

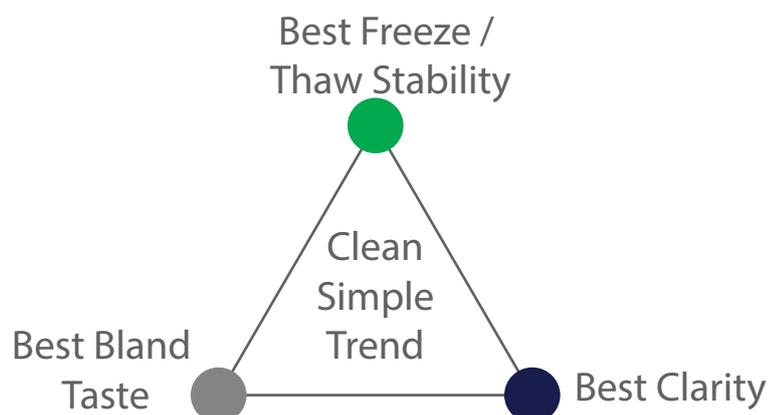
Remarkable functionalities of WAXY TAPIOCA STARCH to the next level

SMS is the world's first waxy tapioca starch manufacturer and the pioneer of waxy tapioca starch development with dedication to research on waxy varieties for optimal functionalities.

01 Unique Functionalities of waxy tapioca

Waxy tapioca synergizes the main preferable properties of waxy starches and normal tapioca starch which are excellent freeze/thaw stability, excellent texture clarity, and bland taste. The unique preferable properties are not simultaneously found in other commercial waxy starches including waxy maize, waxy rice and waxy potato. The paste and gel of waxy tapioca starch have outstanding freeze-thaw stability compared to other waxy – type starch sources.

Waxy tapioca starch also contributes bland taste and low odor due to very low residues of protein and lipid in waxy tapioca starch. Therefore, waxy tapioca starch does not interfere with any taste and flavor of foods, especially dairy, beverage and confectionery.



02

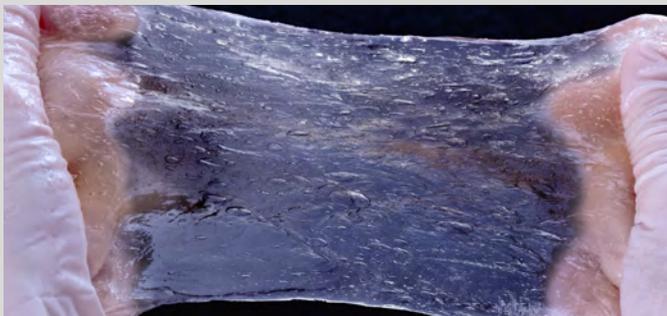
Comparison of gel characteristics made from normal and waxy tapioca starch.



Waxy tapioca is developed by breeding technology which is non-GMO. It contains less than 2% of amylose (AM) because the amylose synthesis is limited by the absence of the enzyme granule-bound starch synthases (GBSS). Accordingly, amylopectin is the main component of waxy tapioca giving rise to the preferable gel characteristics.

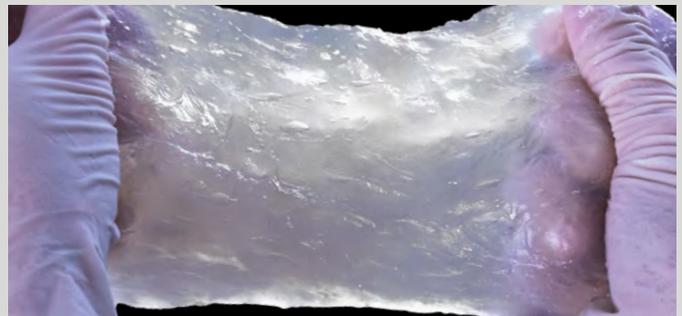
The figure below demonstrates the higher clarity of paste and gel as well as a better freeze-thaw stability performance of waxy tapioca starch when compared to non-waxy tapioca starch. In addition, waxy tapioca starch gives a better melt away mouth-feel than non-waxy tapioca starch because it forms less cohesive paste and gel.

WAXY TAPIOCA STARCH



- Transparent gel
- More stretching ability

TAPIOCA STARCH



- Opaque gel
- Stretching ability

03

Paste and gel properties of waxy tapioca are more preferable among other waxy starches.

Among gels prepared from waxy starches (15% ds), waxy tapioca starch forms a sticky gel with the most transparency and most glossiness. The gel of waxy tapioca starch can also maintain its clarity even after it is frozen. Freeze-thaw stability of various waxy starch pastes are evaluated for 2 cycles of freezing and thawing process as shown.

Evidently, the gel made from waxy tapioca shows the best freeze-thaw stability when compared to gels made from other waxy starches. After two freeze/thaw cycles, the waxy tapioca gel still provides high viscosity and high clarity, while the gels from other waxy starches change in their appearance and viscosity.

