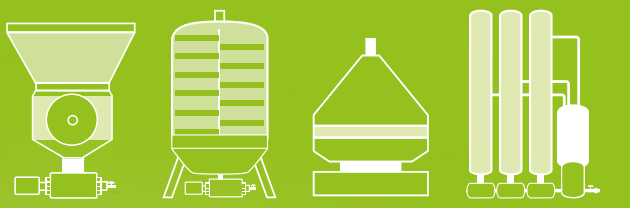
Modern vegetable processing



ERBSLÖH

Progress is our future

Vegazym - for the production of cloud-stable fruit and vegetable juices and purees

Cloud-stable juices and pulp-containing nectars are in alimentary physiological respect increasingly regarded as valuable foods and thus, the demand in high-quality products raises steadily. An important quality factor is the cloud-stability of the macerates and juices. This stability is indeed significantly improved by a suitable processing technology and by a targeted use of enzymes.

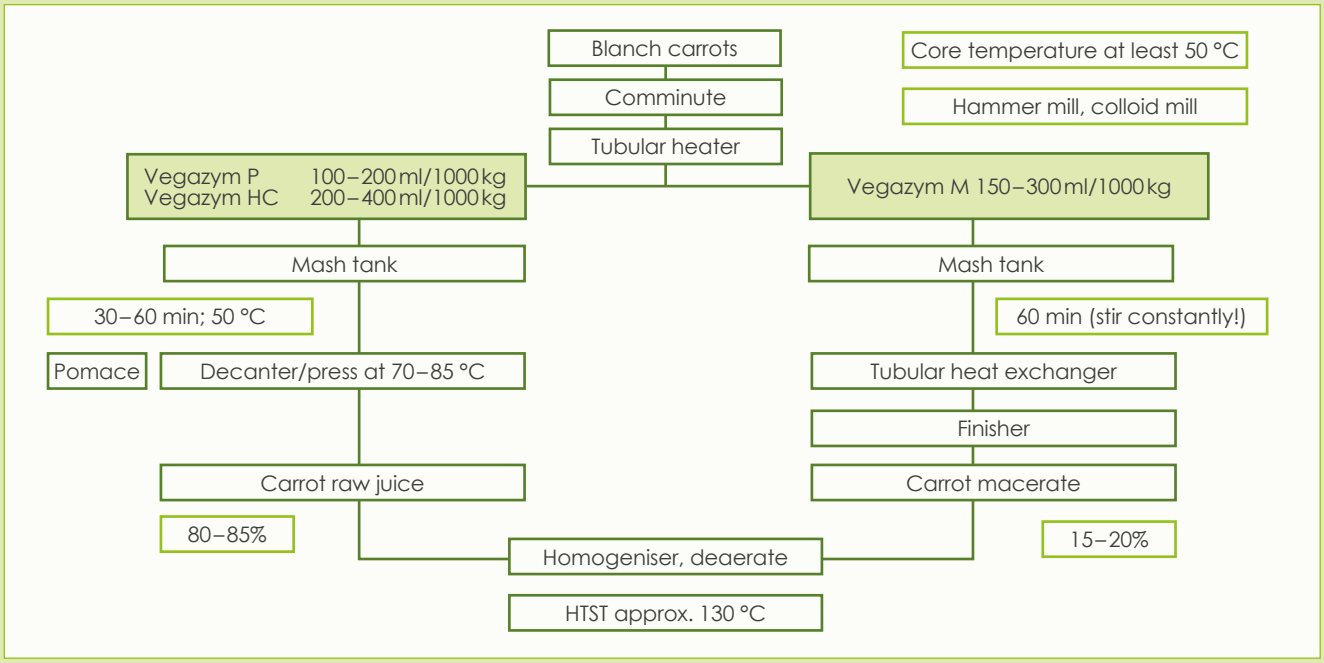
Puree production

The raw materials are blanched and comminuted. Preferably a mixing device with high shear forces is used. If necessary, with vegetables the pH-value should be adjusted. For optimal maceration of fruit or vegetable mash, the application of Vegazym M is recommended. Maceration is controlled through a final short-time heating (HTST pasteurisation). Puree produced in this way is mostly applied as blending portion in the making of cloud-stable vegetable juices rich in sediments (see flow chart "Cloud-stable carrot juice with pulp addition").

