ELIANE™

The New Waxy Potato Starch of AVEBE

Detmold, 2006

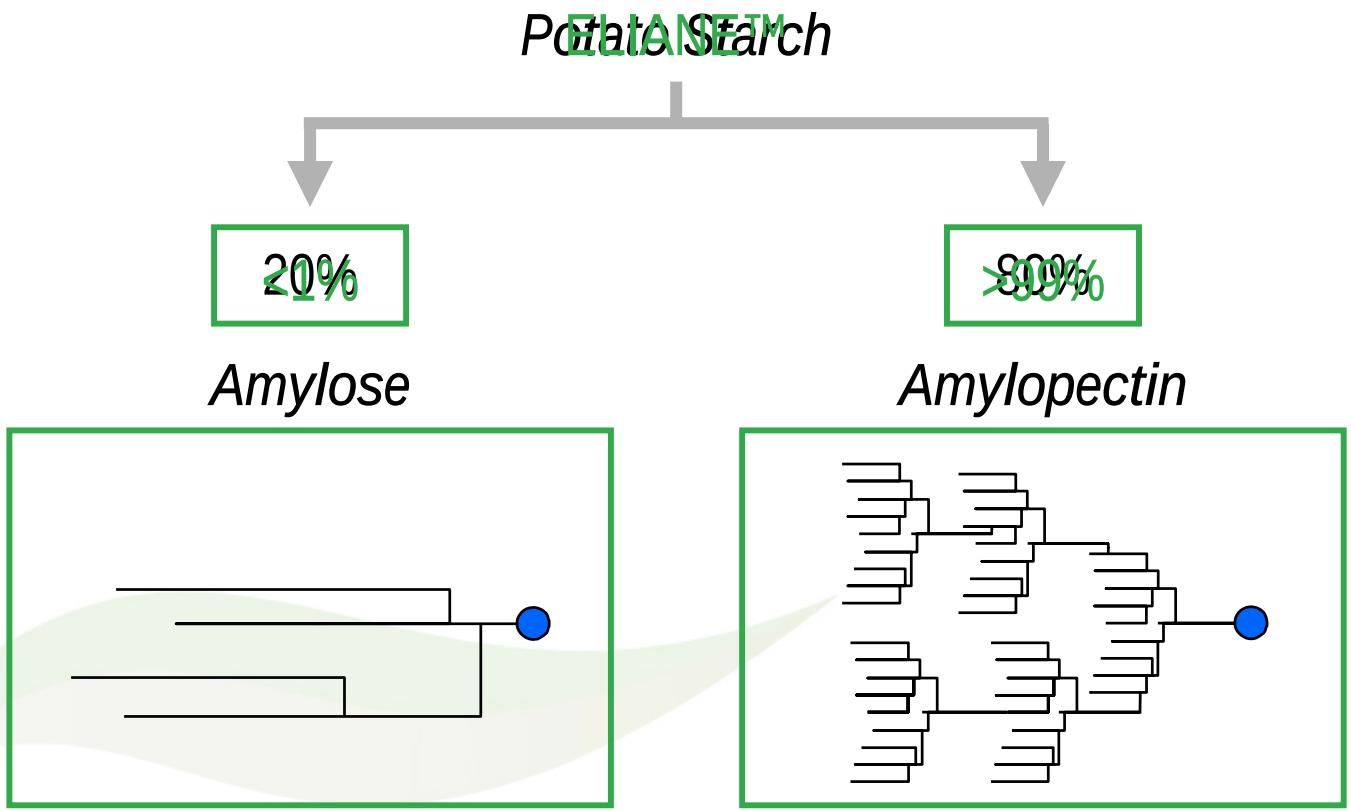
Eliane
food starch

Contents

- Introduction to ELIANE™
- Characteristics of ELIANE™, differences with other starches
- ELIANE™ in several food applications

What is ELIANE™?

- ELIANE™ is AVEBE's new unique amylopectin potato starch obtained by state-of-the-art classical breeding techniques (non-GMO)



What is ELIANE™?

