



We have
1001 reasons
to invest in sorghum

GELATINIZATION OF SORGHUM STARCH:

Technological and Nutritional Importance



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La Veronese Molino e Riseria Martini

Allergen Free Company

- Italian Excellence in Gluten Free Manufacturing.
- Tradition and Innovation.
- High-quality raw materials.
- Field-to-fork supply chain.
- Since 2015 involved in the processing of Sorghum
- In the European landscape, the company is uniquely positioned, having developed proprietary technology for the gelatinization of Sorghum.



25.000 m²

**Of cultivated
Land**



90

**Years of
Experience**



20.000 ton

**Of flour
produced**



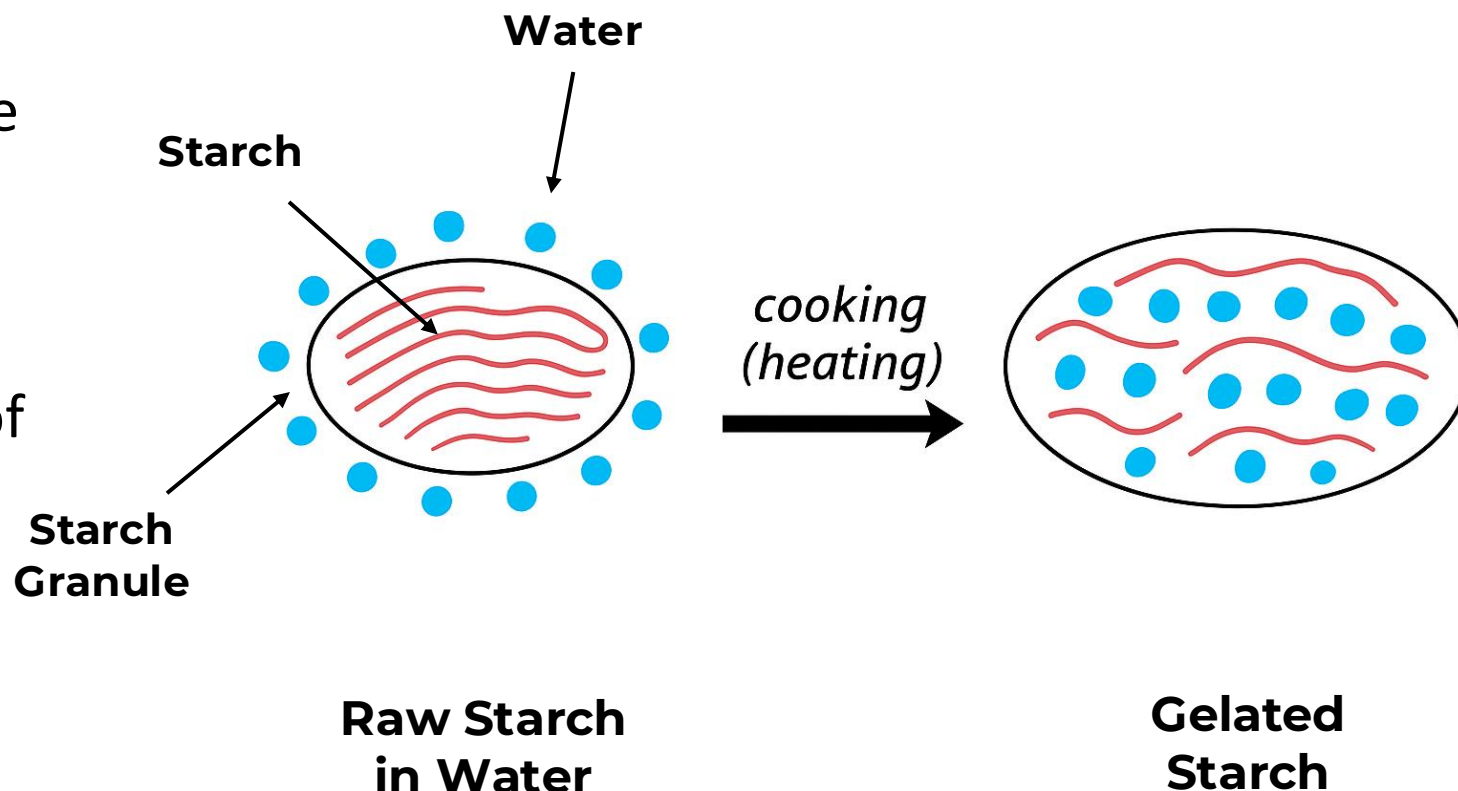
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**Raw material
processed**