	Vegazym M (mL/1000 kg)	Temperature (°C)	Reaction time (minutes)
Carrots	150–300	50	90
Paprika (pepper, capsicum)	250–500	50	60–120
Strawberries	150–300	25	45–60
Peaches	300–400	50	60–90
Apricots	300–400	50	60–90
Apples	30–60	55	30–45

Alternatively, cloud-stable juices can be obtained through a combination of juice extraction (optimised yield) and puree production (increased cloud stability).

Cloud-stable carrot juice with pulp addition



Cloudy vegetable juices and vegetable concentrates

For this purpose the special pectinases Vegazym P or Vegazym P-CS are always applied in combination with Vegazym HC. The choice is made according to the respective aim.

Application instructions to produce cloud-stable juices

Aim	Vegazym P	Vegazym P-CS
Content of sediments	Low to medium	Medium to high
Cloud stability	Medium	High
Concentration	Juice, ready-to-drink to full concentrate	Juice, ready-to-drink to semi-concentrate
Pomace extraction	Very suitable	Suitable
Juice yield	Very high	High
Colour yield	Very high	High

Processing

Contrary to conventional fruit varieties, leaf and root vegetables contain low water portions and the solid structure of the tissue additionally retains the sap in the cell vacuoles. Therefore vegetable mashes must undergo intensive mechanical/thermal digestion in advance. As subsequent step, an application of Vegazym assures optimal extraction. Vegazym P, Vegazym P-CS and Vegazym HC are the optimal tools to be used for individual requirements in the processing of vegetables.

Aim

Cloud-stable vegetable juices with high solid matter content

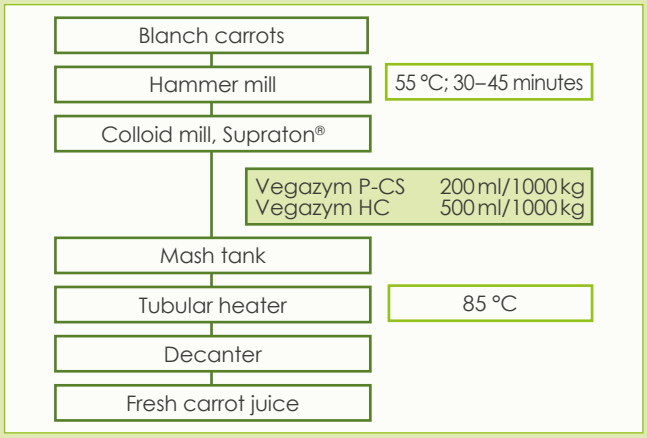
By the application of Vegazym P-CS an economic compromise between good juice extraction and subsequent cloud stability is obtained. Along with solids content juice viscosity is high and therefore full concentrates cannot be produced. With the special pectinase an exclusively extracting effect is realized even when pH-values are high and unlike conventional commercial pectinases the vegetable material is not getting mushy. The valuable ingredients of the vegetable mash are released while an overall good mash structure is securely preserved for dejuicing. Vegazym P-CS is applied in combination with Vegazym HC.

