Optimising the Oil Refining Process and Integrating ZLD System

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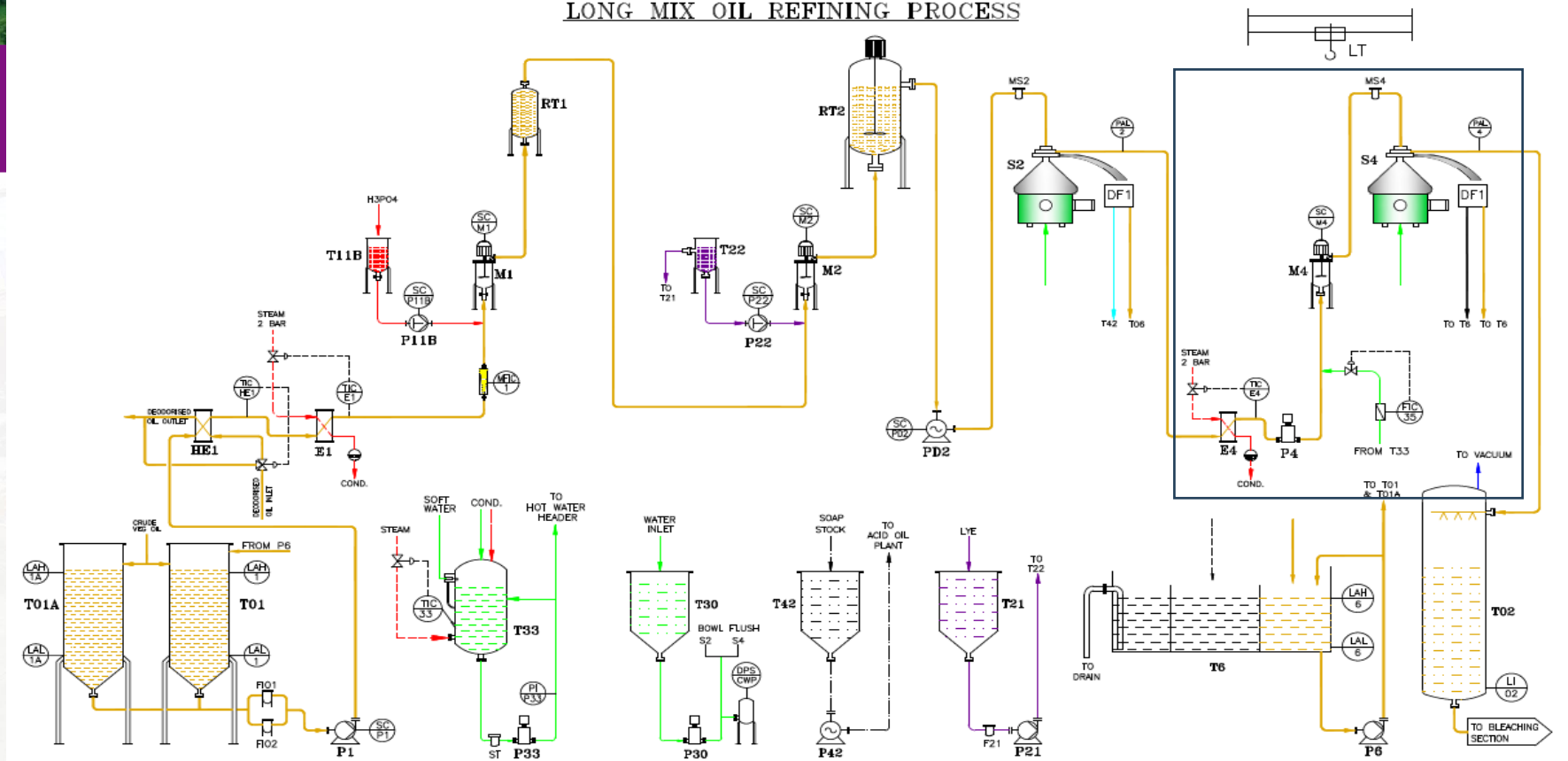
LONG MIX OIL REFINING PROCESS



PHOSPHORIC ACID		VACUUM LINE	
WATER LINE		PROCESS WATER	
GUM LINE		WASH WATER LINE	
CONDENSATE LINE		SOAP LINE	
STEAM LINE		CAUSTIC LYE	
OIL LINE		CITRIC ACID	

LINE CODE

DVC PROCESS TECHNOLOGISTS

BANER, PUNE–411045.

