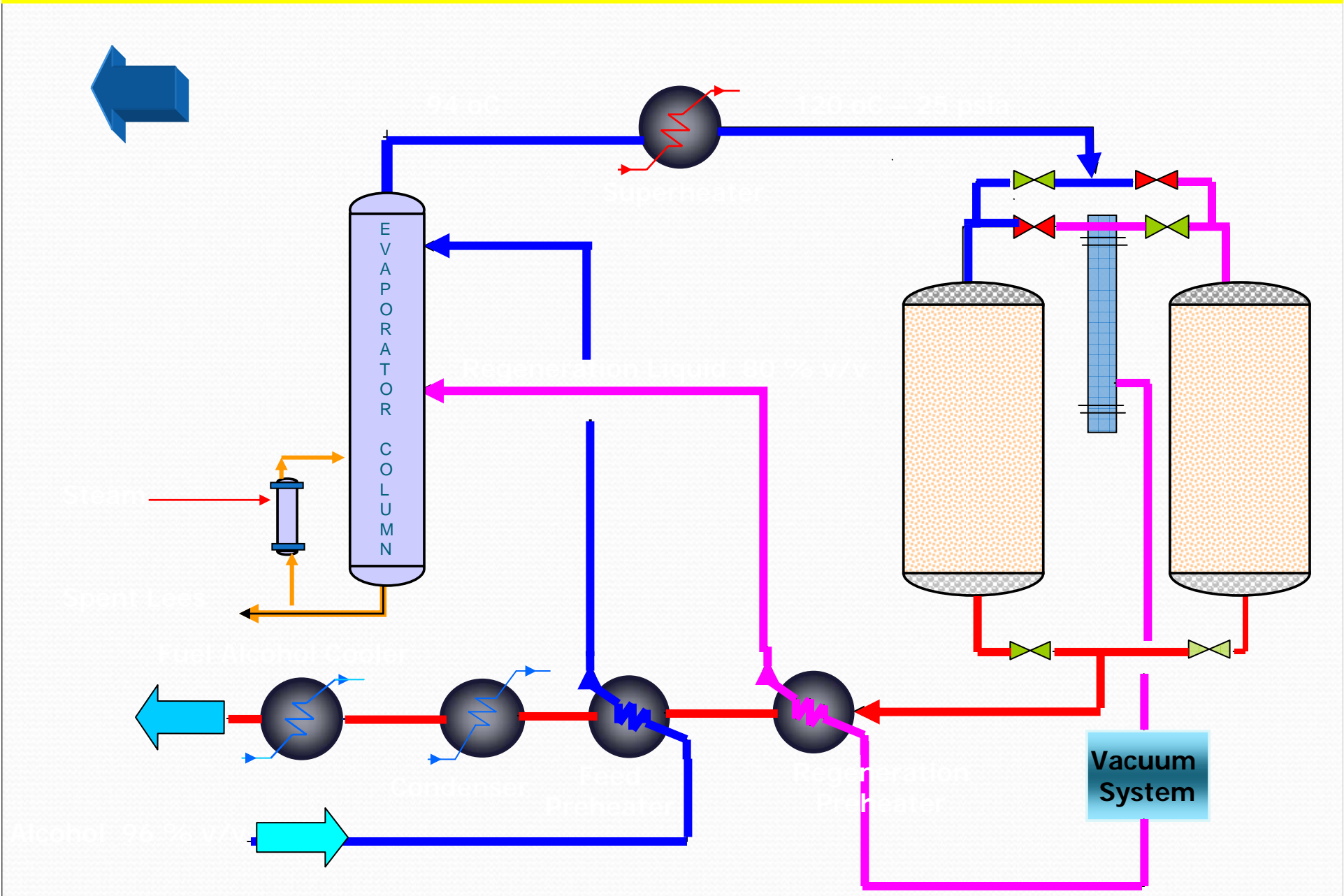
DEHYDRATION SYSTEM – MOLECULAR SIEVES



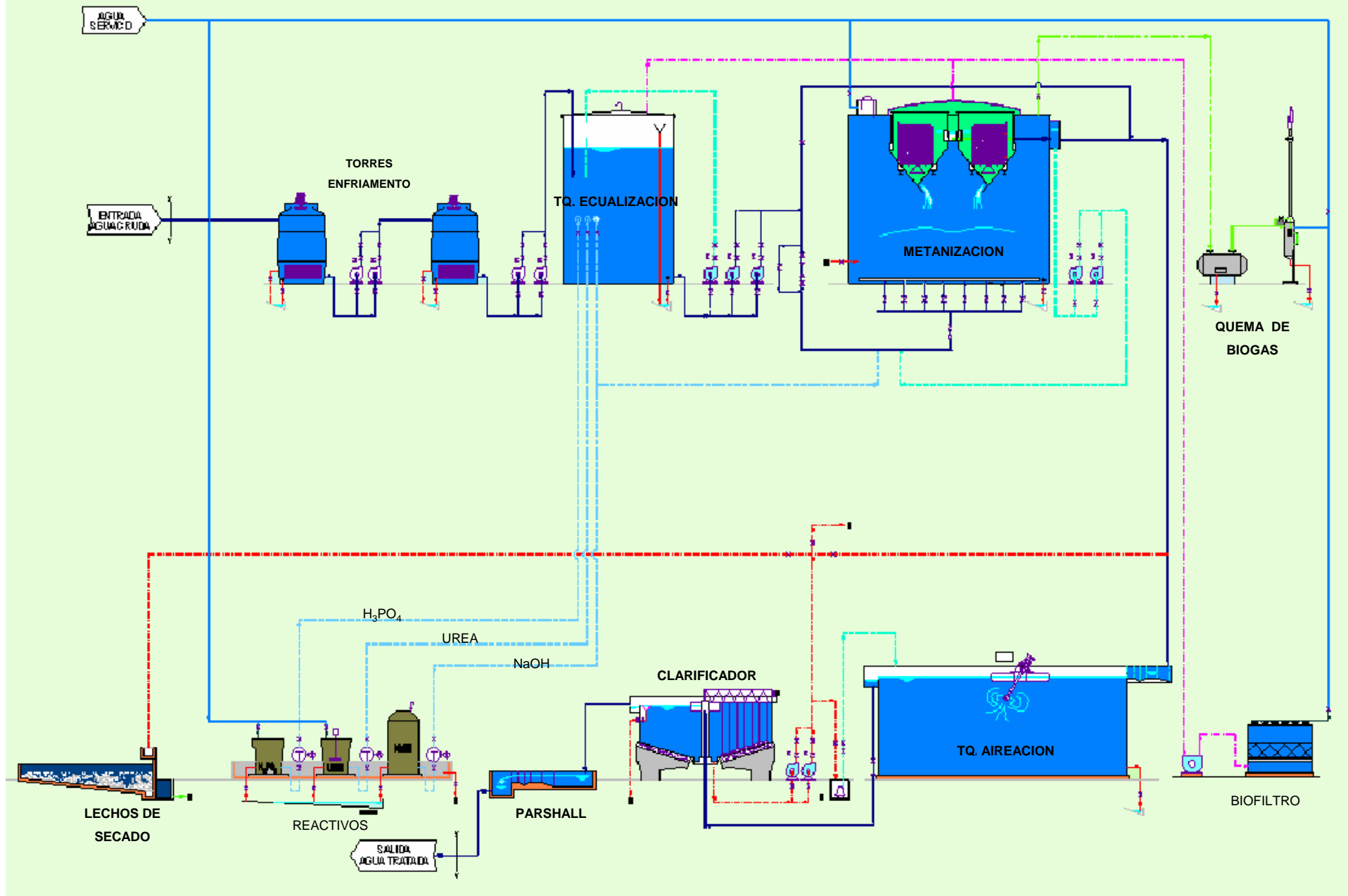
