

Inrae-AgroParisTech
International Centre for Molecular and Physical Gastronomy

International Journal of Molecular and Physical Gastronomy

Authors

Roisin Burke

Title of the work

Creating an emulsion from onions

Year 2023, Volume 10, Number 5, pp. 1-3

Published online:

21 May 2023,

<https://icmpg.hub.inrae.fr/international-activities-of-the-international-centre-of-molecular-gastronomy/international-journal-of-molecular-and-physical-gastronomy/1-news/image-for-thought/image-for-thought-onion-emulsion>

[Creating an emulsion from onions](#) © 2023 by Roisin Burke is licensed under [Attribution 4.0](#)

[International](#) 

Creating an emulsion from onions

Roisin Burke¹

1. *Technological University Dublin.*

*Correspondence: roisin.burke@TUDublin.ie

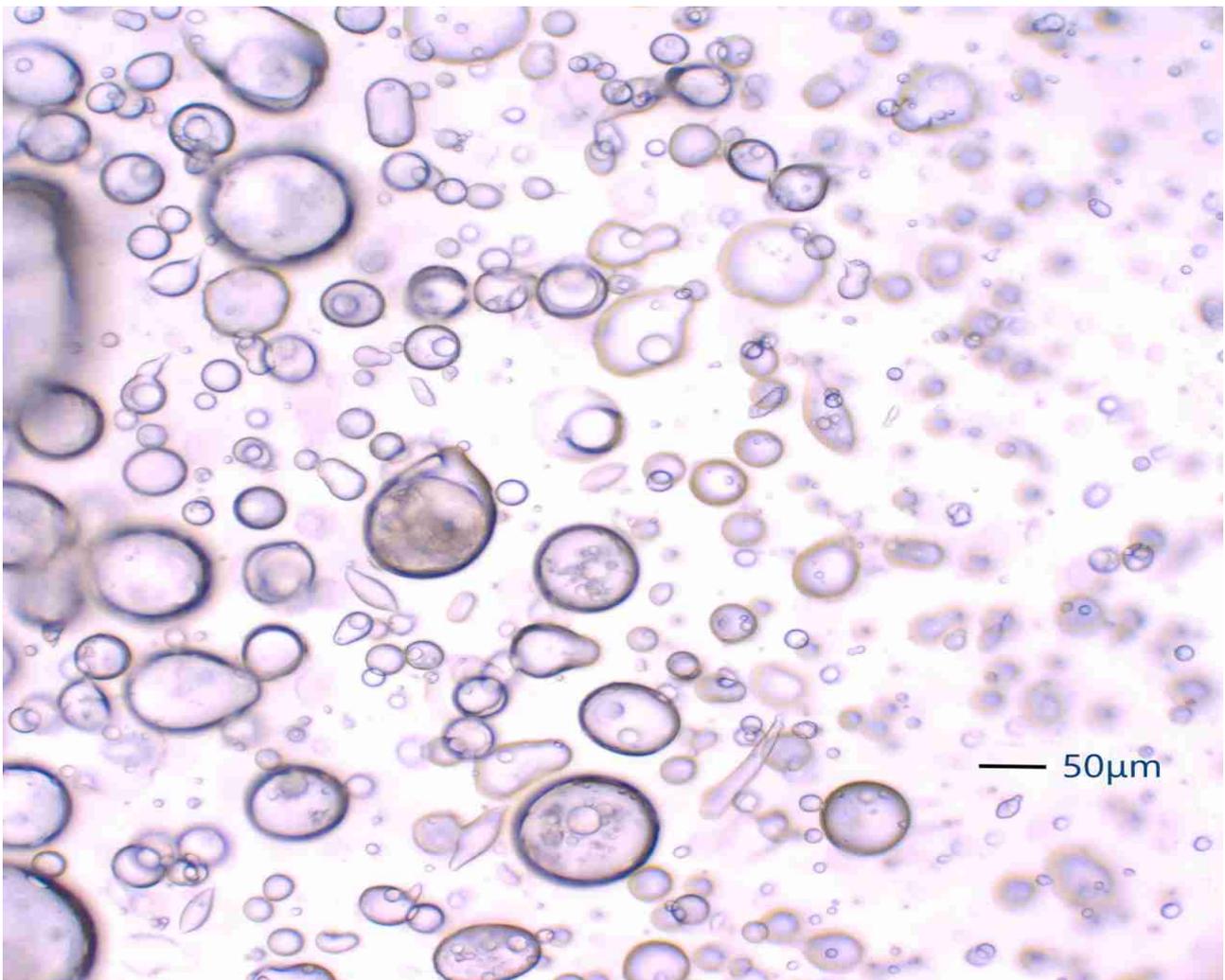


Figure 1. An onion based emulsion magnified 100 times using an Olympus BH-2 microscope and Pixelink M1 camera.