PROJECT:	Std.		
DESCRIPTION:	Long Mix Oil Refining Process		
DRG. NO.:	DVC–LMX–11A	DATE:	18.06.2019
SHEET:	A3	FILENAME:	2019–Flowchart

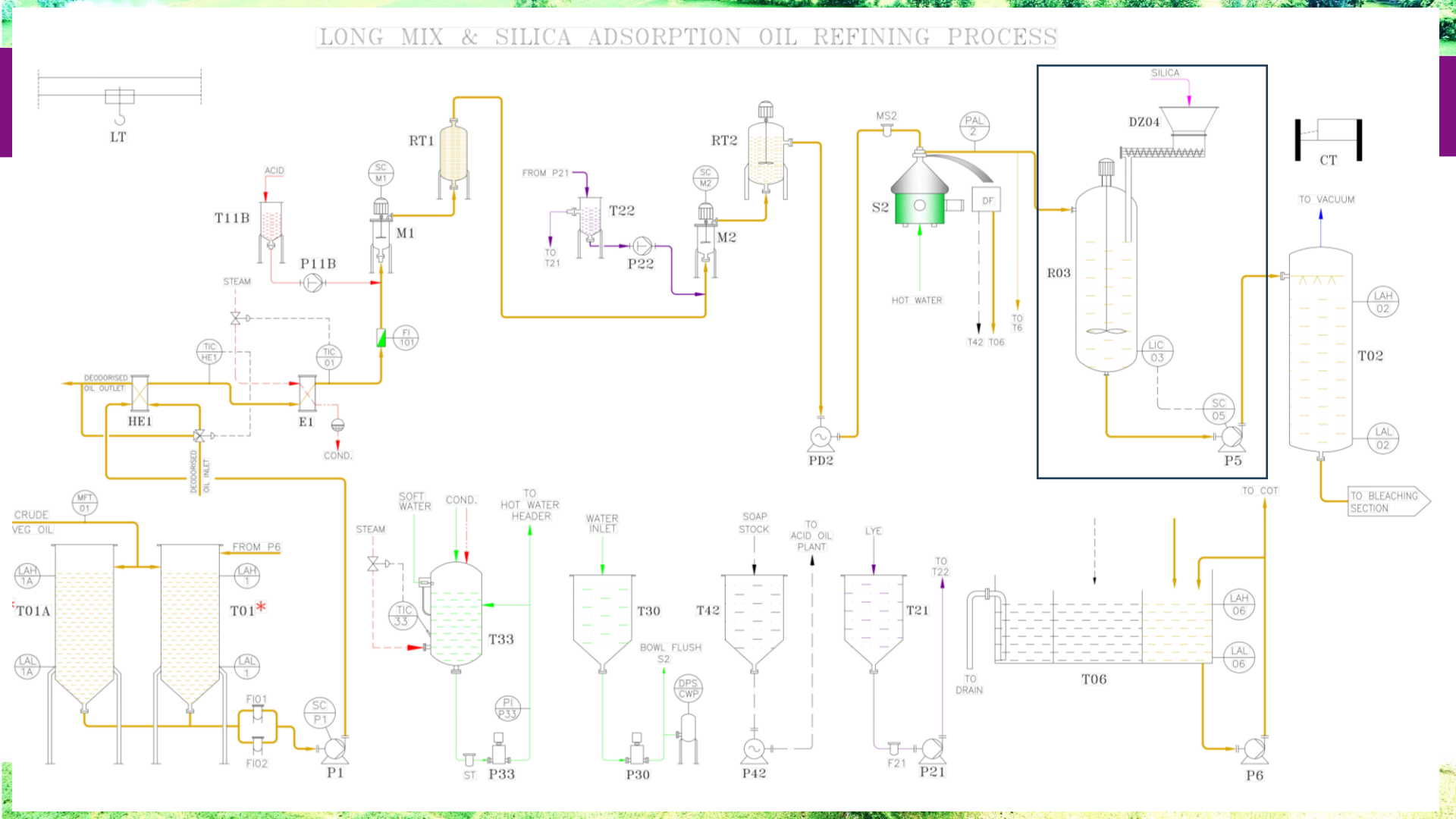
Challenges in Edible Oil Refining

- Process water consumption in washing stage, upto 10% of the feed oil

- Effluent generation during washing and Soapstock splitting process, upto 19% of feed oil

CONSERVE ENERGY SAVE ENVIRONMENT

LONG MIX & SILICA ADSORPTION OIL REFINING PROCESS



About Soap Adsorption Process

