

Aspirin

Introduction

Aspirin is the trade name given to acetylsalicylic acid. It is available as a white tubular or needle like crystals or crystalline powder. Aspirin is an extremely useful analgesic. Its continued upward trend of the production and sales for the last 20 years has been so noticeable and so dramatic that it has left the other analgesics far behind in its usefulness.

Properties

1. Aspirin is the trade name of acetylsalicylic acid.
2. Its mol. weight is 180.
3. Its melting point is 135-137°C.
4. Its boiling point is 140°C when it decomposes.
5. It has needle like crystals.
6. It is sparingly soluble in water but very soluble in alcohol.

Uses and Applications

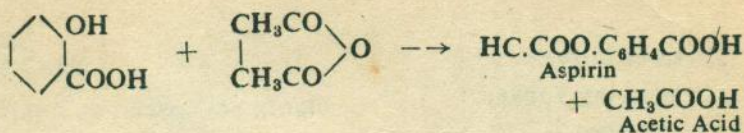
1. It is used in proprietary headache remedies.
2. It is used in ethical pharmaceuticals.
3. It is used in APC tablets manufacture.

Industrial Scope

The present approved installed capacity for Aspirin is 1360 M.T. In view of the growing demand of this product, it may be estimated that there is a wide gap between the present production and the estimated demand. The technology of this product is easily available indigenously.

Process of Manufacture

Aspirin is manufactured from salicylic acid and acetic anhydride. The reaction is shown below :



The process consists the following operations :

1. Charging the reactor.
2. Acetylation.
3. Slurry preparation.
4. Filtration.
5. Crystallization.
6. Centrifuging.
7. Washing of crystals.
8. Drying.
9. Packing.

Salicylic acid and acetic anhydride are charged to the reactor in the required proportion. The reactor is made of S.S. and is provided with steam jacket and provision for water cooling. An agitator is fitted into it. The temperature is then raised to the acetylation temperature of 90°C and kept below 90°C for 2 to 3 hours. After the reaction is complete, 100 litres of water are added to it to make its slurry. It is filtered through vacuum filter and any solid mass is discarded.

The filtrate is collected and is sent to a crystallizer where by cooling, crystallization is carried out. Chilled water is circulated to get better yield.

The charge from the crystallizer is sent to centrifuge where the crystals of acetylsalicylic acid are separated by centrifuging.

The crystals are finally washed better with benzene. The aspirin crystals are thoroughly washed and the solvent is recycled to the washing tank after filtration.

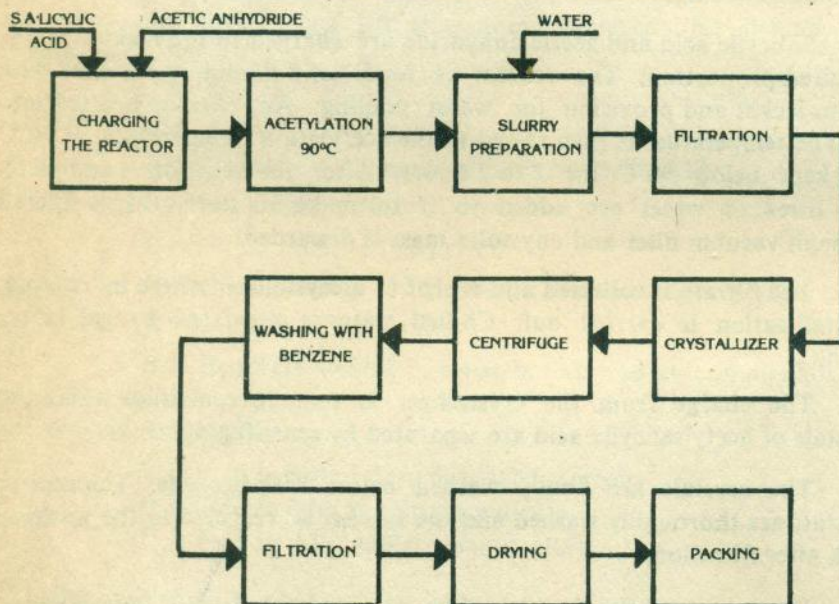
The pure crystals of aspirin thus obtained are dried in a tray dryer. The dried aspirin crystals are packed in polythene lined card board boxes and sent for marketing.

List of Plant and Machinery

1. Reactor.
2. Vacuum Pump.
3. Nutsch Filters.
4. Crystallizer.

5. Centrifuge.
6. Washing Tanks.
7. Tray Driers.
8. Boiler.
9. Storage Tanks.
10. Intermediate Tanks.
11. Refrigeration Plant.
12. Conveyer.
13. Process Pumps, Pipes and Fittings.
14. Erection, Transport etc.

PROCESS FLOW DIAGRAM FOR MANUFACTURING ASPIRIN



COST ANALYSIS

BASIS : 1 M.T. Aspirin/P.D.

1.	Covered Area Required		500 m ²
2.	No. of Employees		19
3.	Land & Building	Rs.	5,44,500
4.	Plant & Machinery	Rs.	9,90,000

5. Fixed Capital	Rs. 15,34,500
6. Working Capital for One Month	Rs. 16,91,151
7. Working Capital for 3 Months	Rs. 50,73,453
8. Total Capital Investment	Rs. 66,07,953
9. Cost of Production Per Annum	Rs. 2,14,45,885
10. Receipt Per Annum	Rs. 2,39,80,000
11. Profit Per Annum	Rs. 25,34,115
12. Rate of Return	38.3%
13. Break Even Point	36.7%