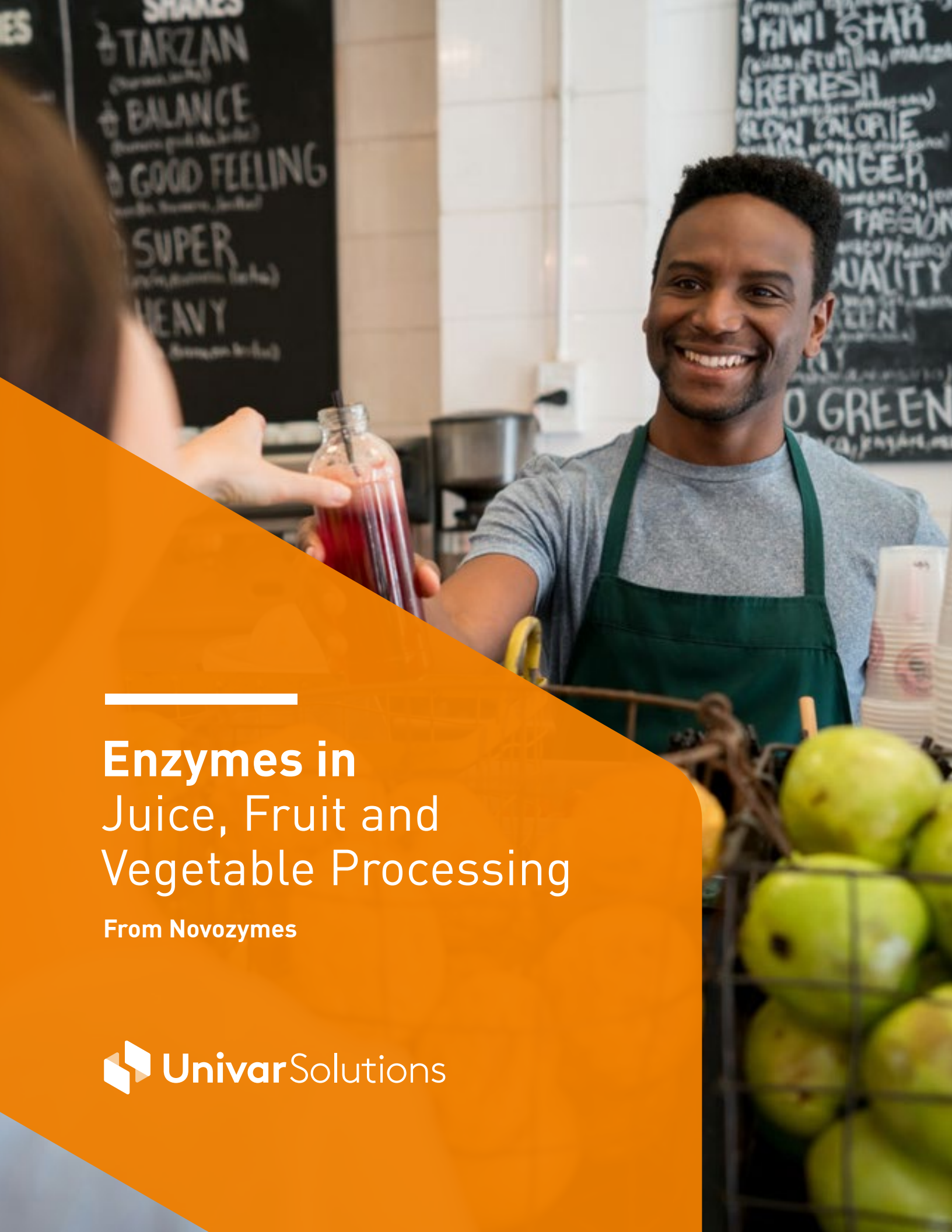


Enzymes in Juice, Fruit and Vegetable Processing

From Novozymes

UnivarSolutions

Enzymes in Juice, Fruit and Vegetable Processing

Covering fruit and vegetable applications

Fruit juice production has never been more competitive. Global trade and rising economic pressure on producers make it paramount to achieve high yields and throughputs. Enzymes are an important tool to manage this, both in the first mashing and, to an even greater degree, with a second extraction.

Enzymes allow producers to get more out of their expensive fruit and achieve a more sustainable production process.