- Silica Hydrogel acts as an adsorbing agent
- Adsorbing Soaps, phospholipids and trace metals
- Operating temperature @ 80 deg. C.
- Retention time upto 30 minutes
- Dosage 0.1 – 0.25 %
- Reduces the soap level by 90%

Typical physical properties of Adsorbent	
Surface area	615 m2/g
Pore volume	1.31 mL/g
Average particle size	17.5 microns
Permeability	0.11 darcy

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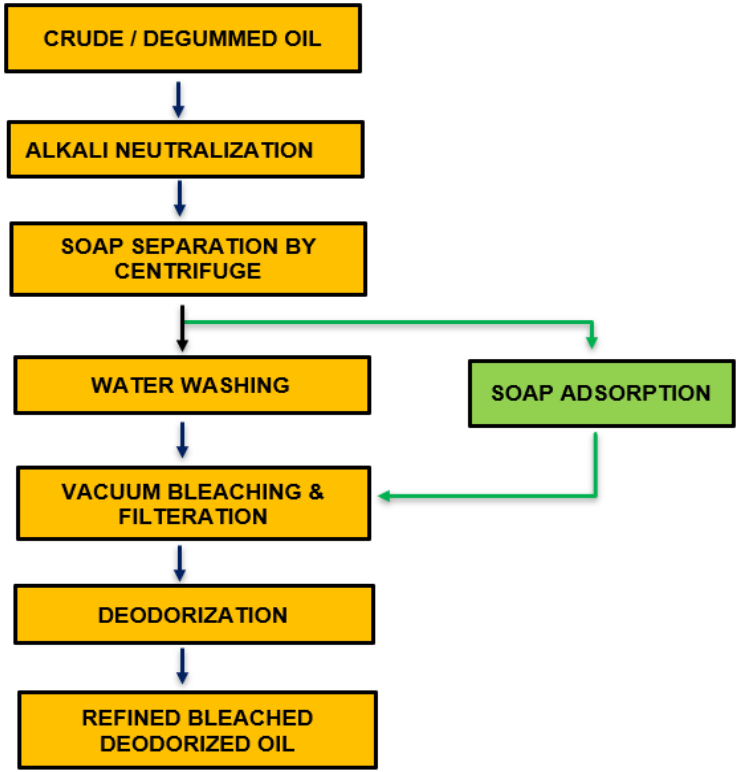
Adopting Soap Adsorption Process in Oil Refining