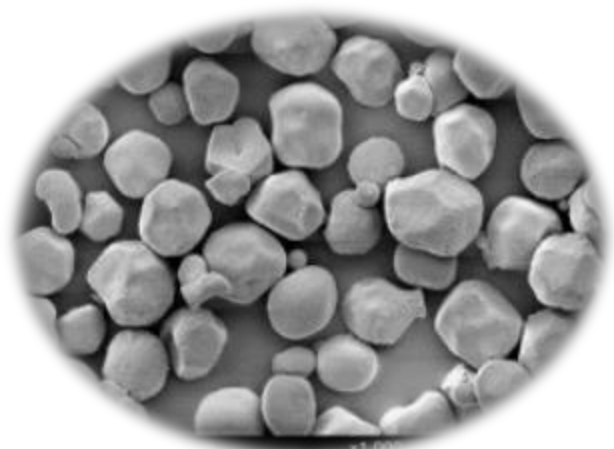
Defining Gelatinization in Starch-Based Systems

Gelatinization is a physical process in which starch granules, upon heating in the presence of water, lose their crystalline structure and swell.

This leads to the formation of a viscous matrix with increased accessibility to digestive enzymes.



Simplified diagram, author's own elaboration.



Sorghum Starch

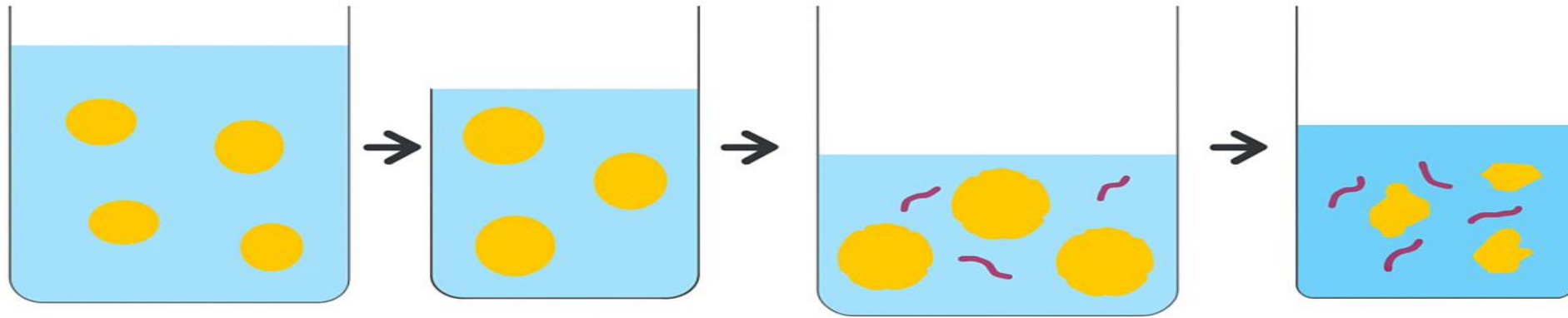
Sorghum Starch is mainly composed of Amylose (20-30%) and Amylopectin (70-80%).

Small granules, round or polygonal, with thermal behavior different from other cereals (maize, rice).

Gelatinization temperature: 68–78 °C, depending on the variety.

Photo from sciencedirect.com
Sorghum starch as depressant in mineral flotation.