- Starch
- Pectins
- Hemicelluloses
- Celluloses
- Proteins

Degradation of these above substances is only possible by using enzymes.

Enzymes can do the job

Enzymes is the only processing aid which can be used several times in the juice making process

- Several applications: mashing, clarification, filtration and enhancing healthy substances
- Useful for most of vegetable and fruit juices

Benefits

The main benefits of using enzymes for first and second mashing are:

- Increased juice yields due to easier separation of liquids and solids
- Higher capacity with press or decanter
- Less pomace and less cost for disposal
- Improved decanter or press operations (discharge, cleaning)
- Reduced or no-water use for extraction
- More sustainable production

APPLE/PEAR JUICE PRODUCTION

Option for cloudy apple juice:
Addition of ascorbic
acid approx. 300-700mg/l

Option:
Secondary mash treatment/pomace
extraction with Pectinex® Ultra AFP

Apples/Pears

Milling — Enzyme addition into the mill

Enzyme treatment of the mash — 40-80 ml/t Pectinex® Yieldmash Plus

Mash holding — Holding time: > 30 min. or 1-2 h, 77-80.6°F, no stirring

Solid-Liquid Extraction — Press or Decanter

Pomace

Juice with approx 12°Bx

Pasteurisation

Centrifuge

Concentration

Cloud stable juice concentrate with 70-72°Bx storage at <39°F

Juice with approx 12°Bx

Aroma recovery

Juice treatment for Starch & Pectin degradation — 20-40 ml/1000 L Pectinex® XLL or 30-50 ml/1000 L Pectinex® Ultra Clear