**FUEL
ALCOHOL
99.5% v/v**

**RECTIFIED
ALCOHOL
96 % V/V**

DEHYDRATION FLOW DIAGRAM



WASTE TREATMENT



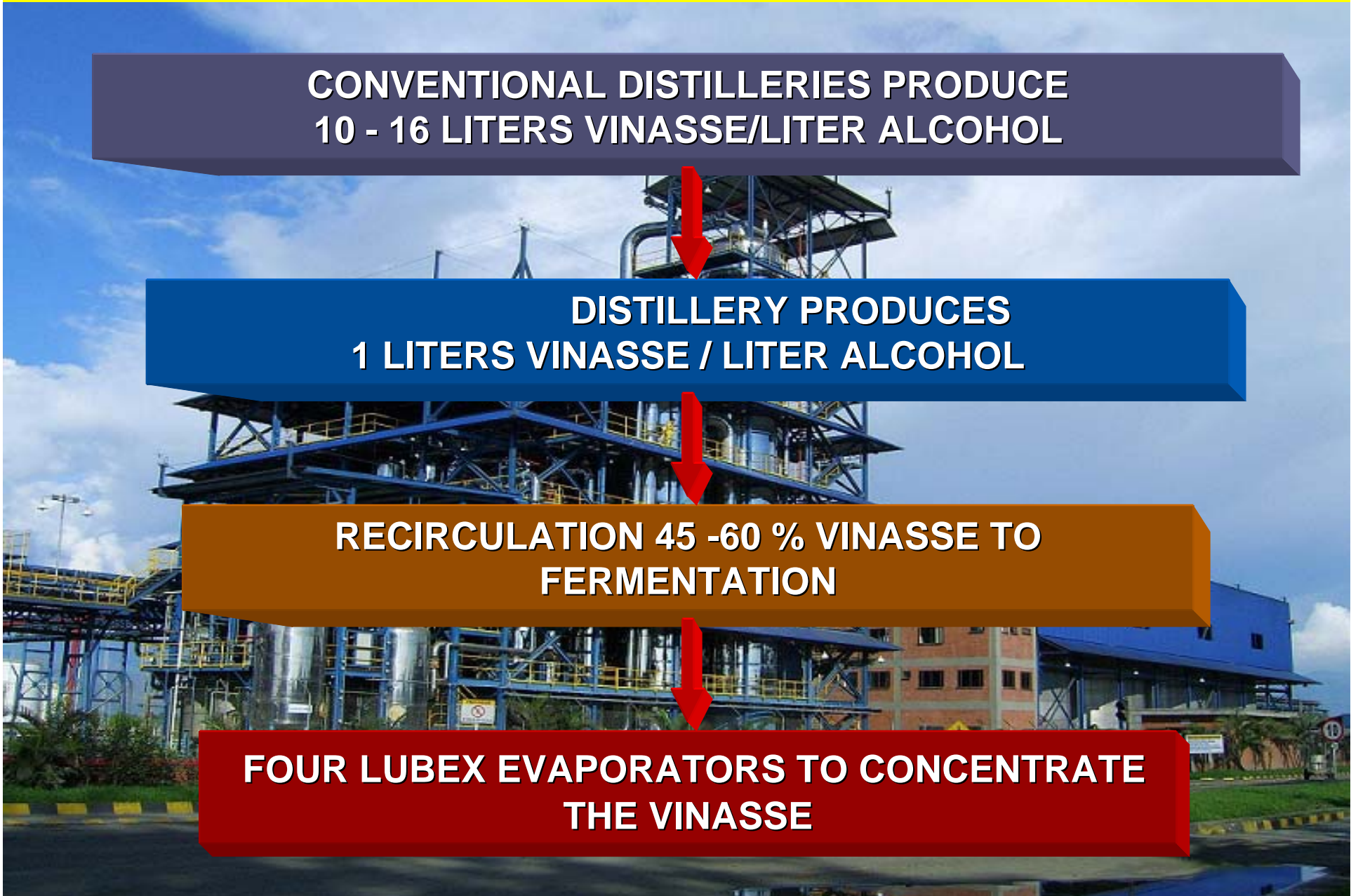
DISTILLE - VINASSE PRODUCTION

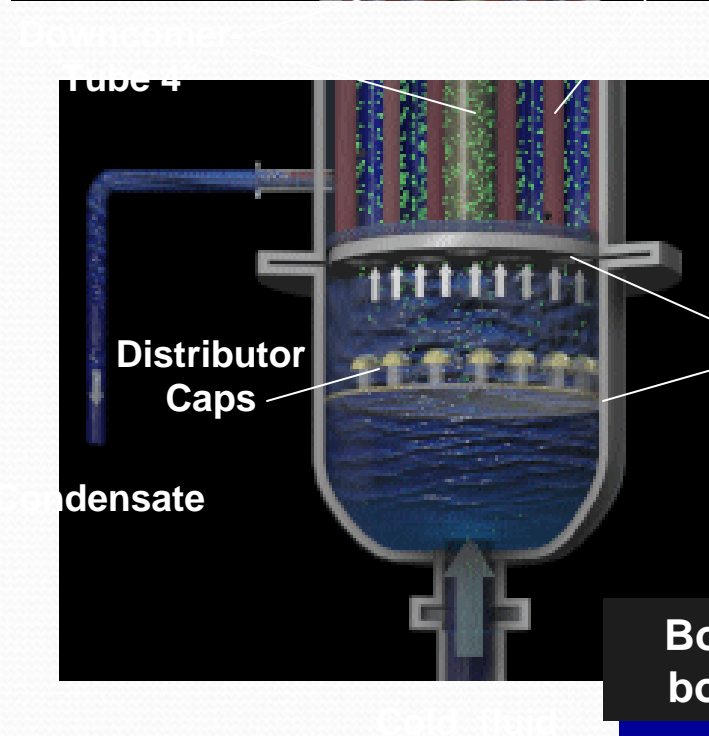
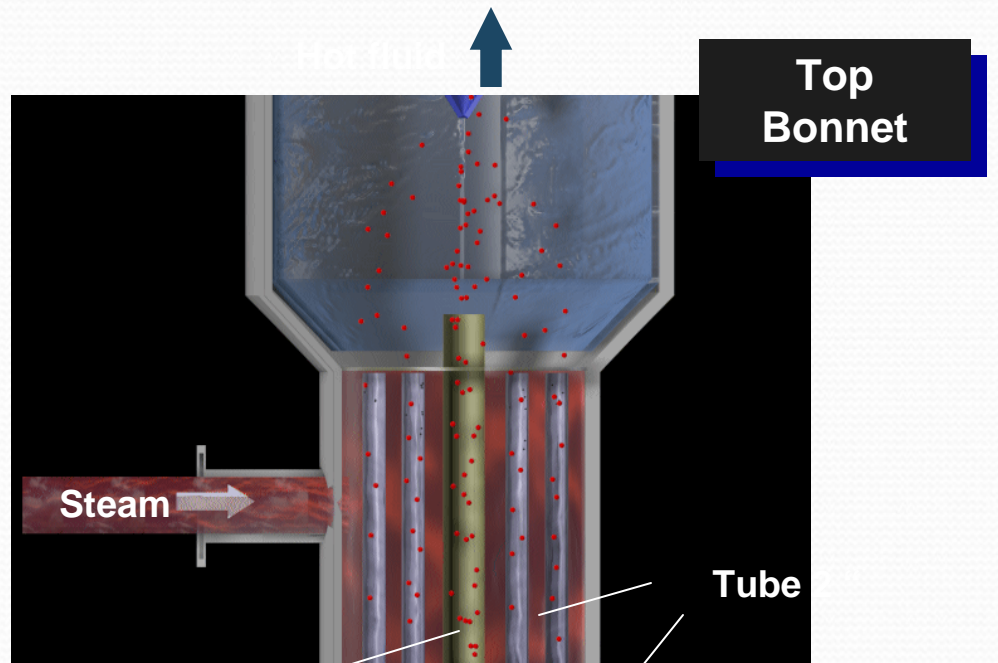