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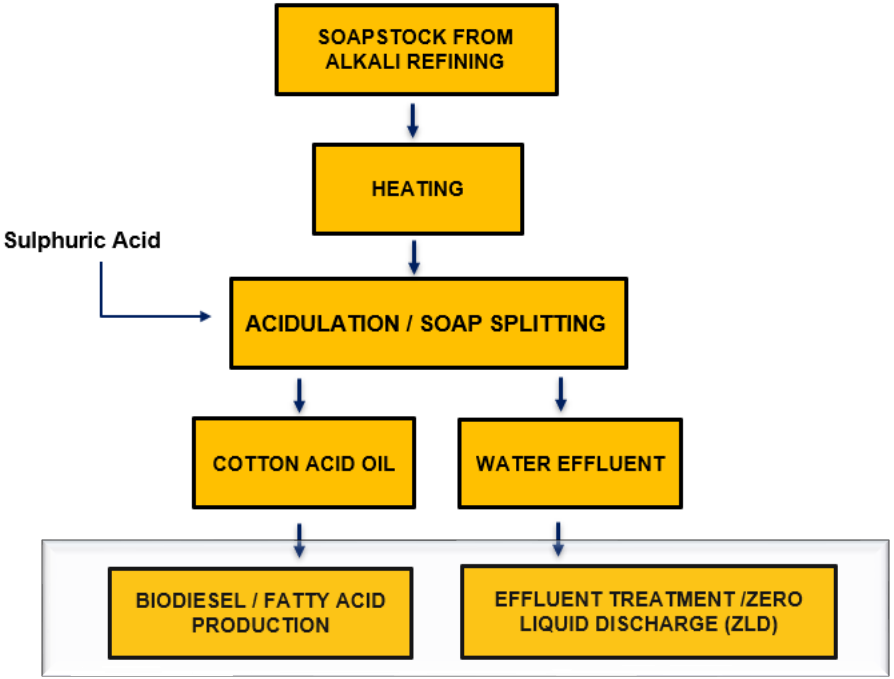
Advantages of Soap Adsorption Process

- Reduction in water consumption by upto 10% which further leads to reduced effluent generation
- Eliminating centrifuge for water washing application
- Reduction in maintenance cost
- Reduction in utility cost like electrical power and steam
- Reduction in phosphoric acid and bleach earth chemical consumption