Fining & filtration — 20–60 ml Amylase® AG 300 L
20–40 ml Amylase® AG XXL

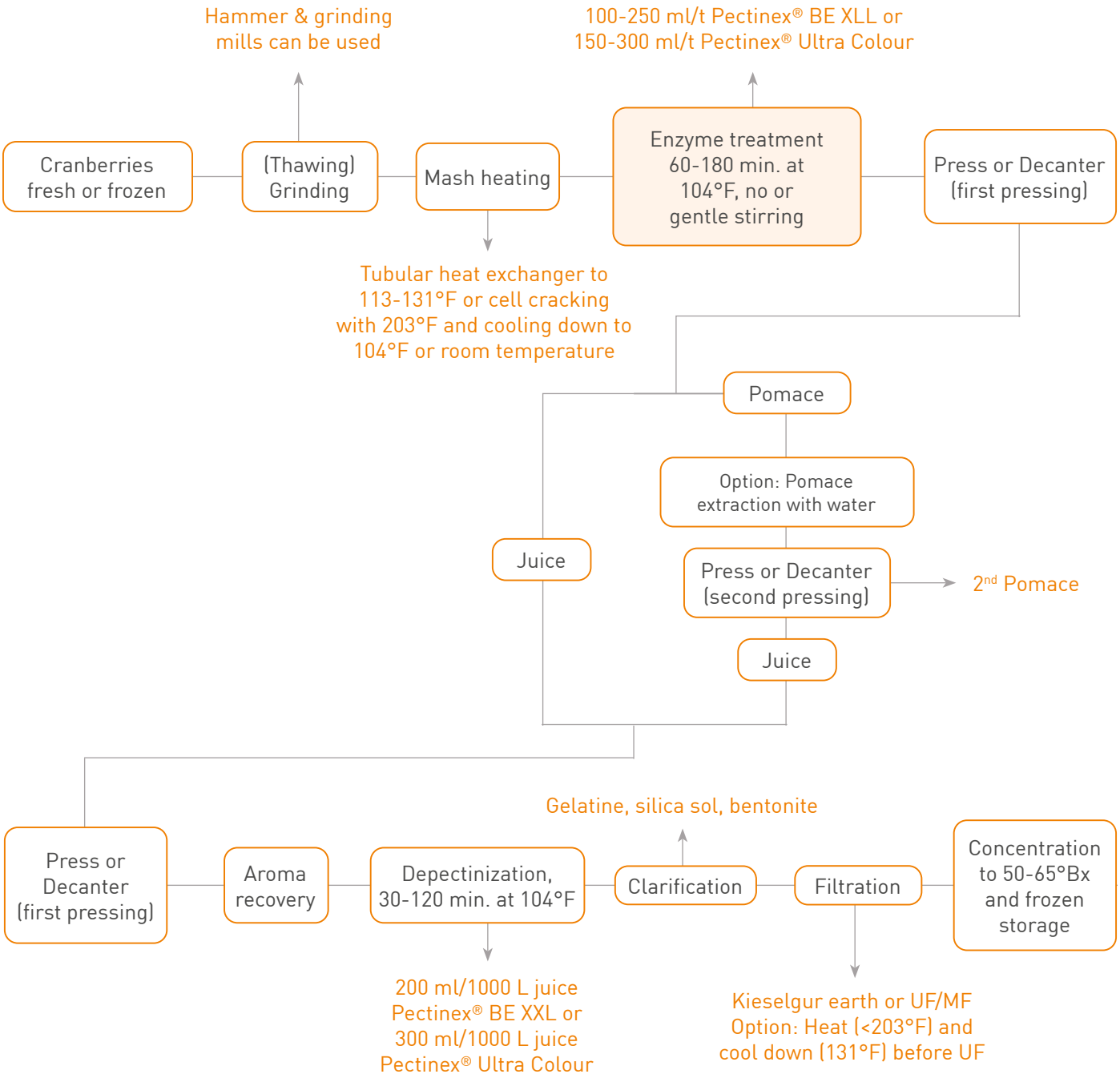
Concentration

Cloud stable juice concentrate with 72°Bx Storage at < 39°F

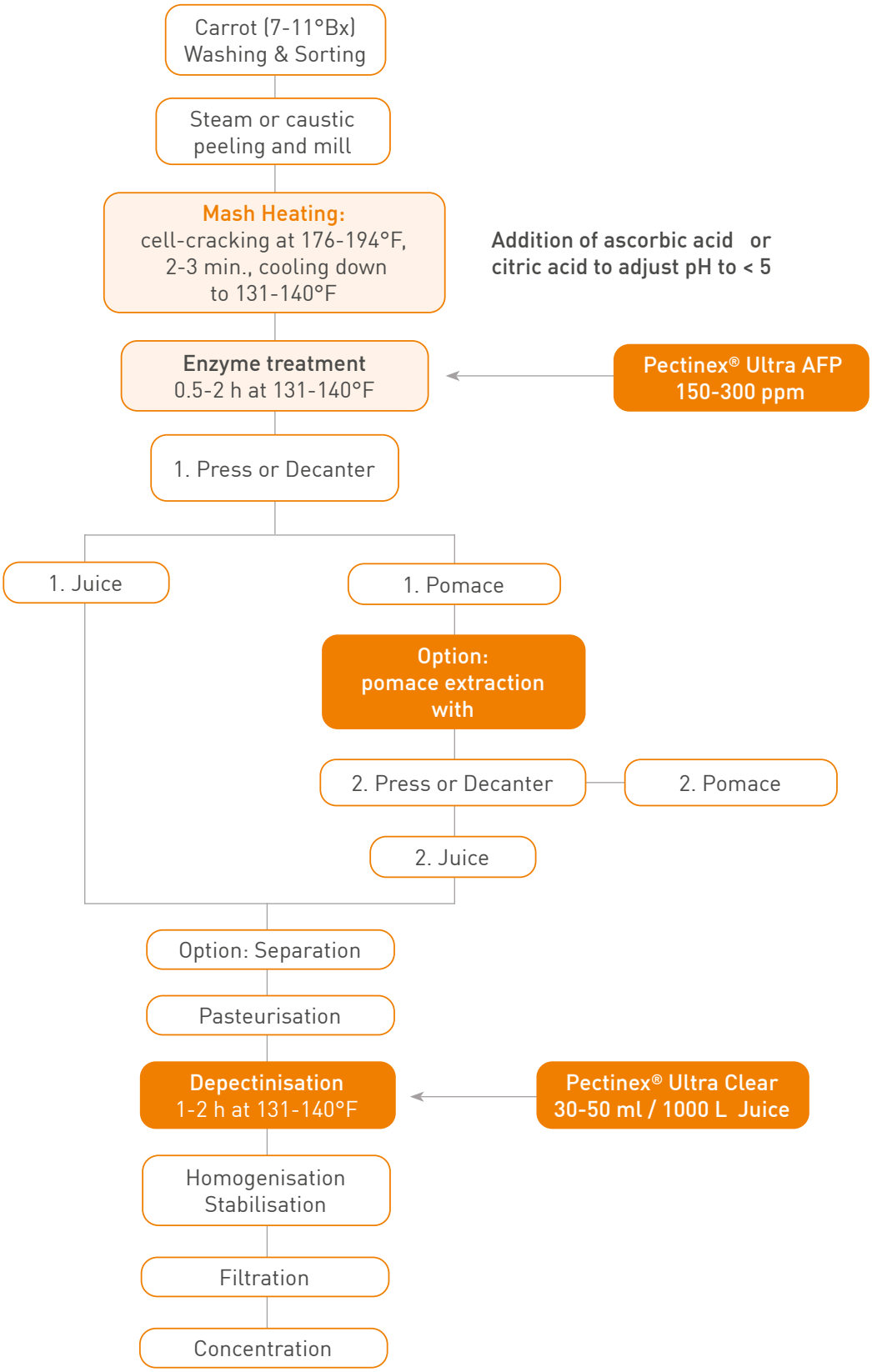



UnivarSolutions | novozymes

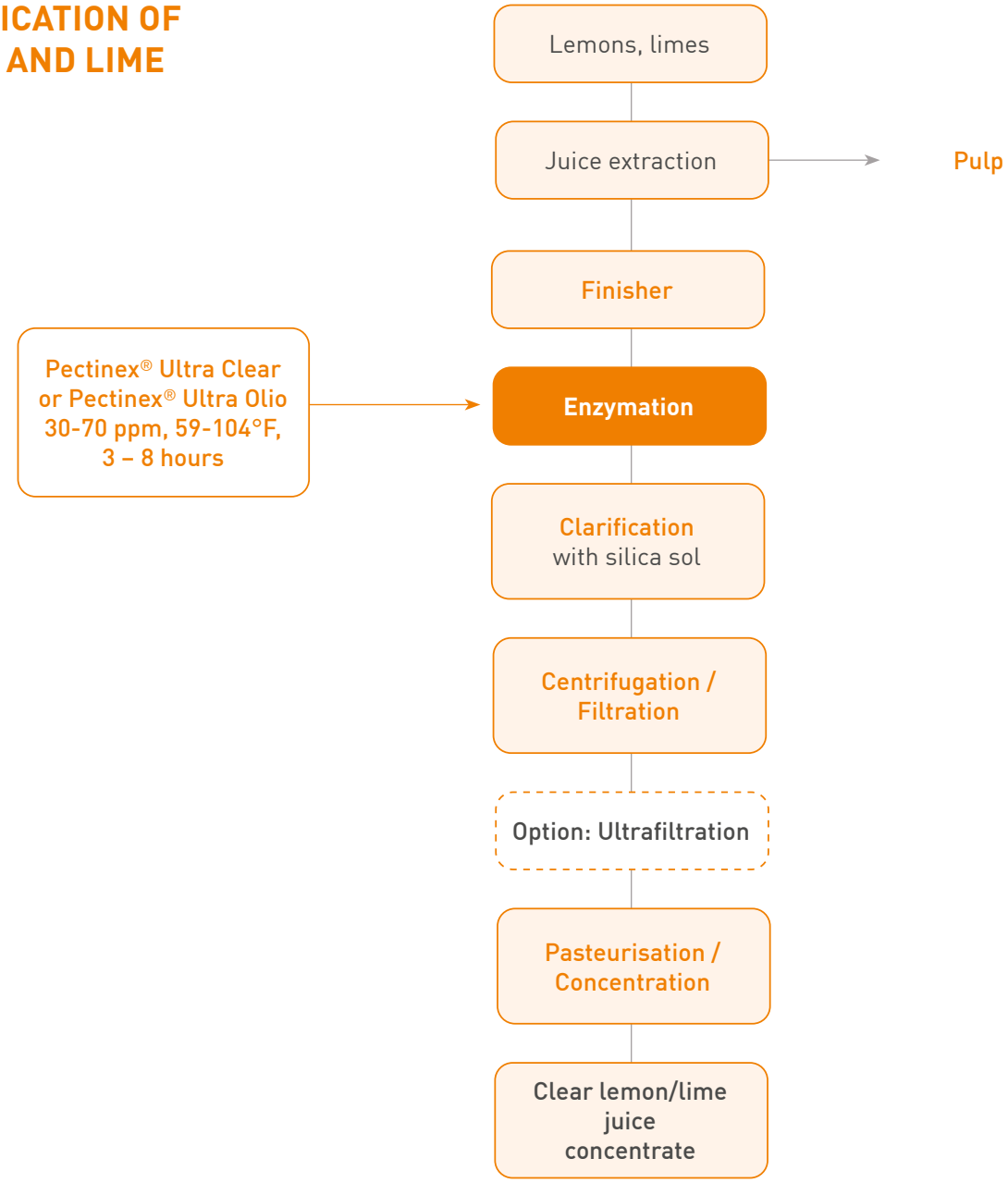
CRANBERRY JUICE PRODUCTION



CARROT JUICE PRODUCTION

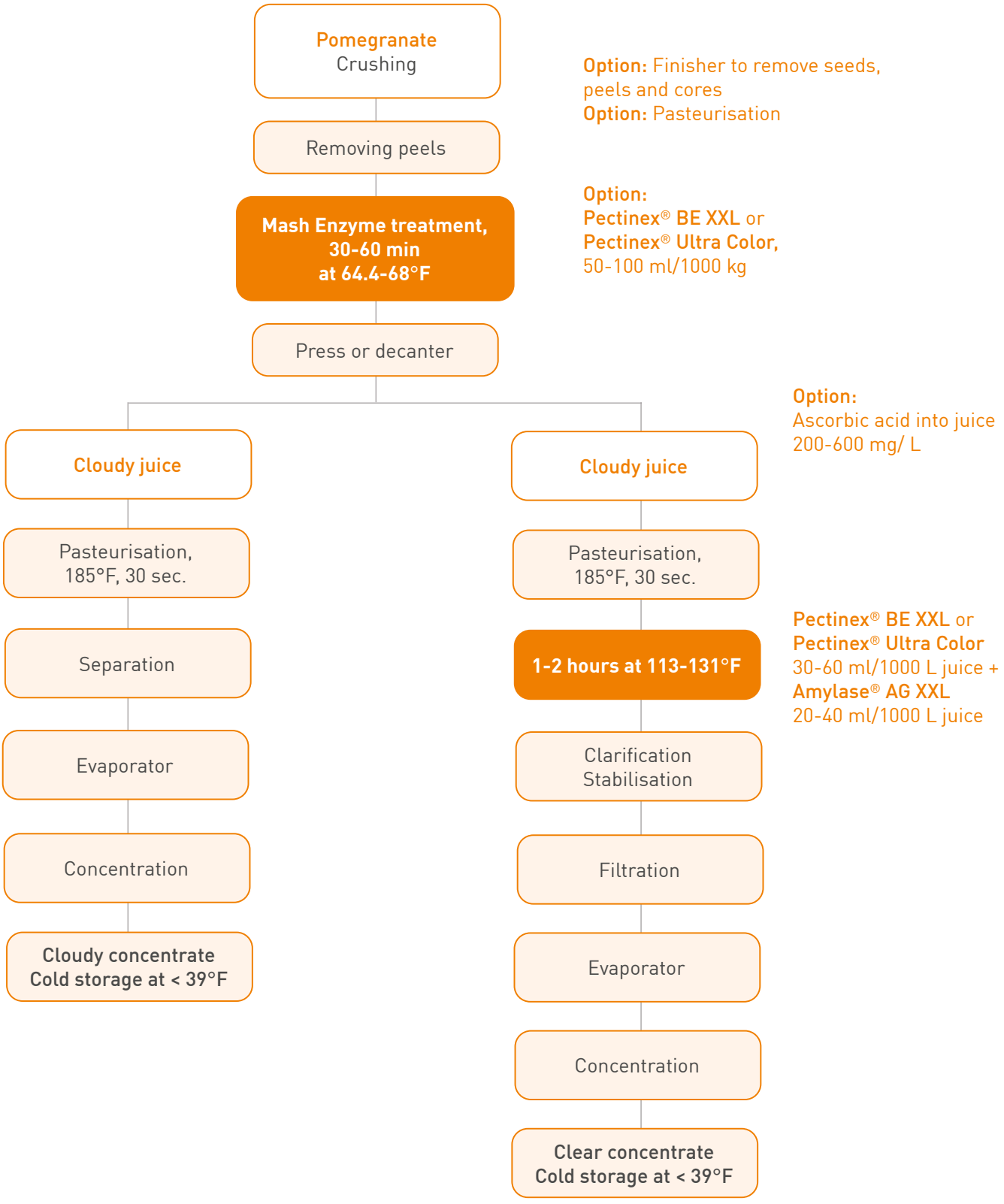


CLARIFICATION OF LEMON AND LIME






POMEGRANATE JUICE PRODUCTION



ENZYMES IN JUICE, FRUIT AND VEGETABLE PROCESSING					
FRUITS & VEGETABLES	**APPLICATION**	**PRODUCT**	**ORIGIN**	**DOSAGE**	**MAIN BENEFITS**
Apple and Pear	1st mashing	Pectinex® Yieldmash Plus	Self-cloned	40 – 80 ppm (fresh fruit) 80 – 120 ppm (stored fruit)	• Increase yield and Capacity • Selective degradation of soluble pectin