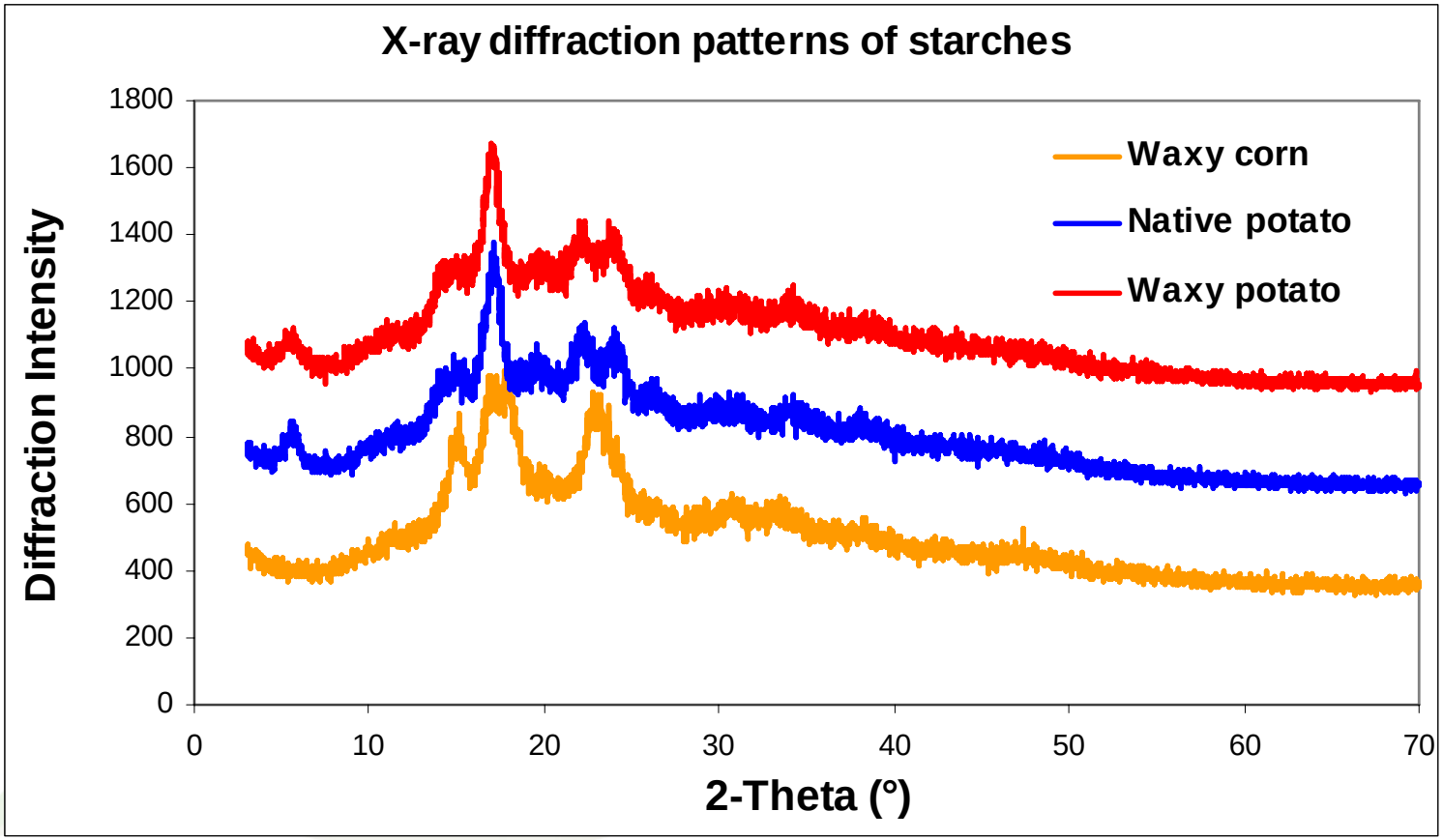
- ELIANE™ is AVEBE's new unique amylopectin potato starch obtained by state-of-the-art classical breeding techniques (non-GMO)
- Discovered by the university (Groningen) and developed by AVERIS, AVEBE's breeding institute
- Complete chain control "From potato plant to end product"

ELIANE™ Compared to Other Food Starches

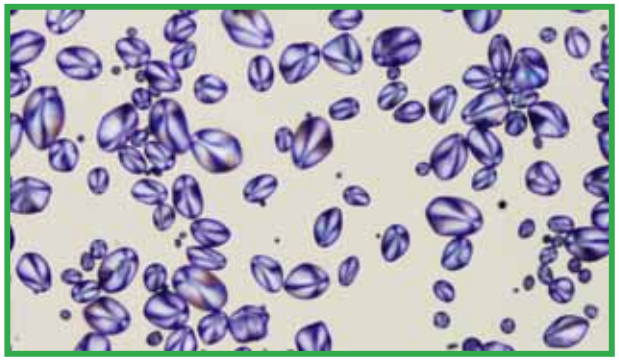
Starch type	ELIANE™	Potato	Waxy maize	Tapioca
Amylose (%)	<1%	20-22%	<4%	17%
Phosphate (ppm)	800-1000	800-1000	~30	~90
Diameter range (μm)	5-100	5-100	2-30	4-35
Gelatinization T	(Very) low	Very low	Medium	Low
Protein (N) g/100 g	0.04	0.07	0.33	0.10
Lipids g/100 g	0.1	0.1	0.2	0.1
Crystal structure	B-type	B-type	A-type	C-type