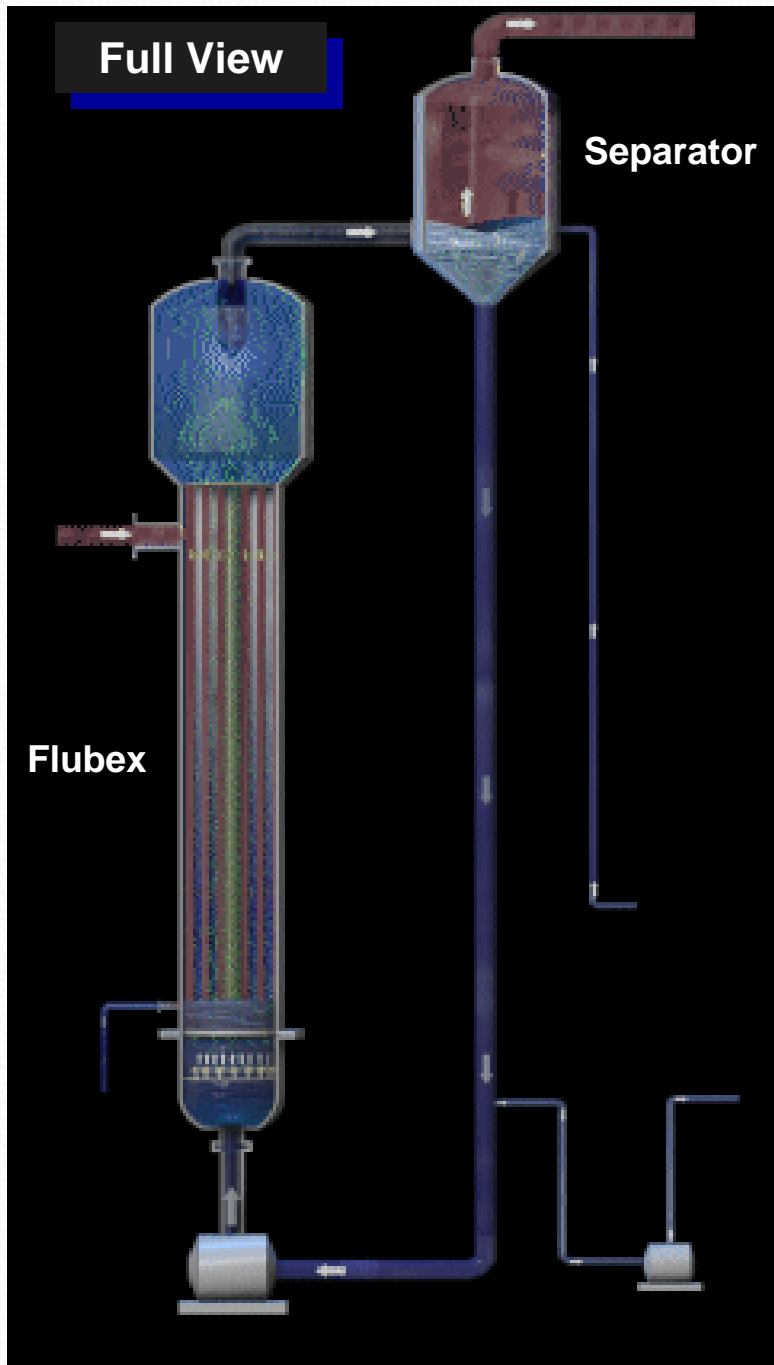
**CONVENTIONAL DISTILLERIES PRODUCE
10 - 16 LITERS VINASSE/LITER ALCOHOL**