Soapstock Processing



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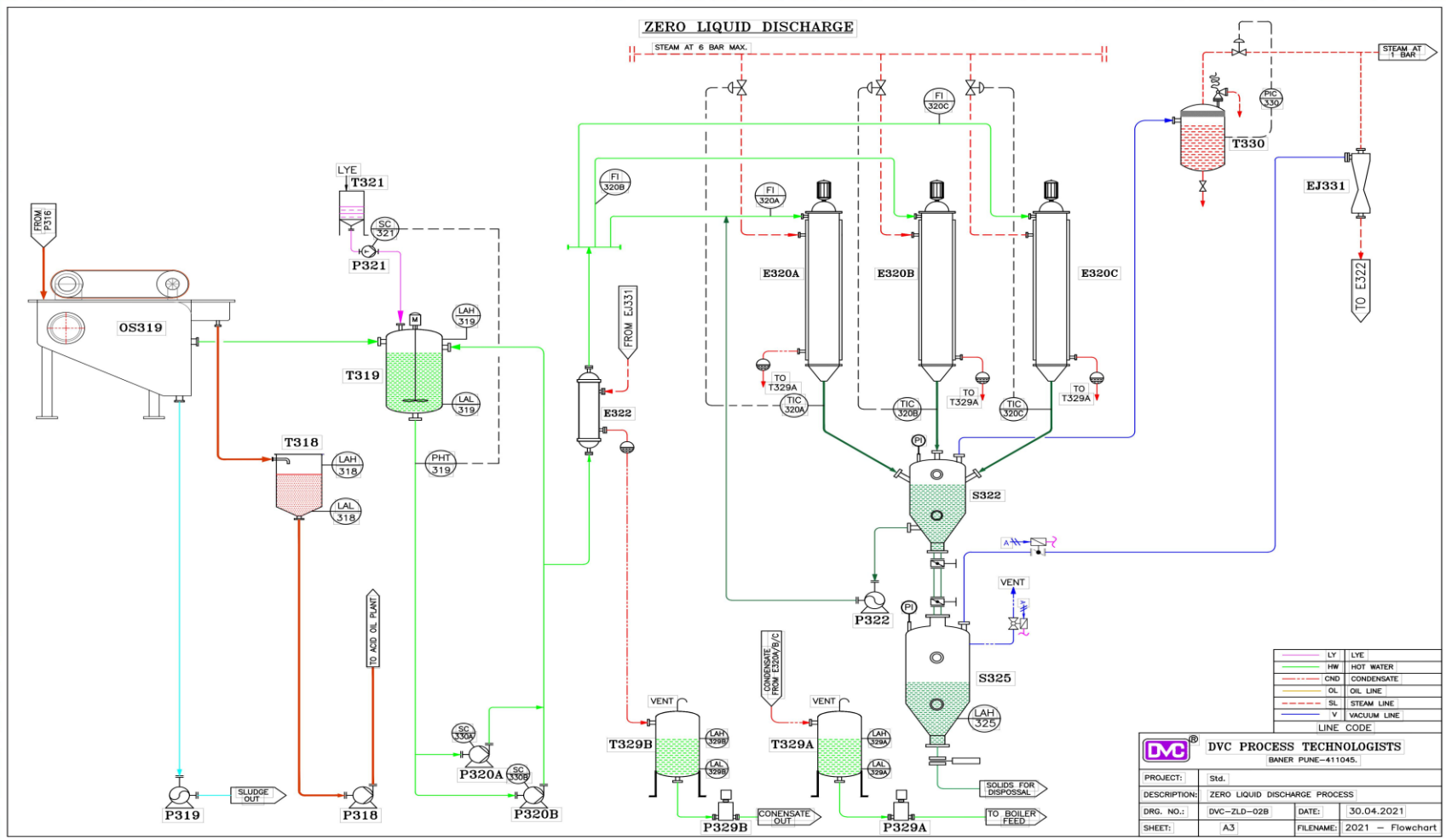
ZERO LIQUID DISCHARGE
STEAM AT 6 BAR MAX.
STEAM AT 1 BAR
FROM P316
OS319
LYE
T321
SC 321
P321
T319
LAH 319
LAL 319
PHT 319
T318
LAH 318
LAL 318
TO ACID OIL PLANT
P319
SLUDGE OUT
P318
SC 330A
P320A
SC 330B
P320B
FI 320B
FROM EJ331
E322
FI 320A
FI 320C
E320A
E320B
E320C
TO T329A
TIC 320A
TIC 320B
TIC 320C
PIC 330
T330
EJ331
TO E322
PI
S322
P322
VENT
S325
LAH 325
CONDENSATE FROM E320A/B/C
T329B
T329A
LAH 329B
LAL 329B
LAH 329A
LAL 329A
P329B
CONENSATE OUT
P329A
SOLIDS FOR DISPOSAL
TO BOILER FEED
LY LYE
HW HOT WATER
CND CONDENSATE
OL OIL LINE
SL STEAM LINE
V VACUUM LINE
LINE CODE
DVC PROCESS TECHNOLOGISTS
BANER PUNE-411045.
PROJECT: Std.
DESCRIPTION: ZERO LIQUID DISCHARGE PROCESS
DRG. NO.: DVC-ZLD-02B
DATE: 30.04.2021
SHEET: A3
FILENAME: 2021 - Flowchart

Features of Zero Liquid Discharge Plant

- For Treatment of waste water coming from Soapstock Splitting plant
- Easy disposal of final dried solid waste
- Energy efficient system due to recovery and utilization of heat energy from binary steam/ hot water
- Fully automated plant with PLC SCADA operation

Specifications of a 10 TPD ZLD System

Inlet water specification

PARAMETER	UNIT	Qty
Total Dissolved Solids	ppm	Up to 125,000
pH		2-3

Outlet Specification

PARAMETER	UNIT	Qty
Binary Steam @ 1 bar g	MTD	8.2
Solids after S325	MTD	1.4
Moisture content in Solid Waster	%	4

Utilities/ Chemical Consumption

PARAMETER	UNIT	Qty
Steam for Heating	Kg/ MT	925
Installed Power	Kw	~45
Caustic lye 100% basis For inlet water with 2-3 pH	Kg/MT	12-13