ELIANE™ has unique raw material characteristics

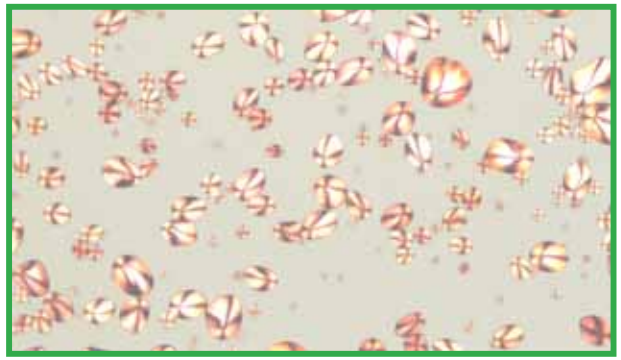
X-ray diffraction pattern of commonly used starches



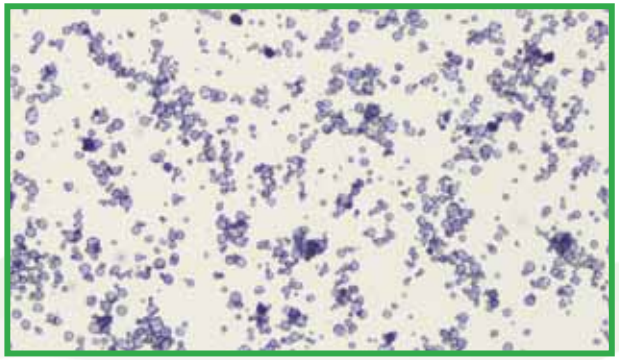
Microscopic Pictures (100x)



