



Esterification Reaction in Gansons Nauta™ Processor

Project Goal

To improve production results through esterification reaction in a Gansons Nauta™ Processor.

Background

A client performed two-stepped esterification reaction, which involved challenges associated with product formation. With a view to solve these challenges and reduce the process time, trials were conducted using a Gansons Nauta™ Processor.

Challenges

There were two main challenges, froth formation and choking of the product. A higher rpm was required for the reaction to materialize, which led to froth formation and thus, affected the product quality. Second, simultaneous addition of raw materials led to choking of the product at the bottom of the reactor causing some of the product to remain unreacted.

Present Approach

The esterification reaction was performed in two steps at the client's end. The first step involved batch esterification reaction in a glass line reactor. The produced molten mass was then cooled in another reactor to obtain the desired product. Using this method, 89% conversion was achieved.



Gansons Solution

Gansons recommended using the Nauta™ Processor which is highly efficient in carrying out gentle mixing. The following were considered to achieve desired results:

- Process optimization based on time of addition of reactants with slow addition rate (2-3 kg/hr)
- Gentle mixing and optimization of various parameters to eliminate the need for higher rpm, thus preventing froth formation
- Appropriate timing of vacuum and nitrogen purging
- Maintenance of temperature (180-200°C)
- Optimization of several parameters including rpm of screw and arm, process time, inlet temperature, nitrogen pressure, vacuum and jacket pressure

The Gansons Nauta™ mixer was successful in:

- Reducing the reaction time by 50%, with 87% conversion (as desired) and final product in the form of granules
- Eliminating the challenges associated with product choking
- Achieving desired moisture content of 0.032% v/w



Results

Using the Gansons Nauta™ Processor, 50% reduction in process time was observed with optimum product conversion in a single step.

Challenges associated with product choking and froth formation were eliminated.

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