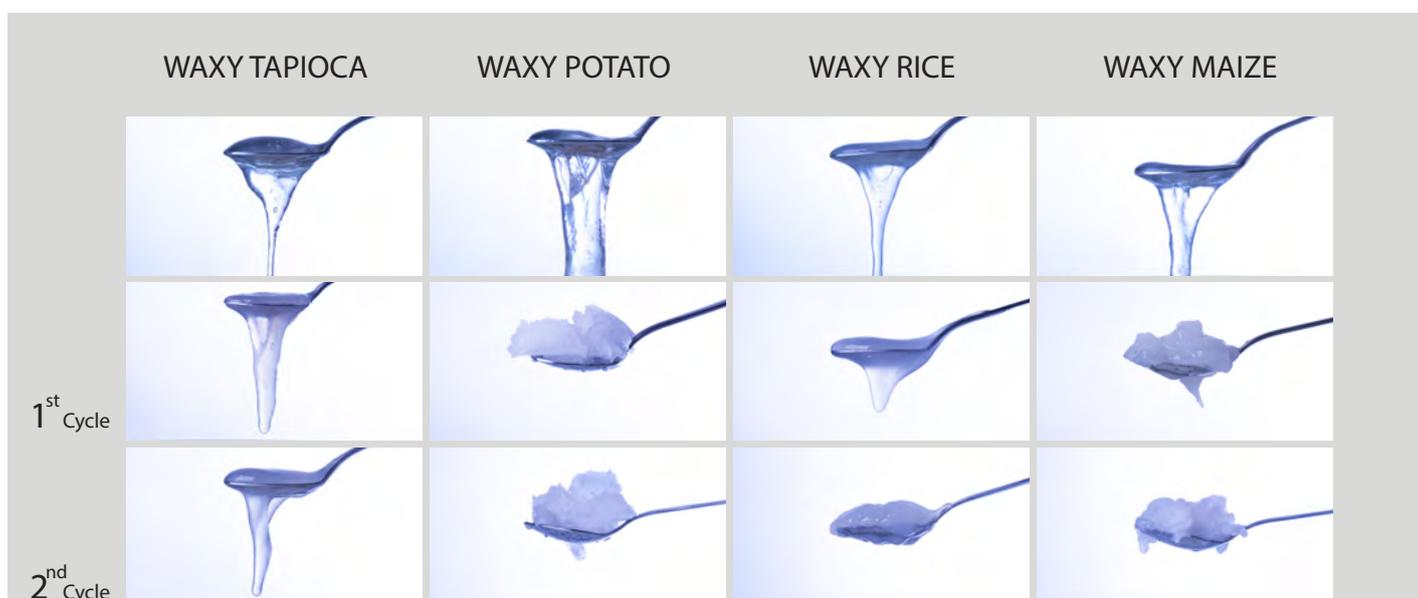
| Properties | Waxy Tapioca | Waxy Potato | Waxy Rice | Waxy Maize |
|---|--------------|-------------|-----------|------------|
| Peak Viscosity (BU) ^[1] | 1,000-1,400 | 1,600-2,000 | 400-700 | 500-800 |
| Granular size (µm) | 14-19 | 40-100 | 5-10 | 5-12 |
| Degree of swelling | 61.4 | 91.2 | 42.8 | 55.8 |
| Paste Clarity (%T) ^[2] | 91 | 82 | 33 | 36 |
| Cold storage of Gel ^[3] | Clear | Opaque | Opaque | Opaque |
| F/T stability of paste (Cycle) ^[4] | 2/Excellent | 0/Poor | 1/Fair | 0/Poor |
| Odor / taste | Very Low | Low | High | High |

[1] Brabender amylograph, 6% starch

[2] Light transmittance of paste (1%ds) at 650nm

[3] Gel of 15% starch, at 4°C

[4] Paste of 6% starch, freeze and thaw condition (-18°C for 18h & ambient)



04

Waxy tapioca is an excellent starch ingredient solution for clean label food such as clean label yogurt and clean label frozen soup and sauce.

Health awareness becomes an ever more important aspect of the global food trends. Modern consumers are aware that clean label food is safe, high in quality, and healthy due to its all natural-based ingredients, free-from chemical and synthetic substances. The clean label trend prompts food manufacturers to develop product recipes to be free-from food additives without E-number or the word 'modified' in the label while maintaining product enjoyment quality.

The outstanding characteristics of waxy tapioca starch which are; high clarity, excellent freeze-thaw stability, and bland taste, are highly required for modern food applications. Waxy tapioca starch provides the best solution for clean label ingredients, thickener, and texturizer at consumers' preference.



About SMS

The global leader of Non-GMO TAPIOCA STARCH AND MODIFIED TAPIOCA STARCHES from THAILAND is internationally certified with BRC, FSSC 22000, FDA, HACCP, ISO, HALAL, KOSHER.

SMS CORPORATION

38/6 MOO 11 PATHUM THANI - LAT LUM KAEO ROAD,
KOOBANGLUNG, LAT LUM KAEO,
PATHUM THANI, 12140, THAILAND



INFO@SMSCOR.COM
WWW.SMSCOR.COM



+66 2598 1128

