CHE261A Patent Application

Nature of Invention: Process design

Applicant: Chimique Inc

Inventors: 1. Shreya Shree

2. Supriya Goyal

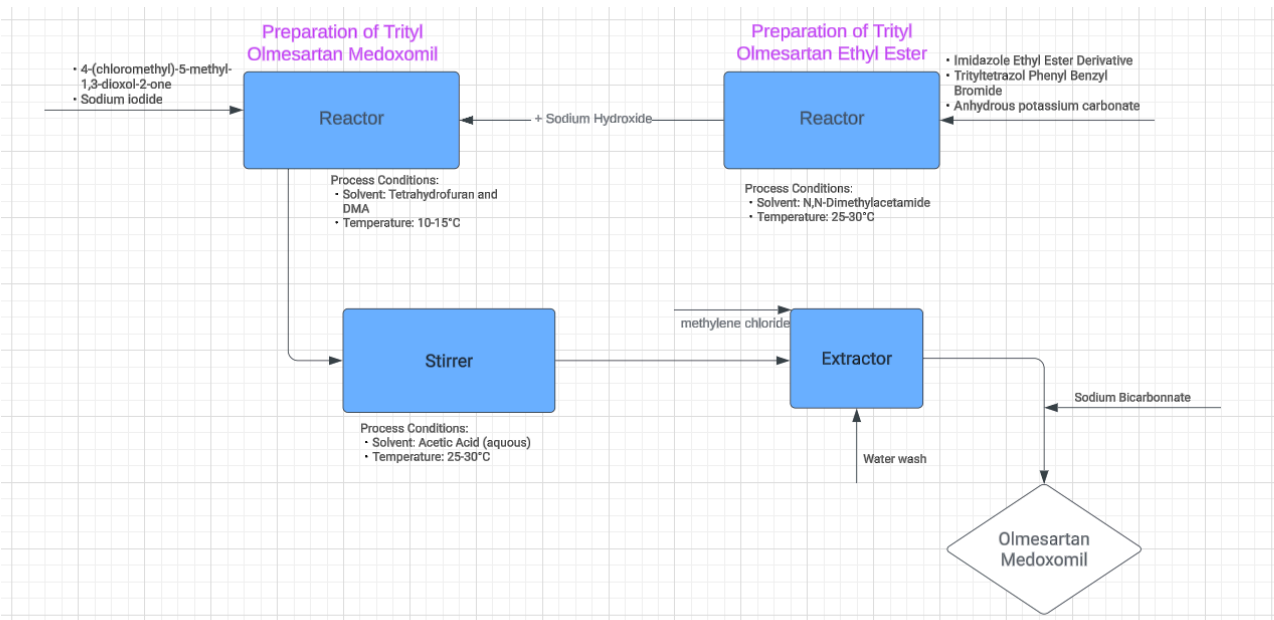
Chemical Formula: $C_{29}H_{30}ClN_6O_6$

Chemical Name: Olmesartan Medoxomil

Process Title:

Process Description:

a. Give the block diagram for the feasible process (as determined in the market analysis report). List all unit operations and process conditions.



b. Give the material balance for a scaled-up process plant with capacity of 1000 kg/day. (If needed, simplify the calculations by stating assumptions)

- Preparation of Trityl Olmesartan Ethyl Ester:
  - Reactants:
    - Imidazole ethyl ester derivative: 100 g
    - 4-[2-(trityltetrazol-5-yl) phenyl] benzyl bromide: 227.5 g

        - Total input = 100 + 227.5 = 327.5 g
        - Assuming 100% conversion and yield, the output will be 327.5 g of Trityl Olmesartan Ethyl Ester.
    - Preparation of Trityl Olmesartan Medoxomil:
        - Reactant:
            - Trityl Olmesartan Ethyl Ester: 268 g (as obtained in step 1)
        - Total input = 268 g
        - Assuming 100% conversion and yield, the output will be 268 g of Trityl Olmesartan Medoxomil.
    - Preparation of Olmesartan Medoxomil:
        - Reactant:
            - Trityl Olmesartan Medoxomil: 203 g (as obtained in step 2)
        - Total input = 203 g
        - Assuming 100% conversion and yield, the output will be 203 g of Olmesartan Medoxomil.

For a plant capacity of 1000 kg/day:

- Input of Imidazole ethyl ester derivative = (100/327.5) * 1000 ≈ 305.45 kg/day
- Input of 4-[2-(trityltetrazol-5-yl) phenyl] benzyl bromide = (227.5/327.5) * 1000 ≈ 694.55 kg/day
- Output of Olmesartan Medoxomil = (203/268) * 1000 ≈ 757.46 kg/day

Assumptions:

1. All reactions proceed with 100% conversion efficiency.
2. The density of all solutions remains constant.
3. No losses occur during the process.

c. List the capacity of reactors needed and evaluate the cost. Use Glass lined Carbon steel (GS lined CS) as the material of construction (MOC). Use the pressure according to reaction conditions. You will use only 70% of the total volume. If you design a 1000 L reactor, you can only fill 700 L reaction mixture.

Capital cost (only for the reactors):

Assumption- All capacities are based on flow rates needed per hour.

Equipment	**Design Capacity (L)**	**No. of units**	**Cost/unit ($ for year 2014)**	**Total Cost ($ for year 2014)**
Reactor 1	1000	1	95000	95000
Reactor 2	5000	1	223000	223000
Reactor 3	6000	1	245700	245700

reference:
https://matche.com/

List the contributions of each author:

Shreya carried out the literature search and found the reaction steps and product yield. And found necessary separation steps to achieve desired product purity.

Supriya evaluated the reactor capacity and Shreya evaluated the cost

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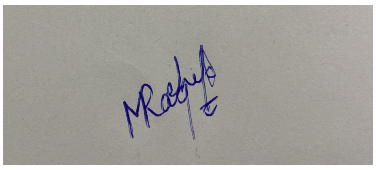
Mehek Agarwal	220646	
Shreya Shree	221029