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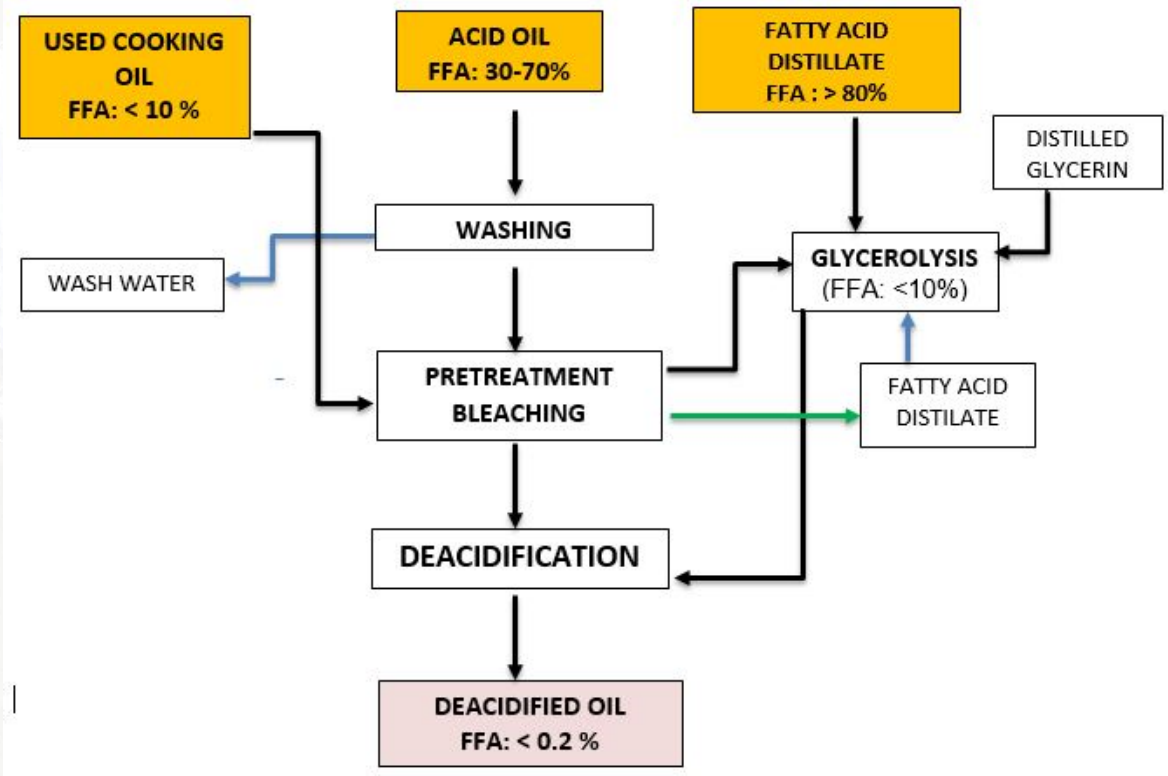
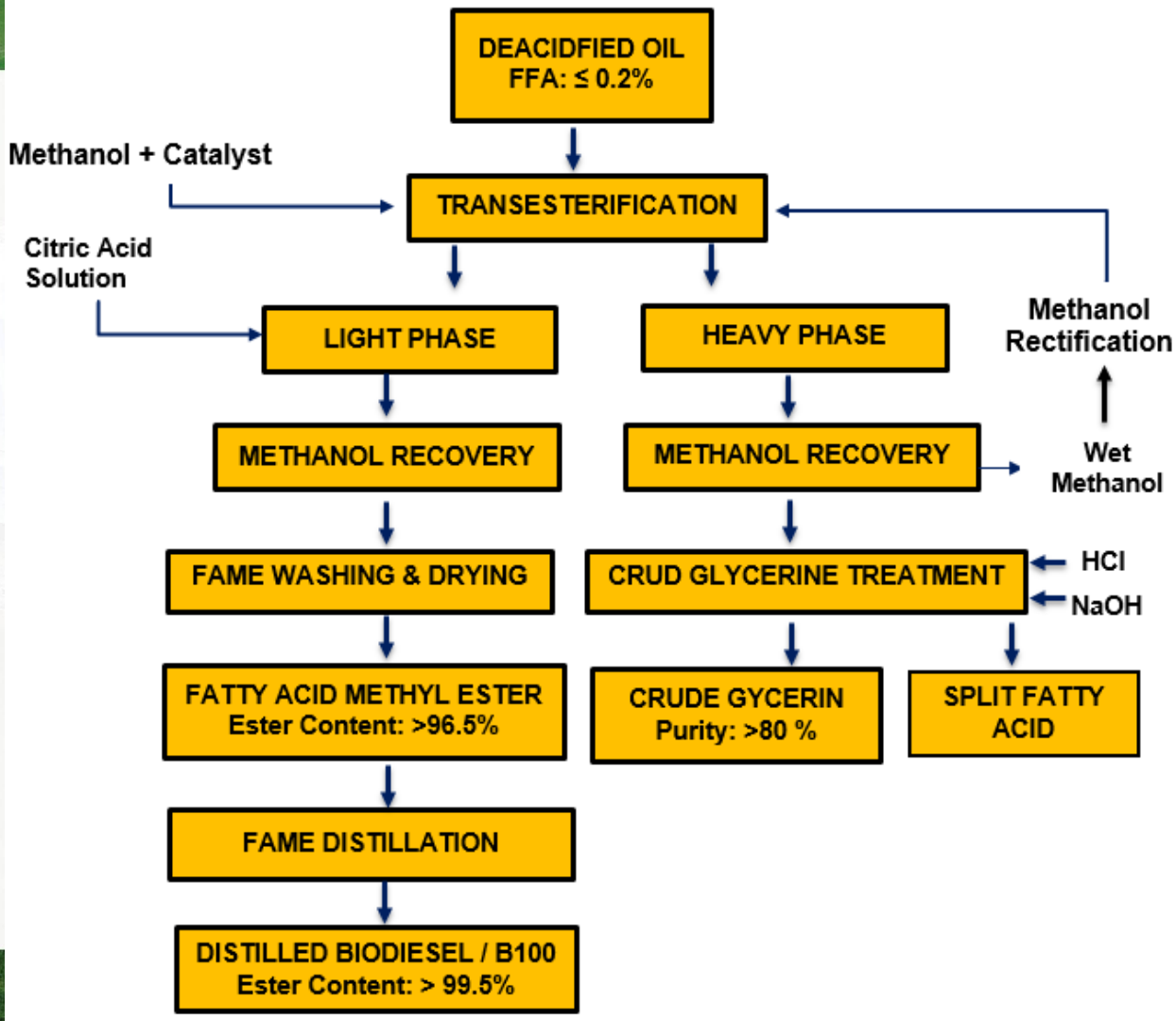
Biodiesel Production with Pre-treatment