Gelatinization Mechanism



1. Application
of heat and
water

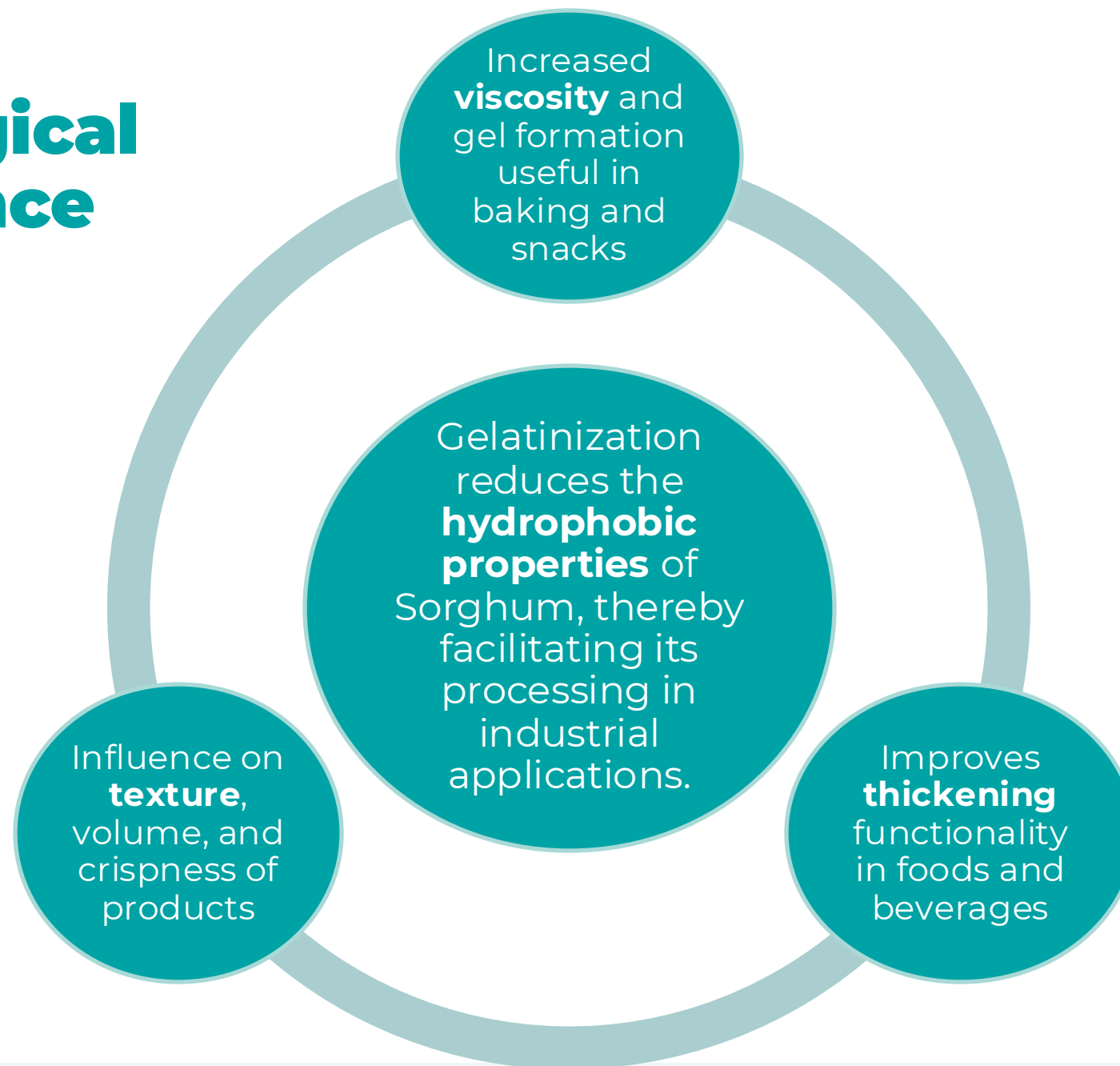
2. Granule
absorption
and swelling

3. Loss of birefringence
and disruption of
crystalline order

4. Amylose leaching
and increased
viscosity

Simplified diagram, author's own elaboration.

Technological Importance



Importance of Sorghum Gelatinization for the Food Industry

- Ensures product **standardization**
- Improves process control and **stability**
- Enhances **quality** and **uniformity** of the final product
- Improves **shelf life** and stability of the processed products