**DISTILLERY PRODUCES
1 LITERS VINASSE / LITER ALCOHOL**

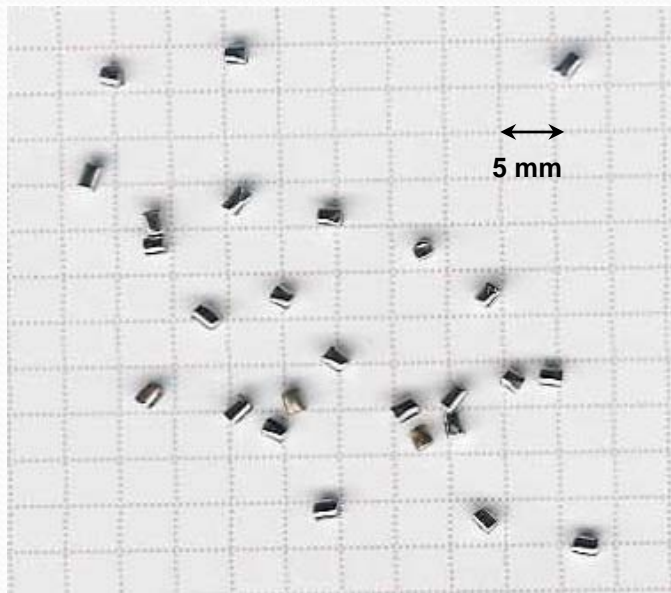
**RECIRCULATION 45 -60 % VINASSE TO
FERMENTATION**

