

Converting Waste Cooking Oil Into Biodiesel

Danny Vargas, Valerie Wade, Parker Helble, Nate Collins, Rekan Mirawdaly

Advised by Dr. Adebayo Ogundipe



JMU
ENGINEERING

Mission Statement

- Convert **locally** generated waste cooking oil into biodiesel fuel
- Utilize a **continuous flow** reactor to meet production demands
- (Optional) Produce biodiesel fuel that meets **ASTM standards**



Packed Bed Reactor

- High space efficiency
- Thorough mixing
- Low operating cost - sustainable
- Continuous operation
- Use of solid catalyst



Basic Processes

- Pretreatment
 - Removal of foreign material
 - Titration
 - Preheating of oil
- Reaction
 - Constant inflow of MeOH/KOH and oil
- Separation of Products
 - Biodiesel, glycerin, other



Engineering Analysis

The main goal of our reactor is to be able to **convert a variable volume of waste oil** into biodiesel to fit the specific needs of potential users.



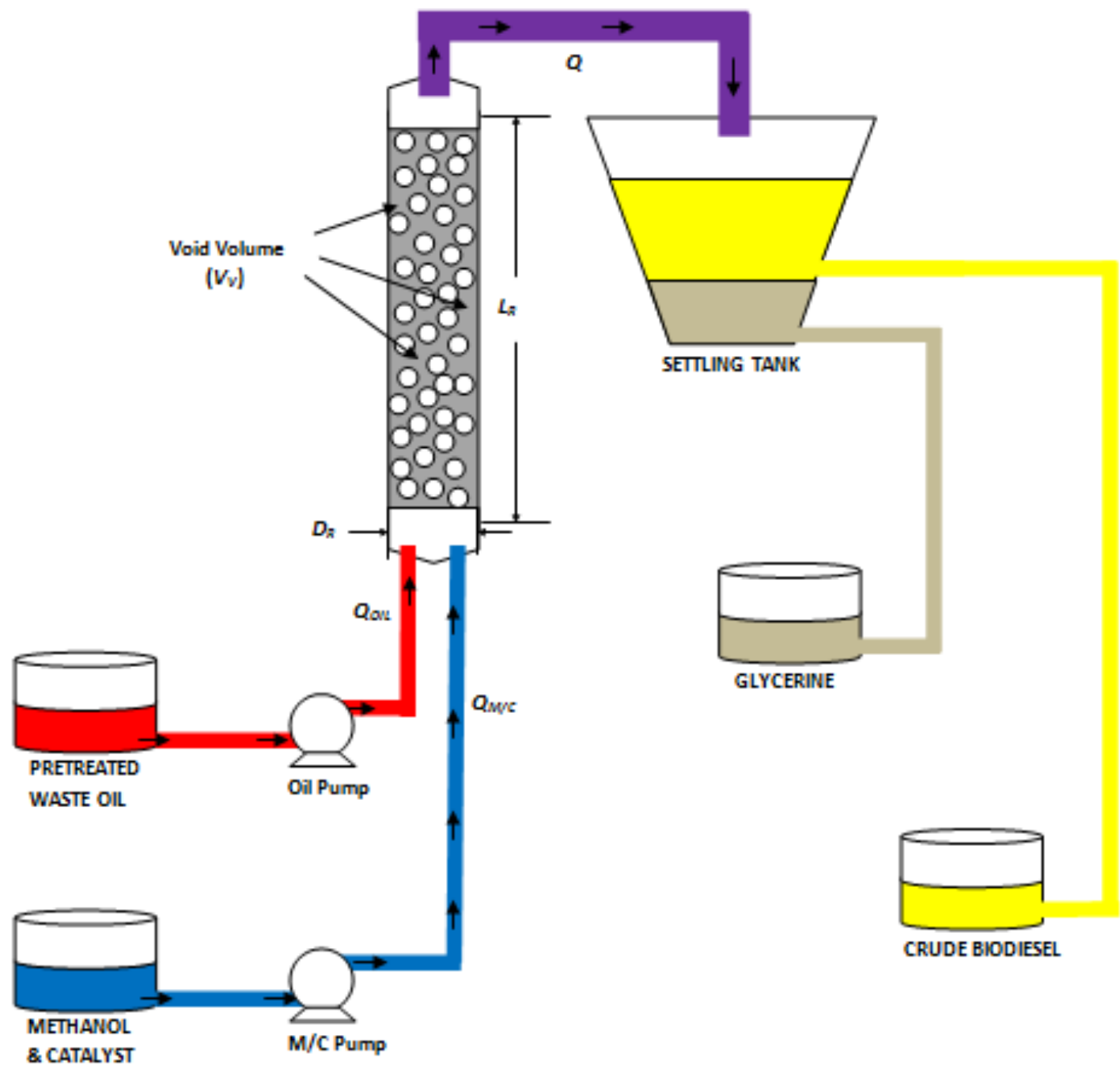
$$\varepsilon = \frac{V_V}{V_R}$$

$$Q = \frac{V_V}{t_r}$$

$$V_R = A_R L_R$$

$$Q = \frac{\pi(D_R)^2 \varepsilon L_R}{4 t_r}$$

$$\rho_{PM} = \frac{m_{PM}}{V_R}$$



Questions?



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