Competitiveness

and

Market Share Acquisition

Application of Sorghum in the Food Industry



**Beers and
traditional Beverages**



**Flakes and
precooked Flours**



Pasta

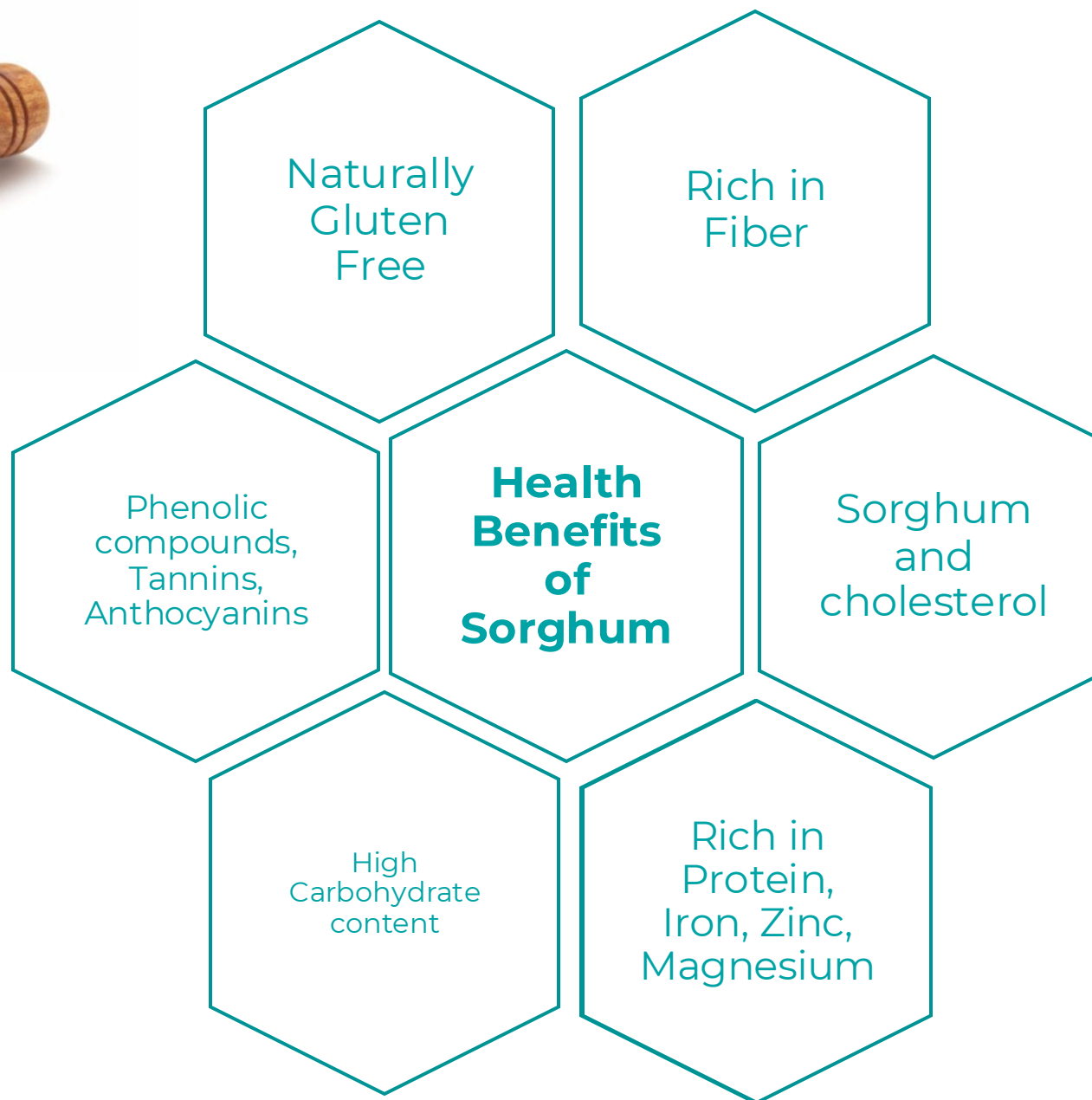


Photo from Shutterstock – Wise Society

GELATINIZATION OF SORGHUM KEY POINTS

Optimization of
technological quality
and **standardization** of
the processed products

Enhancing market
competitiveness

Opportunities for the
development of
healthy, gluten-free,
low-glycemic foods

References

- Beta, T., Corke, H., Rooney, L.W. (2000).** *Starch properties as affected by sorghum grain chemistry.* Journal of Cereal Science, 31(3), 295–307.
- Chiremba, C., Taylor, J.R.N., Rooney, L.W., Beta, T. (2012).** *Phenolic content, antioxidant activity, and consumer acceptability of sorghum cookies.* Food Chemistry, 134(2), 869–875.
- Nsor-Atindana, J., Zhong, F., Mothibe, K.J. (2012).** *In vitro digestion and physicochemical properties of starch from five varieties of sorghum.* International Journal of Food Sciences and Nutrition, 63(5), 597–609.
- Rooney, L.W., Serna-Saldivar, S.O. (2000).** *Sorghum.* In *Handbook of Cereal Science and Technology* (2nd ed., pp. 149–175). CRC Press.
- Zhao, Y., Schaffert, R.E., Klein, B.P., Rooney, L.W. (1993).** *Gelatinization and pasting properties of sorghum starch.* Cereal Chemistry, 70(6), 642–646.



Thank you for your Attention



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