

Intensification of Fatty Acid Nitrilation

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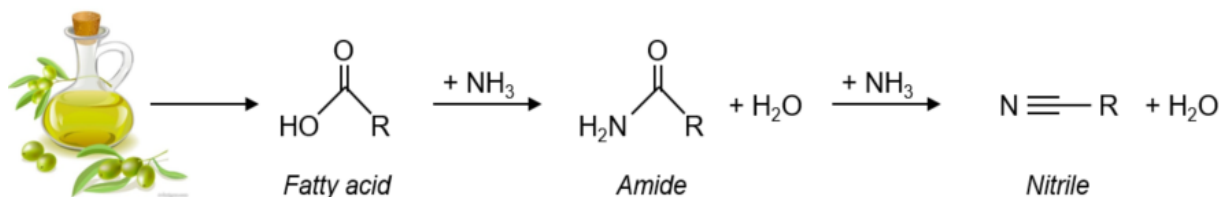


Introduction

A long list of chemicals are historically produced from fossil resources. With the necessary shift to renewable resources, new paths to intermediate chemicals need to be found. One such intermediate chemical group are long chain fatty nitriles. The process to produce nitriles from fatty acids won from fats and vegetable oils dates back to the 1930s and has recently come back into research interest due to its sustainability.

Project summary

Fatty acid nitrilation is generally carried out after this **reaction scheme**:



The reaction can be carried out in two different ways:

- In the **gas phase**, in which the fatty acid is vaporized
 - + Reaction time = ~10 seconds
 - Formation of undesired side products
- In the **liquid phase**, in which the fatty acid is liquid
 - + Less formation of undesired side products
 - Reaction time = ~6 hours

As there are 2 moles of water per mole of nitrile, and the typical liquid phase set-up is a batch reactor, the reaction can be accelerated by more **effective water removal**.

Project goals

- Characterizing the current batch liquid process with a kinetic study
- Studying possible routes for water removal to accelerate the reaction
- Planning and set-up of a continuous liquid process in an intensified reactor for quick(er) reaction

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