

# Additively Manufactured Packings in Biocatalysis

Master thesis at the  
Institute of Technical Biocatalysis

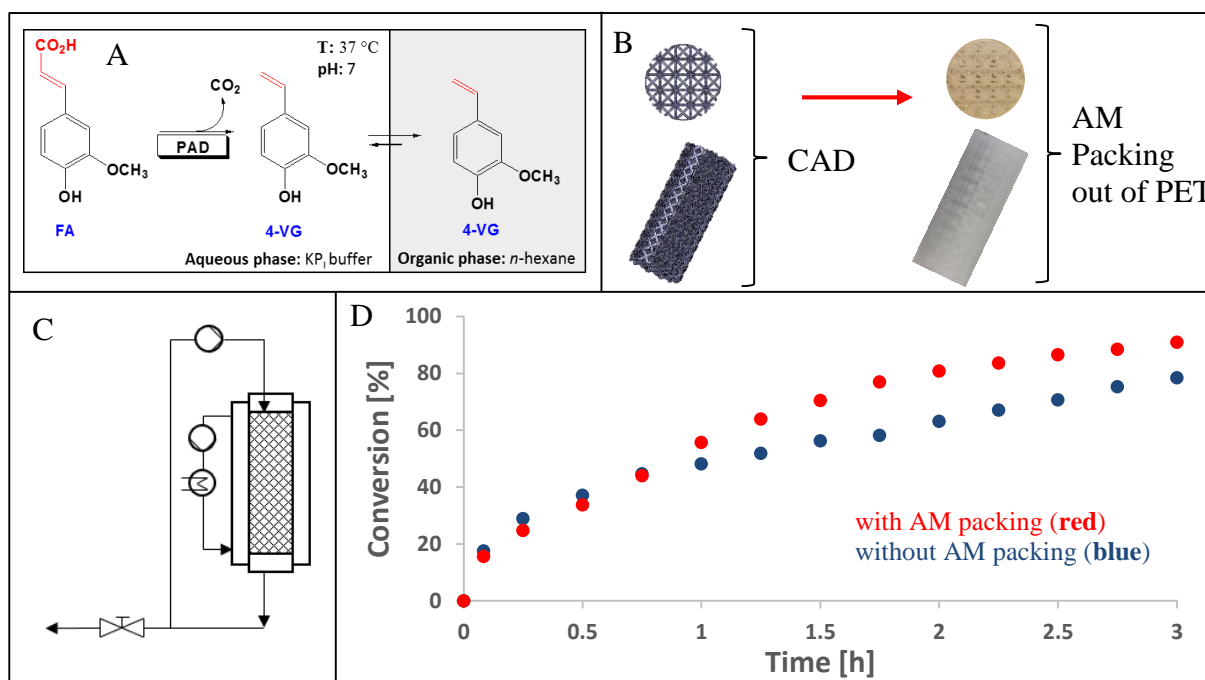


## Introduction

Optimized additively manufactured (AM) structures aim to improve mass transport in flow reactors, especially in the case of multiphase systems and to evolve an efficient and fast production of packings designed to meet the needs of heterogeneous reactions.

## Aim of the Research

The enzymatically catalyzed decarboxylation of ferulic acid (FA) (Figure 1 A) shall be used as a model reaction to show the advantages of AM packings (B) in flow reactors. In this model reaction the fast product removal is crucial to overcome severe product inhibition. The aim of the thesis is the characterization and optimization of the *in situ* product extraction of 4-vinylguaiacol (4-VG, Figure 1 A) with the help of AM structures working as static mixers for the two liquid phase system (2LPS).



**Figure 1:** A) 2LPS for the decarboxylation of FA and *in situ* product extraction with n-hexane. FA: ferulic acid; PAD: phenolic acid decarboxylase; 4-VG: 4-vinylguaiacol. B) Model and Picture of AM packing. C) Reactor setup D) Preliminary studies: Conversion of FA with *in situ* product extraction and AM packing (red) and without AM packing (blue)

## Requirements

General knowledge of (heterogeneous) biochemical catalysis, team player, capable to work independently

## Beginning

As soon as possible

## Contact

Name: Niclas Büscher  
Institute of Technical Biocatalysis  
Denickestr. 15 (K), Room: 2504  
Phone: +49 40-42878-4171  
Email: niclas.buescher@tuhh.de