

What is Starch Gelatinization ?

Starch represents 70% of wheat flour.

Starch is not a filler; it is highly functional.

Viscosity refers to the thickness or resistance to flow of a wheat starch after Gelatinization. The viscosity of wheat starch is a key property in food and industrial applications, influencing **texture, stability, and thickening ability** in products like sauces, noodles, and adhesives.

Viscosity Stages of Wheat Starch

1. Pasting/Gelatinization (~60-70°C)

- Starch granules absorb water, swell, and begin thickening.

2. Peak Viscosity (~75-90°C)

- Maximum thickening occurs before the starch begins to break down.

3. Breakdown (Shear Thinning)

- Continued heating and stirring may cause viscosity to decrease.

Why Should We Care?

Wheat **Starch Gelatinization** impacts many characteristics, notably **Product Size and Shape, Color, Moisture/Freshness, Crumb Texture, Product Crispness, Volume...** on all kinds of products; **Noodles, Pizza Crusts, Steamed Buns, Biscuits** to name a few.

How To Measure It?

- **Mixolab®**: During the heating phase (between C2 and C4), the Mixolab allows starch to gelatinize and as the mixing continues, to measure the Starch gel resistance.
- The impacts of starch gelatinization such as product color, volume... are very well detected through **vision inspection systems**



Whereas most of the existing systems work on very diluted doughs, the Mixolab® is the only existing device allowing to measure **Starch Gelatinization** on a dough system.

This allows a more representative assessment of the competition for water between the different flour constituents and therefore a better indication of the potential impact on final product.

Starch Gelatinization Impact On Baked Products Characteristics

The numbers in the table represent the strength of the impact of each **COMPONENT** on the **CHARACTERISTICS** of various baked products:

- **3 = Strong impact** / **2 = Medium impact** / **1 = Low impact**
- The Impact Factor in rows indicates how strongly a COMPONENT affects a specific CHARACTERISTIC.
- The Impact Factor in columns shows how strongly a COMPONENT influences a particular BAKED PRODUCT.

	Noodles	Flat Bread	Crackers	Pan Bread	Wafer	Wheat Tortilla	Baguette	Hamburger Bun	Pizza Crust	Sponge Cake	Biscuit	Croissant	Streamed Buns	Impact Factor
Color	3	2	1	3	1	2	3	3	2		1	1	3	69%
Size & Shape	2	3	2	3	2	3	3	3	3	3	2	3	3	92%
Volume/Rise				3			3	2	3	3			3	46%
Surface	2			2	2	2	3			2			3	54%
Scoring							3							8%
Puffing		3							3			3		23%
Thickness				3		3	3		3					31%
Crispness		3	3		2		3		3		3	3		54%
Softness	3	3	3	3	3	3	2	3	3	2	3	2	3	92%
Texture	3	3	3	3	3	3	2	3	3	2	3	2	3	92%
Elasticity	3	3		3			2	3	3	2		2	3	62%
Stickiness	3	3												23%
Flexibility		2				3								15%
Chewiness	3	3		3			2	3	3	2		2	3	69%
Springiness				3			3	3		3			3	38%
Crumb Texture		3		3			2	3	3	2		2	3	69%
Flakiness			2		2						2	3		31%
Crumbling		1	3	1	3		1	1	1	3	2	1		77%
Slicing				3				3						15%
Moisture		3		2		3	3	2	3	3		3	3	77%
Cooking	3													8%
Water Abso.	2													8%
Staling														0%
Sogginess		2		2				2	2					31%
Impact Factor	46%	38%	33%	54%	31%	38%	50%	46%	54%	46%	46%	46%	54%	