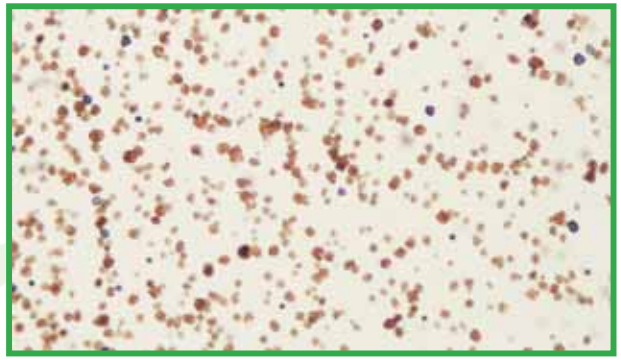
Potato



ELIANE™

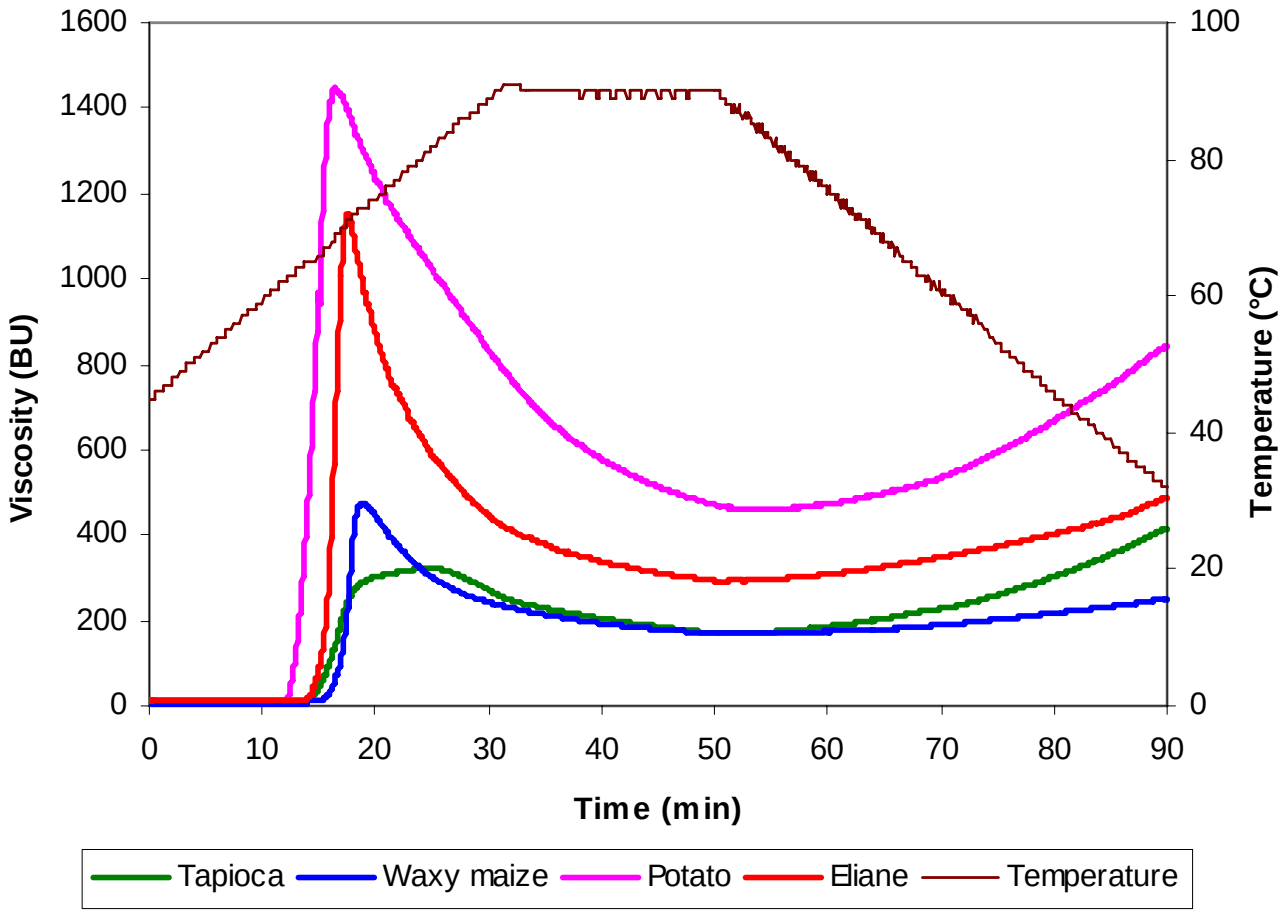


Tapioca

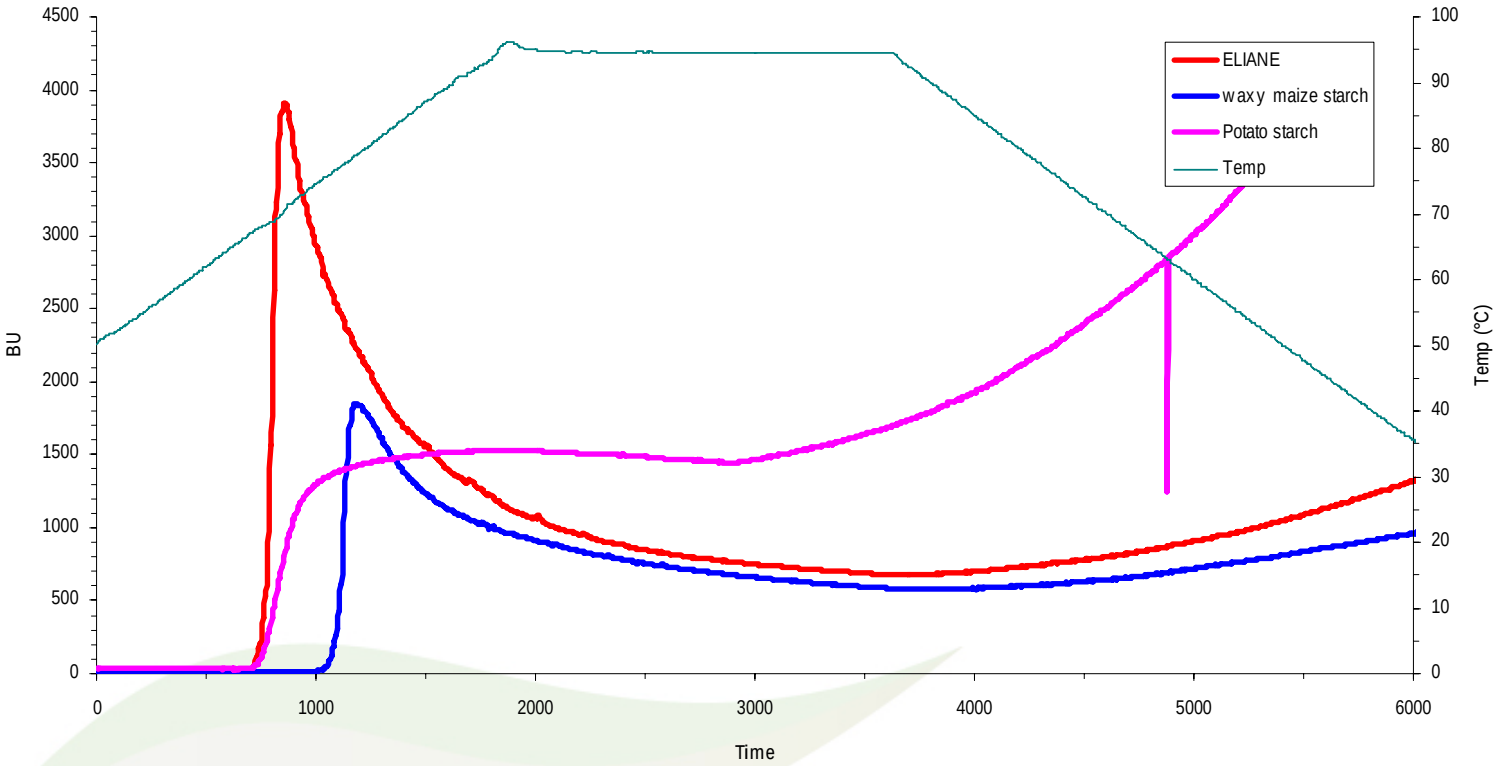


Waxy Maize

Brabenders Native Starches (5%) in Demineralized Water

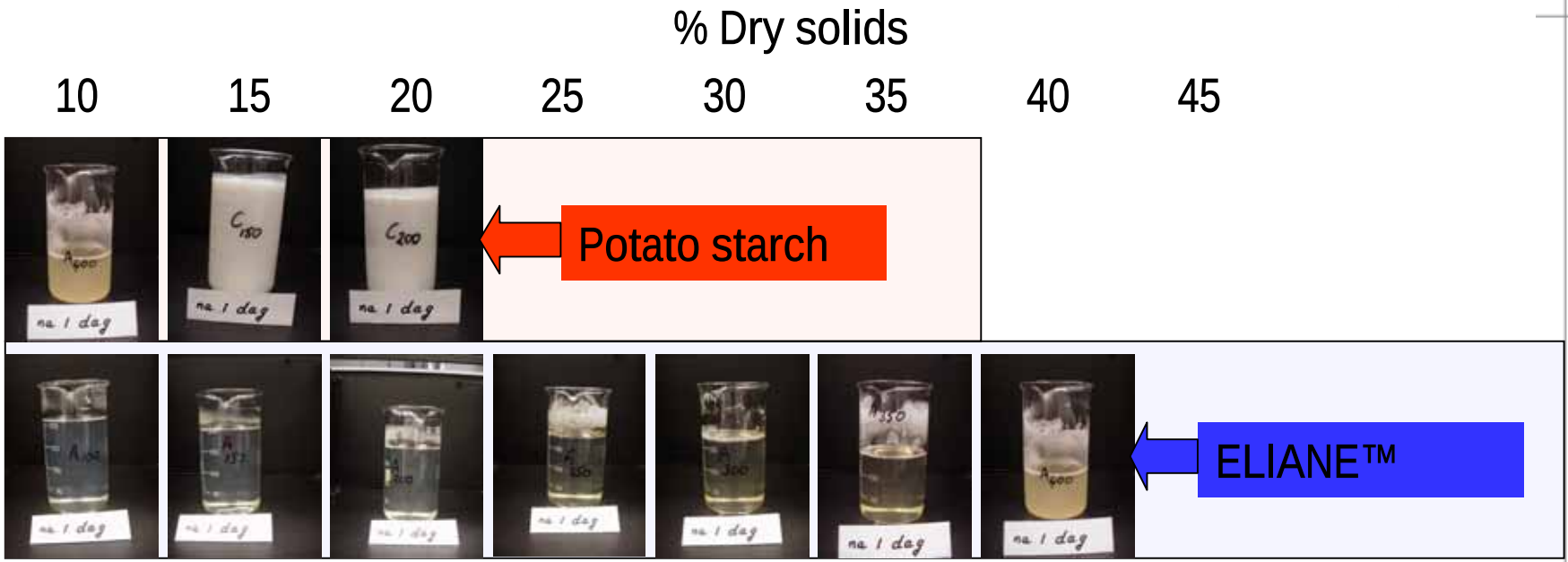


Brabenders Amylopectin Starches (5%) in 2% Salt Solution