**FOUR LUBEX EVAPORATORS TO CONCENTRATE
THE VINASSE**

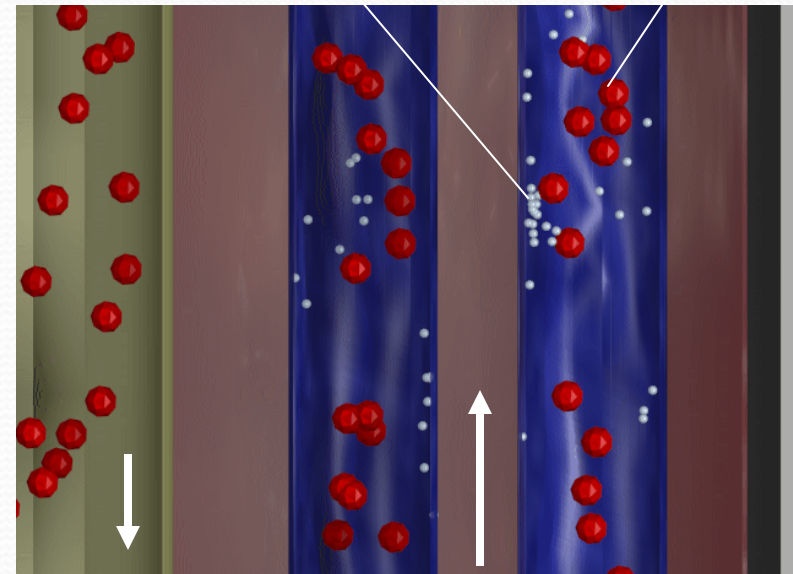




WIRE BITS ARE POURED INTO FLUBEX



Compared Size



Scouring Action

**ONE MONTH - CONTINUOUS OPERATION
DUE TO SELF-CLEANING MECHANISM FROM
WIRE BIT ACTION**

Products to Vinasses and Mill Mud “Cachaza” .

- **Bagasse and Mill Mud with vinasses:** Organic fertilization in different cultures. Combination or substitution with chemical fertilizers.
- **Vinasses transform in a organic fertilizer (Liquid).** Organic fertilization in different cultures by irrigation systems. Combination or substitution with chemical fertilizers.
- **Stabilization of Vinasses similar product to molasses:** substitution of molasses for Cattle. Agglutinated in Concentrated Protein concentrated for animal use.