DEACIDFIED OIL
FFA: ≤ 0.2%
Methanol + Catalyst
TRANSESTERIFICATION
Citric Acid Solution
LIGHT PHASE
HEAVY PHASE
Methanol Rectification
METHANOL RECOVERY
METHANOL RECOVERY
Wet Methanol
FAME WASHING & DRYING
CRUD GLYCERINE TREATMENT
HCl
NaOH
FATTY ACID METHYL ESTER
Ester Content: >96.5%
CRUDE GYCERIN
Purity: >80 %
SPLIT FATTY ACID
FAME DISTILLATION
DISTILLED BIODIESEL / B100
Ester Content: > 99.5%

DISTILLED BIODIESEL

CRUDE GLYCERIN

CONSERVE ENERGY SAVE ENVIRONMENT

Key Features of Biodiesel Processing

- Proven Technology for handling multiple feedstocks
- Meeting Biodiesel BIS standards (B100)
- Glycerin processing to get additional Commercial Glycerin
- Instead of doing acid esterification, pretreatment play key role in removing impurities (Moisture, FFA, Unsap Matter)
- Further accelerates the transesterification section , giving higher rate of conversion

ARIAL VIEW OF MULTIFEEDSTOCK BIODIESEL PLANT

(A PROJECT BY DVC PROCESS TECHNOLOGISTS)

THANK YOU!

DVC PROCESS TECHNOLOGISTS

Technology with Innovation

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