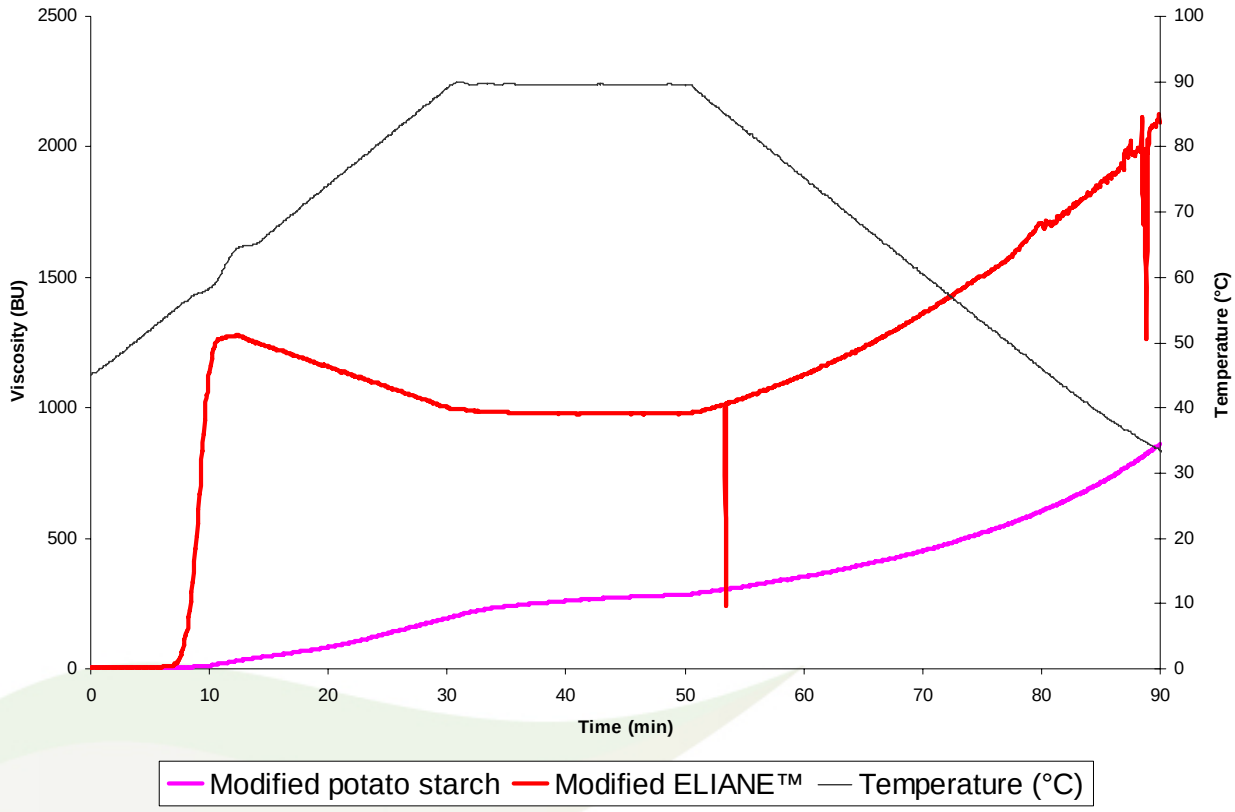


High Clarity & Stability of ELIANE™ compared to Potato Starch

High stability of low DE maltdextrines of ELIANE™



Brabenders Modified Starches (4%)



Discrete Fragment Formation upon Shear

Before shear

After shear

ELIANE™ stands for:

- High viscosity and water binding
- High clarity
- Stability
- Clean neutral taste
- Low temperature of gelatinization (fast viscosity development/hydration)
- Smooth and shiny texture
- High expansion and soft crispy texture

ELIANE™

Applications in Food Systems

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Potato starch *vs.* waxy maize starch

Potato starch no 1 in:

- Instant noodles
- Snacks
- Bakery cream
- Instant soups

Fast Hydration of ELIANE™ in Noodles

ELIANE™ in Instant Noodles

- Fast rehydration
- Excellent long lasting texture

Standard noodle with potato starch after 3 minutes 85 °C

Noodle with ELIANE™, after 3 minutes 85 °C

New Textures with ELIANE™ in Snack Applications

ELIANE™ in Coated Nuts

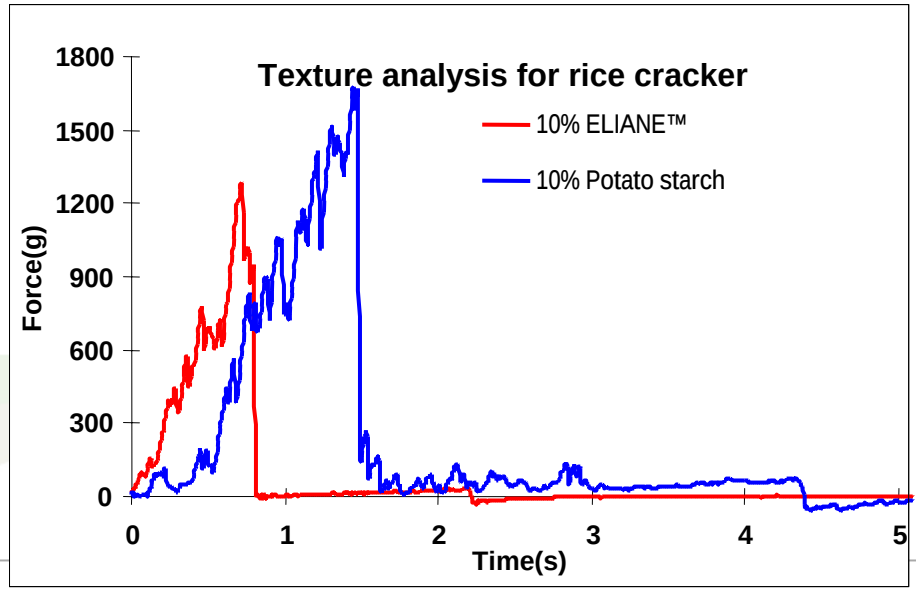
- High expansion
- Soft crispy texture
- Special textures
- Excellent performance in baked coated nuts

Standard coated nut with a 100% potato starch formulation on the left and with 100% ELIANE™ formulation on the right

New Textures with ELIANE™ in Snack Applications

Benefits of Elianes in rice cracker products

- Soft crispy texture
- Easy to be melted in mouth
- Uniform structure (air cells)
- Controlled and uniform expansion
- Less energy required during baking



ELIANE™ in Instant Bakery Cream

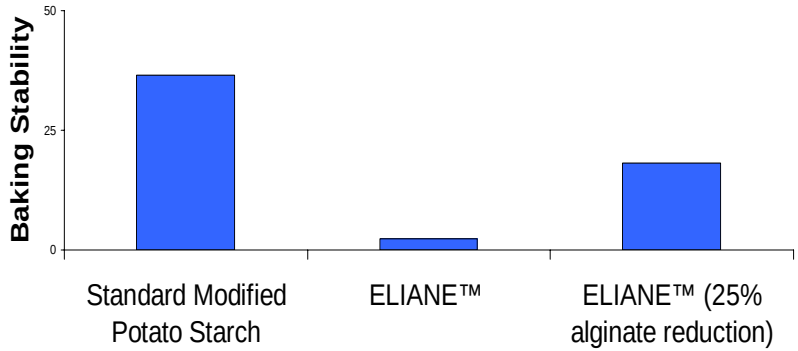
- High bake stability
- Excellent texture

Left: Standard modified potato starch

Right: ELIANE™

Baking Stability

(% flow at 200°C 20 min)

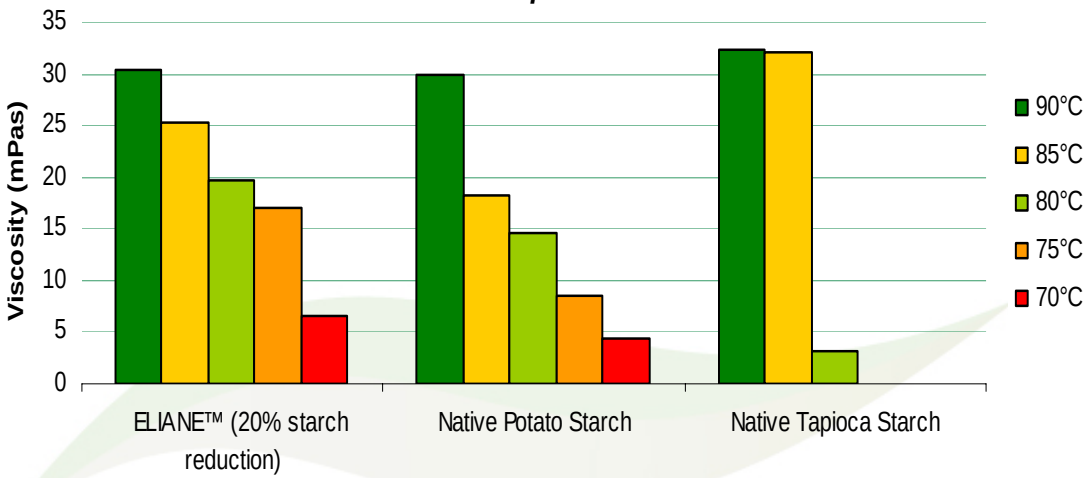


The lower the flow
the better the baking stability

ELIANE™ in Instant Soups & Sauces

- High viscosity
- Viscosity development at relatively low T

Viscosity of an instant tomato soup prepared with different water temperatures



Potato starch *vs.* waxy maize starch

Waxy maize starch no 1 in so-called 'liquid foods'

