Characterizing the structure of stirred yogurt through digital technology and the mapping of critical production points

Duration: 2020-2022

Highlights

- In 2018, 387,707 tonnes of yogurt were produced in Canada, of which more than 75% were produced in Quebec. Canadians consume mostly stirred yogurt.
- The pace of development of new products is very fast in the yogurt industry and manufacturers need to provide advanced formulations to meet consumer expectations.
- Stirred yogurt is obtained by breaking the gel after fermenting in tanks.
- The structure of stirred yogurt can be summarized as a microgel suspension (gel fragments) interconnected in serum. The characterization of these microgels could predict certain structural properties, such as viscosity, firmness, and syneresis.
- Recently, a fast and inexpensive microscopic image analysis method was developed in an experimental context.
- This project aims to validate the use of this method with a range of products representative of the diversity of products on the market.
- A generalized mapping document for use by yogurt manufacturers will provide an overview of the critical points in the production process for stirred yogurt.

Objectives

The objectives of the project are to:

- Map the determinants of the structural properties of stirred yogurt;
- Summarize the mapping in a simple, easy-to-read document for quick decision-making;
- Validate a simple and fast method of characterizing the structure of stirred yogurt by surface analysis using digital imaging.
- Provide two new tools for yogurt manufacturers to support their product improvement and innovation efforts.

Results and potential benefits

Making yogurt is a complex process with numerous parameters that must be controlled and optimized to obtain a product that consumers enjoy. Among the quality criteria is creaminess, which is defined as a thick product (viscous, firm) with a smooth (lump-free) texture and a homogeneous appearance (no serum separation). The digital image analysis method provides a quick overview of the structure of stirred yogurt based on microgel size and heterogeneity. A correlation between the product's microstructure and the physical properties of viscosity, firmness, and syneresis was demonstrated in a previous experimental yogurt project using this method. This project aims to evaluate the predictive accuracy of this method on eight different commercial yogurts (varying in fat content and the presence of stabilizers). These yogurts have been generously provided by Quebec industrial partners. Early results suggest a link between the structural characteristics and the properties under study. This new method would provide stirred yogurt manufacturers with a new, fast, and inexpensive quality control and R&D tool.

A previous research project identified and studied specific critical points during the stirring and smoothing process for stirred yogurts. This project was carried out on a technical pilot scale 30 L of production) by testing various combinations of processes and formulations. A mapping document will summarize in a clear and concise manner all the results obtained from this project, as well as the key research data from other scientific teams, providing an up-to-date synthesis of knowledge on the subject. The purpose of this document is to be able to provide information as quickly and simply as possible to help manufacturers make quick decisions based on data from several years of scientific research.

Innovative aspects

- Simple and fast method validated on commercial products.
- Use of digital technology to characterize the structure of stirred yogurts.
- Distribution of a summary document to help manufacturers make quick decisions about formulations and stirring processes.

Professionals trained

A research professional, Ms. **Audrey Gilbert**, is working full-time on the project.

For further information

The research results will be promptly transferable to dairy farmers. Training video capsules will be produced to demonstrate the imaging technique. The mapping will be available on the Novalait website in addition to being distributed to dairy manufacturers. Other communication activities (articles and presentations) are planned for collaborating users (Novalait, Lactanet, etc.).

Financial contributions

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- Novalait

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Contact persons

Project supervisors:

Sylvie Turgeon
Professor and Project Supervisor
STELA Dairy Science and
Technology Research Centre
Institute of Nutrition
and Functional Foods (INAF)

Université Laval
2425 Rue de l'Agriculture Street
Paul-Comtois Pavilion
Quebec City (QC) Canada G1V 0A6

1-418-656-2131 ext. 404970
sylvie.turgeon@fsaa.ulaval.ca

Audrey Gilbert
Research Professional
STELA Dairy Science and
Technology Research Centre
Institute of Nutrition
and Functional Foods (INAF)

Université Laval
2425 Rue de l'Agriculture Street
Paul-Comtois Pavilion
Quebec City (QC) Canada G1V 0A6

audrey.gilbert.5@ulaval.ca