



GRANoFLAKES

THE BEST EXTRUDED FLAKES

Launched in 2012, the GRANoFLAKES project brought together five partners: Clextral, Limagrain Europe, Limagrain Céréales Ingrédients, Veodis 3D and INRA (French National Institute for Agronomic Research).

We worked in a coordinated and complementary effort for 4 years.

Together we developed a new approach for the production of **high quality extruded cornflakes** that includes improvements in raw materials and manufacturing process innovations.

Our achievements:

- **Optimization of the extrusion cooking process**
- A new maize variety combining yield, technical and textural properties, and well adapted for cultivation in Auvergne (France).
- A pilot tool for grain drying to optimize first-stage processes.
- Image analysis tools to identify vitreous and floury particles and accurately specify grain color and size.



HIGH QUALITY EXTRUDED CORNFLAKES

Intensified Extrusion Cooking Process

The expertise of Clextral

Our main objective was to **improve the quality of extruded cornflakes by optimizing the extrusion process**. As a result, the intensified process of extrusion cooking produces cornflakes with a quality comparable to traditional cornflakes. This is even more evident when leveraging the **Evolum+** and **Preconditioner+** technical capabilities.

Validated Results

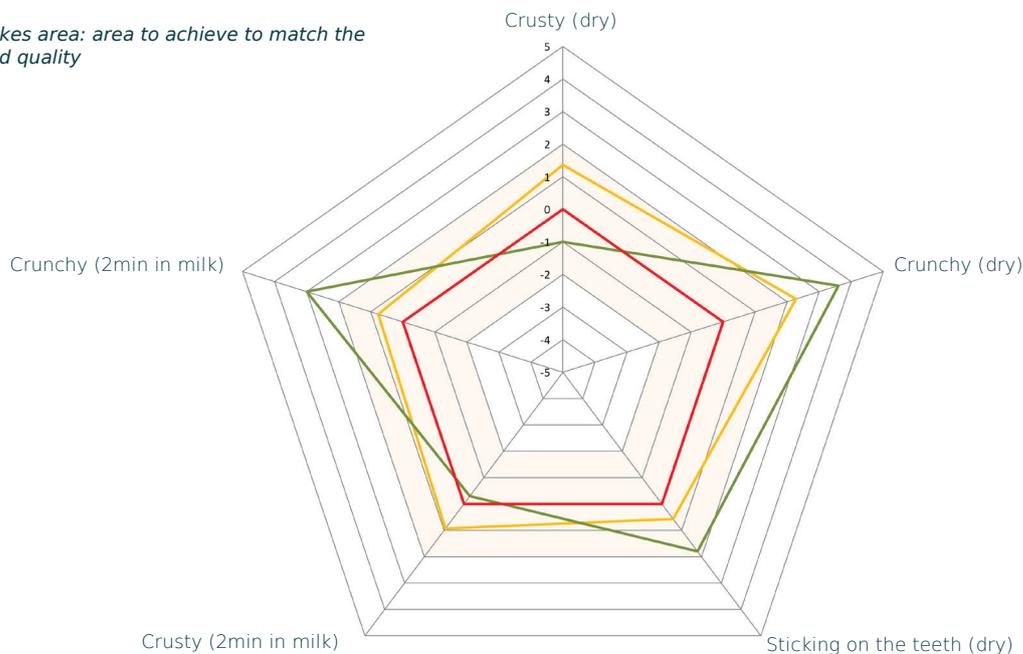
The extruded cornflakes meet the expectations of consumers in terms of appearance and texture. This quality was first evidenced by physicochemical analysis and then confirmed with sensory studies by a panel of consumers and manufacturers who had participated in sensory evaluation training.

Sensory studies results

Over 4 years, 7 test campaigns were completed, representing 150 samples with very satisfactory results.



 Cornflakes area: area to achieve to match the required quality



— New extruded Cornflakes in 2016 — Standard extruded flakes in 2012 — Reference (traditional Cornflakes)

Evolution of the extruded cornflakes quality according to the descriptors evaluated by the panel in comparison of the traditional cornflakes (reference)

Clextral offers semi-industrial tests to improve recipes or to develop new products for its customers.

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Find out more on www.clextral.com