5-2019

Structural and Chemical Characterization of Rice and Corn Starch Granules using Microscopy and Spectroscopy

Nada Yusuf

SCHOOL OF LIFE SCIENCES
MANIPAL
(A constituent unit of MAHE, Manipal)

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Dissertation submitted in partial fulfillment of the requirements for the degree of

Bachelor of Science
in
Biotechnology

By

Nada Yusuf
Reg. No.: 161701170
Sixth Semester, B.Sc. Biotechnology
School of Life Sciences
Manipal Academy of Higher Education, Manipal

Project Advisor

Dr. Nirmal Mazumder
Assistant Professor
Department of Biophysics
School of Life Sciences
Manipal Academy of Higher Education, Manipal

May 2019

Abstract: Starch is a polymeric carbohydrate produced by green plants for energy storage. Found in exceeding amounts in vital food items like rice, corn, potato, it is the most prevalent carbohydrate in human nourishment. Starch granules are made of amylose and amylopectin polymers that correspond to its amorphous and crystalline structures; the ratio of which dictates the extend of the starch digestion and studying this phenomenon is the main aim of this study. To study digestion, alpha amylase is used to digest the starch extracted from corn and rice samples. Structural and chemical changes observed in the starch before and after digestion are studied using various techniques. Optical microscopy, scanning electron microscopy and polarised light microscopy are used to study morphological changes; XRD to quantify crystalline structures present, FTIR to identify the specific functional groups present and DSC for thermal analysis. Data collected is correlated for better understanding of starch digestion which can lead to beneficial nutraceutical pursuits in areas of diabetes, obesity and nutrition; ultimately catering to clinical and personalised medicine.