COMPOSTING PLANT



PRESS MUD
VINASSE



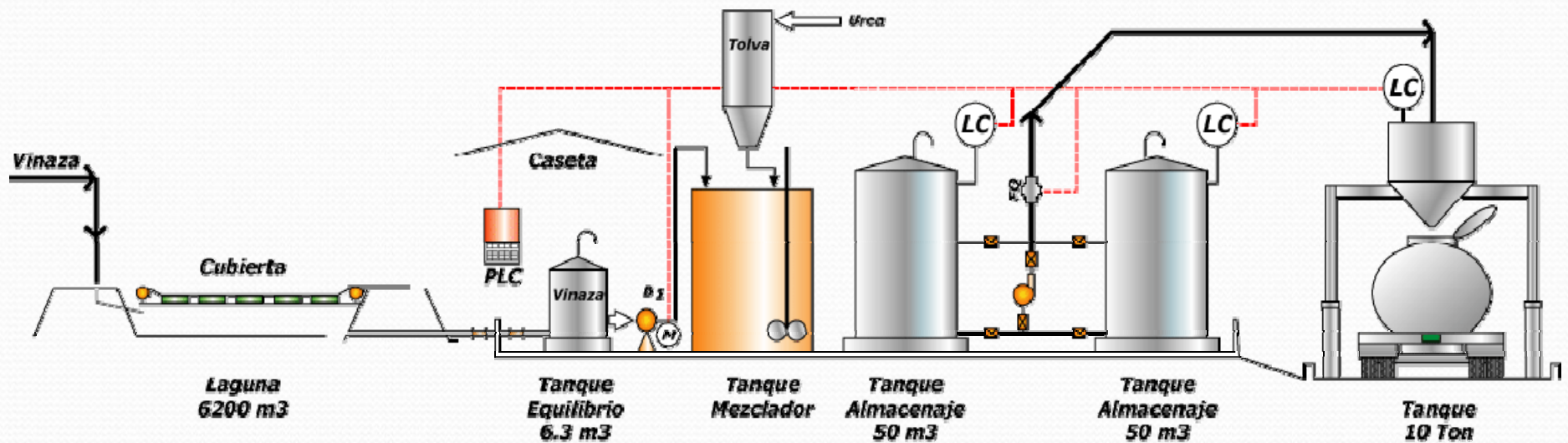
AFTER 65 DAYS WE OBTAIN A
FERTILIZER



BAGASSE
ASH FROM BOILER

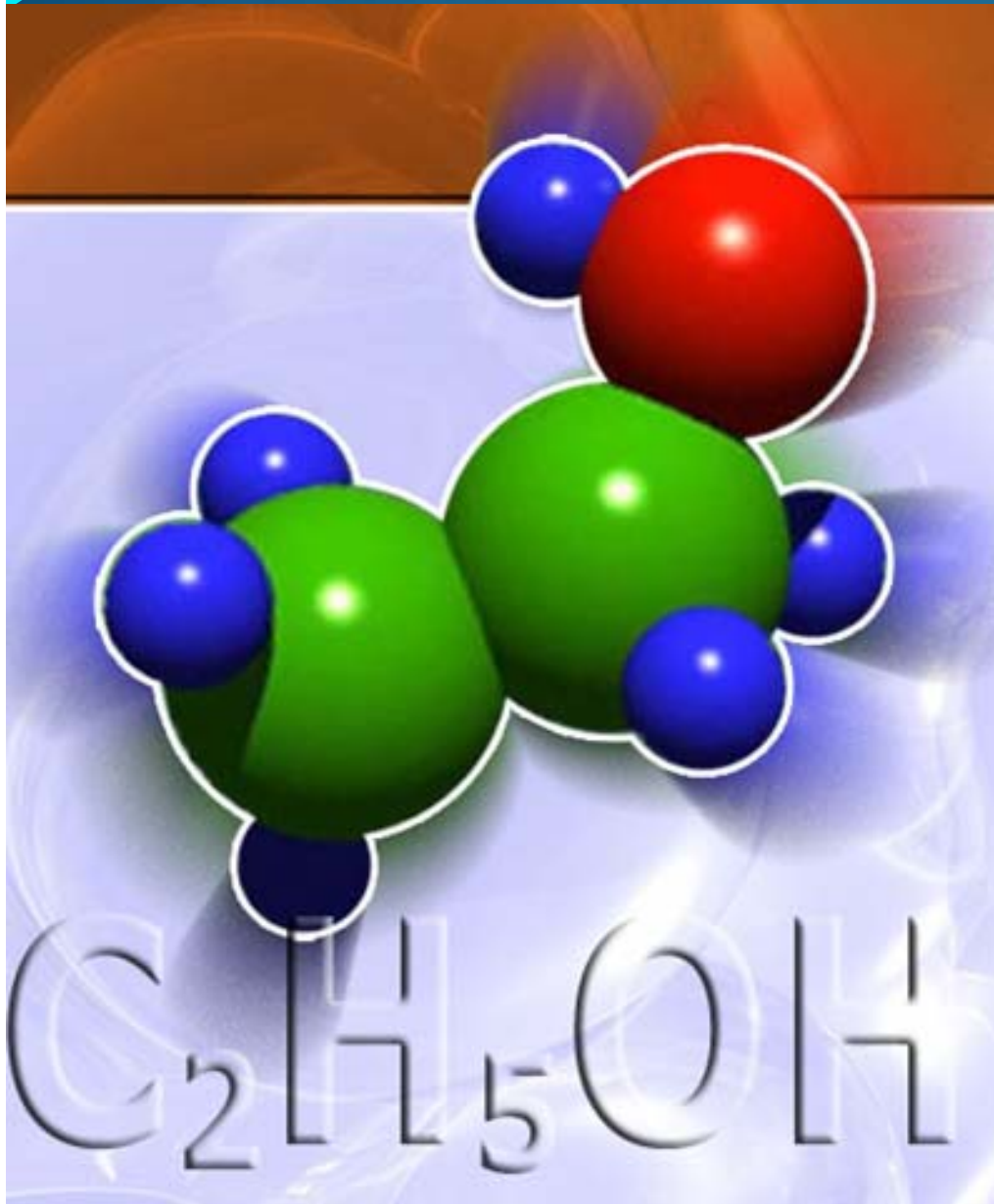


Vinasses transform in a organic fertilizer (Liquid).



PLANT VIEW





Thank you!

Louisiana Green Fuels
Phone: 337-588 4944
Fax: 337-588 4947
LACASSINE, LA