



Abstract-Vorlage DLG-Innovation Award „Junge Ideen“

Thema: (bitte aus der vorgegebenen Liste auswählen)

Circular Economy in Food Industry

Titel der Arbeit:

Usability study in characterizing pectin isolated from apple pomace as a circular scaffold material.

Erstellungsjahr der Forschungsarbeit:

2022

Art der Arbeit: (bitte Kategorie aus der vorgegebenen Liste auswählen)

Abschlussarbeit im Rahmen von Masterstudiengängen in Kombination mit Arbeiten in einem Forschungsprojekt

Autoren und Anschriften: (Bitte vollständige Angabe von Namen und Titeln bei sämtlichen Autoren sowie Angabe von Instituts-/Organisationsnamen, Angabe der kompletten Kontaktadresse inkl. E-Mail des einreichenden Instituts/Organisation, siehe Beispiel:

Prof. Goetz Hildebrandt¹, Jörg Jacob², Bianca Schneider-Häder³,

¹Institut für Lebensmittelhygiene, Berlin, Deutschland, ²bofrost Dienstleistungs GmbH & Co KG, Straelen, Deutschland, DLG e.V., Eschborner Landstrasse 122, 60489 Frankfurt/M., Deutschland, Tel. +49 69 24788-360, Fax +49 69 24788-8360*

Iva Alebic, BSc¹, Prof. Dr. Katrin Bach^{1,2}

1 MCI | Die unternehmerische Hochschule, Österreich, Maximilianstraße 2, 6020 Innsbruck

2 Kontaktdaten: +43 512 20703811; katrin.bach@mci.edu

Abstract: (Die Kurzfassung sollte in Arial Schrift Größe 12 mit 1,5 Zeilenabstand verfasst sein und nicht mehr als drei DIN-A4 Seiten umfassen. Inhaltlich sollten folgende vier Punkte beschrieben sein: Problemstellung, Material & Methoden, Ergebnisse & Diskussion, Schlussfolgerungen & Empfehlungen)

The cell-cultured meat industry has been facing a scaffolding issue for a long time now.

This research project aims to tackle the design and production of scaffolds, using an innovative 3D-printing technique combined with the isolation of pectin from apple pomace, to produce a stable and edible scaffold consisting of pectin and other ingredients.

Additionally, the purpose of this project is to prove the idea of validating the production process, starting from pectin isolation, over ink formulation, and ending with the 3D-printing process of the scaffolds.

Pectin is considered a structural heteropolysaccharide, with a plethora of potential benefits. It is generally, divided into two categories, low methylated pectin (LMP) with a degree of esterification (DoE) <50%, and high methylated pectin (HMP) with a DoE >50%. LMP gels with the addition of sugar, which is the basis of the ink formulations.

The pectin isolation was performed using dilute-acid extraction, followed by alcohol precipitation. The ink formulations, based on Garna et al. 2007 but finally altered, consisted of varying amounts of gelatin, pectin, and water, while sugar and citric acid remained constant. The 3D-printing process was conducted and adjusted on a Procusini 3.0 commercial food 3D-printer. Rheological and textural analyses were performed on solid and liquid states of the ink formulations, as well as the printed scaffolds. A Pectin characterization was done by titration, according to Lindberg et al. 2000.

Process optimization in all three aspects, shows the possibility to print a stable grid design with some of the formulations. Preliminary analytical results imply an observable difference between the ink formulations.

This project shows promising results and offers a possibly new approach to the scaffolding issue in cell cultured meat, that should be explored in more depth.