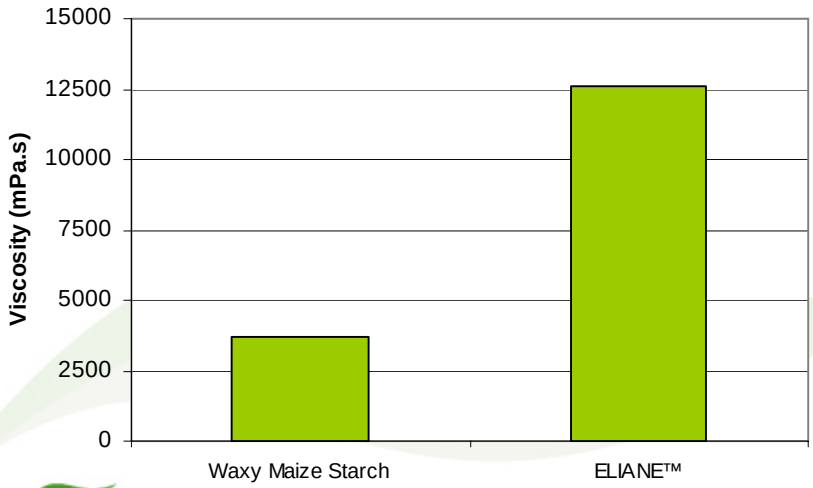
- Dressings (mayonnaise)
- Fruit fillings
- RTE-desserts & yoghurts
- Canned soups

High Viscosity of ELIANE™ in Fruit Fillings

ELIANE™ in Cook Up Fruit Fillings

- Excellent performance at high °Brix
- High clarity
- Fresh, neutral taste

ELIANE™ vs waxy maize starch at 60 °Brix



ELIANE™: a Potato Starch with a Smooth Appearance

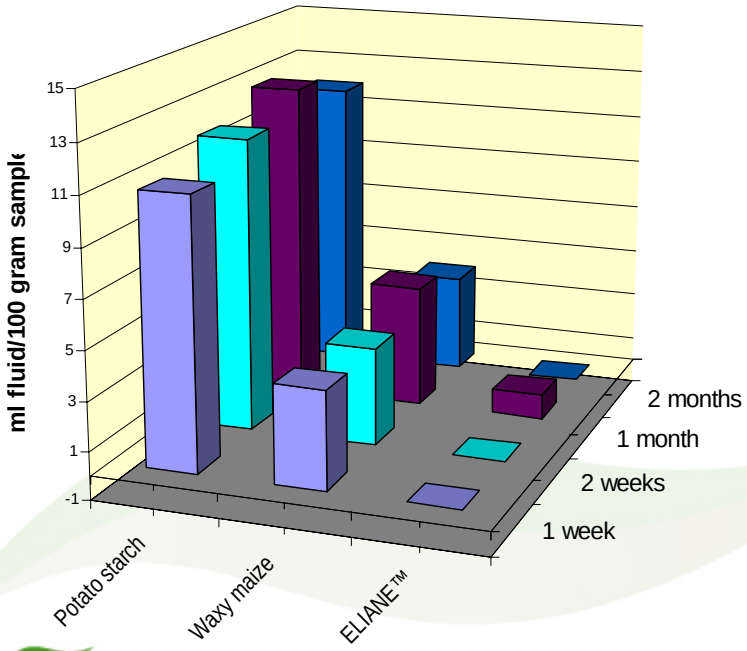
ELIANE™ Texture in Hot Prepared Mayonnaise

- ELIANE™ potato starches (left) develop smooth textures
- Regular potato starches develop more pulpy texture

From Pulpy to Smooth with ELIANE™

ELIANE™ in Liquid Sauces

- High viscosities
- Very low serum separation (syneresis)
- Different textures possible varying from pulpy to smooth



High Clarity of ELIANE™ in Dressings

ELIANE™ in Low Fat Clear Dressings

- Clarity and Suspension Stability
- ELIANE™ products (right) give an excellent suspension of particles
- No non starch hydrocolloids required
- High clarity versus other starches

The clarity of ELIANE™ in dressings (right) is striking compared to the modified waxy maize starch (left)

Conclusions

- ELIANE™ is a new commercial amylopectin potato starch with unique features that adds to the existing range of starches
- ELIANE™ can be used in many traditional potato starch and waxy maize applications to give improved performance
- ELIANE™ can be used to replace expensive hydrocolloids
- ELIANE™ gives our customers the opportunity to innovate!

ELIANE™ is still in the development phase, any ideas/suggestions???