	2nd mashing	Pectinex® Ultra AFP	Non-GMM	150 – 250 ppm	Increase yield and capacity with secondary mash
		Pectinex® Smash XXL	Self-cloned	50 – 100 ppm	• Specific pectinase, no methanol and galacturonic acid (GA) • Cloud stable juices
		Celluclast® 1.5L	Non-GMM	100 – 200 ppm	Only cellulase activities, broad reaction cluster
	Juice clarification	Pectinex® XXL	Self-cloned	20 – 40 ppm (12 °Bx)	Efficient pectinase, lowest GA and methanol
		Pectinex® Ultra Clear	Non-GMM	20 – 40 ppm	Well balanced clarification enzyme
	Starch degradation	Amylase™ AG XXL	Self-cloned	10 – 30 ppm	Aymlase with side activities, starting good with low ph
		Amylase AG 300 L	Non-GMM	20 – 60 ppm	Well balanced amylase
	Cross Flow (UF) Flux increase	Pectinex® UF	Non-GMM	10 – 30 ppm	Efficient Flux increase enzyme, due to broad side activities

ENZYMES IN JUICE, FRUIT AND VEGETABLE PROCESSING					
FRUITS & VEGETABLES	**APPLICATION**	**PRODUCT**	**ORIGIN**	**DOSAGE**	**MAIN BENEFITS**
Berries, color fruits	Color extraction	Pectinex® Ultra Color	Non-GMM	150 – 300 ppm	Well balanced berry enzyme
Peaches, apricots	Mash and juice treatment	Pectinex® Ultra AFP	Non-GMM	50 – 200 ppm	Increase yield and capacity with secondary mash
Citrus	Clarification	Pectinex® Ultra Clear	Non-GMM	40 – 100 ppm	Well balanced clarification enzyme
	Cloudy products	Pectinex® Ultra AFP	Non-GMM	5 – 30 ppm	Suitable for cloud stable citrus beverages
	Oil recovery	Pectinex® Ultra Olio	Non-GMM	50 – 150 ppm	Excellent oil yield increases
Tropicals	Mash and juice	Pectinex® Ultra Tropical	Non-GMM	50 – 200 ppm	Excellent well balanced multi enzyme with side activities
Vegetables	Mash and juice	Pectinex® Ultra SP-L	Non-GMM	100 – 300 ppm	Multi component pectinase with side activities
Grapes	Mash and juice	Pectinex® Ultra Color	Non-GMM	50 – 120 ppm	Well balanced grape and berry enzyme
Other	Mash and juice	Pectinex® Ultra Passover	Non-GMM	50 – 150 ppm	Suitable pectinase forKkosher for Passover requirements
	Olives	Pectinex® Ultra Olio	Non-GMM	200 – 400 ppm	Highest oil yields and improved performances of decanter and separators
	Several applications incl. concord grapes	Pectinex® Ultra Flex	Non-GMM	50 – 200 ppm	In planning, universal enzyme




Contact:

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