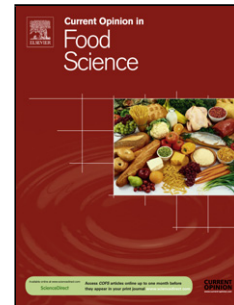


Accepted Manuscript

Title: Fractals in crystallizing food systems

Authors: Bhagyashri Joshi, Steffen Beccard, Thomas A. Vilgis

PII: S2214-7993(18)30002-X
DOI: <https://doi.org/10.1016/j.cofs.2018.05.009>
Reference: COFS 375



To appear in:

Please cite this article as: Bhagyashri J, Steffen B, Thomas AV, Fractals in crystallizing food systems, *Current Opinion in Food Science* (2018), <https://doi.org/10.1016/j.cofs.2018.05.009>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Fractals in crystallizing food systems

Bhagyashri Joshi^{a*}, Steffen Beccard^{a*} and Thomas A. Vilgis^a

^aMax-Planck-Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany

Highlights

- Particle gels in food
- Fractals in fat via box counting method
- Fractals in inulin gels via rheological measurements

Abstract

The present paper reviews and discusses the possible influences of irregular random fractal formation on crystallizing food systems, such as triacylglycerols (fats) and inulin (oligofructoses). In both cases the crystallization process is driven by selective processes. Triacylglycerols consist of three different fatty acids, mostly of different length and saturation degree, inulin of oligofructose molecules of a broad molecular weight distribution. The structure formation, which can be at several stages “fractal”, determines part of the processes in chocolate preparation and in the use of inulin gels, for providing nice mouthfeel during oral processing. The common physics during crystallization is also relevant for using inulin as fat replacer.

1. Introduction

Fat crystals dispersed in liquid fat (oil) are important components of foods, such as margarine, butter, spreads and chocolates [1-4]. Therefore, it is essential to study the microstructural behavior of fat crystals. The phenomena of the formation of fat crystal networks are similar to observations in colloidal gel formation [5, 6].

The formation of primary particles in colloidal gels [7, 8] starts from the solution due to distinct solute-solvent interaction. Those primary particles assemble together to form aggregates, which leads to the formation of a complex network of the particles in the solution. Eventually, depending on the proper interaction between solute-solute and solvent-solute, the gelation occurs [9]. Similarly, in the case of fat crystallization, the nucleation starts either because of

Download English Version:

<https://daneshyari.com/en/article/8409069>

Download Persian Version:

<https://daneshyari.com/article/8409069>

[Daneshyari.com](https://daneshyari.com)