In response to the rising demands of sustainability, and the growing consumer interest in veganism, there is renewed enthusiasm for studying the functionality of plant proteins from different sources (Ningtyas *et al.*, 2021). Many researchers have reported the use of plant proteins as an alternative for animal proteins in non-dairy emulsion-based systems (Amiri Samani and Najji, 2019; Jeske *et al.*, 2019). However, due to low solubility in aqueous media, a significant number of plant proteins are still underutilized in food preparations because of their poor functionality (emulsifying, gelling, and foaming), limiting their effectiveness and therefore applicability in formulations (Kutzli *et al.*, 2021). Manipulating interfacial structures via solid particles provides a promising and green alternative to manufacture stable emulsions. The “surfactant-free” character makes them more suitable for various applications particularly in food, pharmaceutical and cosmetic formulations (Schrade *et al.*, 2013). There has recently been a substantial growth in the number of publications reporting the bridged Ramsden stabilization of high-volume-fraction emulsions stabilized by plant-based materials (Hu *et al.*, 2016; Tang, 2020; Xu *et al.*, 2019). Most of these emulsions are of the O/W type. Amiri Samanai and Najji (2019) note that the long-term stability of the Ramsden emulsion is enhanced by particle network formation within the continuous phase. This colloidal structuring inhibits (or retards) the various instability processes of liquid drainage, sedimentation (W/O systems) and cream layer formation (O/W systems).

The consumer’s shift toward natural and superior foodstuffs for healthier lifestyles has become more popular, with a focus on whole-grain cereals, fruit, and vegetable consumption. Molecular cooking can be used to create new types of tasty and safe recipes that meet the demands of the modernist kitchen (Precup *et al.*, 2021). Co-founder of Molecular Gastronomy Hervé This observed (This, 2006) that an “onionolli can be made from onions” and any other plant or animal tissues: adding oil to such tissues results in the formation of emulsions. Therefore, it is possible to make plant-based emulsions which

can provide tasty alternatives to mayonnaise. For the picture (Figure 1), an “onionolli” was prepared by adding oil to crushed onion. It was spooned in a thin layer onto a microscope slide and visualized by magnifying it 100 times using an Olympus BH-2 microscope and Pixelink M1 camera. Figure 1 shows oil droplets dispersed in a continuous water phase.

Acknowledgement

Thank you to Tony Hutchinson, School of Food Science and Environmental Health, TU Dublin, for technical assistance with the imaging.

References

- Amiri Samani S, Najji MH. 2019. Effect of homogenizer pressure and temperature on physicochemical, oxidative stability, viscosity, droplet size, and sensory properties of sesame vegetable cream, *Food Science & Nutrition*, 7 (3), 899-906.
- Hu YQ, Yin SW, Zhu JH, Qi JR, Guo J, Wu LY, Tang CH, Yang XQ. 2016. Fabrication and characterization of novel Pickering emulsions and Pickering high internal emulsions stabilized by gliadin colloidal particles, *Food Hydrocolloids*, 61, 300-310. <https://doi.org/10.1016/j.foodhyd.2016.05.028>.
- Jeske S, Bez J, Arendt EK, Zannini E. 2019. Formation, stability, and sensory characteristics of a lentil-based milk substitute as affected by homogenisation and pasteurisation, *European Food Research and Technology*, 245 (7), 1519-1531.
- Kutzli I, Weiss J, Gibis M. 2021. Glycation of plant proteins via Maillard reaction: Reaction chemistry, technofunctional properties, and potential food application, *Foods*, 10 (2), 376.

Ningtyas IW, Bhandari B, Prakash S. 2021. Modulating the fat globules of plant-based cream emulsion: Influence of the source of plant proteins, *Innovative Food Science & Emerging Technologies*, 74, 102852, ISSN 1466-8564. <https://doi.org/10.1016/j.ifset.2021.102852>.

Precup G, Mitrea L, Călinoiu LF, Martău AG, Nemeş A, Teleky BE, Coman V, Vodnar DC. 2021. Food processing by-products and molecular gastronomy. In Charis M, Galanakis M (eds), *Gastronomy and Food Science*, Academic Press, 137-163. <https://doi.org/10.1016/B978-0-12-820057-5.00008-X>.

Schrade A, Landfester K, Ziener U. 2013. Pickering-type stabilized nanoparticles by heterophase polymerization, *Chemical Society Reviews*, 42, 6823-6839.

Tang CH. 2020. Globular proteins as soft particles for stabilizing emulsions: Concepts and strategies, *Food Hydrocolloids*, 103, 105664. <https://doi.org/10.1016/j.foodhyd.2020.105664>

This H. 2006. Aioli Generalized. In *Molecular Gastronomy; Exploring the Science of Flavor*. Colombia University Press (first published in This H. 1995. Révélations Gastronomiques, Belin, Paris).

Xu YT, Liu TX, Tang CH. 2019. Novel pickering high internal phase emulsion gels stabilized solely by soy β -conglycinin. *Food Hydrocolloids*, 88, pp. 21-30, <https://doi.org/10.1016/j.foodhyd.2018.09.031>.
[s](https://doi.org/10.1016/j.foodhyd.2018.09.031)

Received :
18 March 2023

Accepted :
13 May 2023

Published :
21 May 2023

Reviewers :

1. Thomas Vilgis, Max Planck Institute for Polymer Research, honorary Professor at the Institute for food and nutrition sciences, Justus-Liebig University, Giessen.

2. Mark Traynor, Horst Schulze School of Hospitality Management, Auburn University

Cite as:

Burke R. 2023. Creating an emulsion from onions, *International Journal of Molecular Gastronomy*, 5, 1-3.