Cloud-stable vegetable juices, high yield

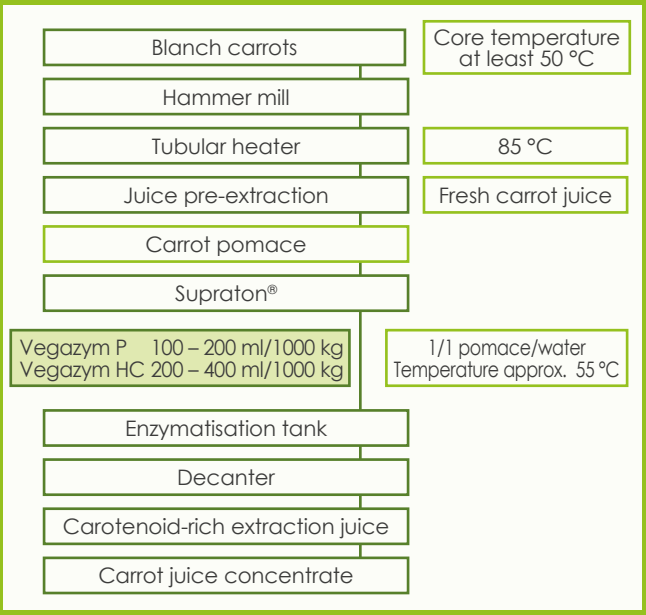
If effective extraction is the aim, for instance, the yield of juice and, at the same time, carotenoids of the vegetable raw material, then the use of the special pectinase Vegazym P is recommended. This enzyme has significantly strong extracting and tissue dissolving properties and thus viscosity reduction in vegetable mashes is considerably accelerated, independent of acidification, and maximum yield of extract and valuable, ingredients from the vegetables are obtained. The product is optimally suitable for the production of extraction juices and juice concentrates with reduced solids.

Vegazym P is applied in combination with Vegazym HC. Combined with one of the above described pectinases, Vegazym HC supports all kind of extraction processes. The highly efficient hemicellulase portions exert a softening effect on the cell tissue with the result that the cell sap flows to the outside more easily. Interesting increase rates of total extract (°Bx) result from this.

Production of cloud-stable carrot juice



Enzymatic extraction of carrot pomace



Conclusion

Particularly during the production of carrot juice concentrate and similar base materials, an optimal use of raw materials is paying. For this purpose, the indispensable mechanical maceration process is supplemented by an enzymatisation of the pomace which has undergone dejuicing in advance. Special enzymes of the Vegazym series contribute to realise the successful and profitable processing of vegetables:

- Cloud-stable carrot juices with high yield
- Full concentrate carrot juice with good cloud stability
- Components can be individually adjusted to every vegetable variety
- Extraction juices with high contents of secondary plant materials (e. g. carotenoids)

Selection of enzymes for the production of fruit juices

	Product	Treatment aim
Pectinases	Fructozym® P	Pectin degradation in fruit juices
	Fructozym® P-6 L	Pectin degradation in strongly acidic beverages
	Fructozym® COLOR	Optimization of colour, clarification and filtration with coloured juices
	Fructozym® EC COLOR	Optimization of mash extraction and colour with coloured juices
	Fructozym® BE	Pectin degradation in colloid-containing coloured juices
	Frutase PL	Pectinase without galacturonic acid release
Amylases	EnerZyme® HT	Complete starch degradation with highly concentrated amyloglucosidase
	Fructamyl® FCT	Starch degradation and prevention of filamentous cloudiness through cold clarification amylase
	Fructamyl® FHT	Starch degradation and prevention of filamentous cloudiness through hot clarification amylase
Stabilisation and Ultrafiltration	Fructozym® FLUX	Colloid degradation for particularly high stability and filtration requirements
	Fructozym® UF	Protein degradation in fruit juices
	Fructozym® FLOW UF	Pectin degradation and improved filterability
Maceration enzyme	Vegazym M	Production of cloud-stable juices and purees from fruits and vegetables
Mash enzymes	Fructozym® PRESS	Maximum yield and capacity increase with pome fruits
	Fructozym® APX	Yield and capacity increase with fresh and stored pome fruits
	Fructozym® MA-LG	Optimal extraction of pome fruit mashes and pomace
	Fructozym® Ultra HPX	Extraction of pome fruit and its pomace, maximum yield in the cascade process
Tropical fruits and citrus fruit processing	Citrolase® TS	Yield increase and viscosity reduction in pulp and corewash juices
	Citrolase® TF CLEAR	Production of clear juices from tropical fruits and purees
	Frutase Citrus Cloudy	Citrus peel extraction for natural turbidity stabilizers and peel extracts
	Fructozym® UF	Extraction of citrus essence oil, cleaning of ultra-filtration plants in citrus fruit processing
Vegetable processing	Vegazym P-CS	Special pectinase for vegetable processing
	Vegazym HC	Hemicellulase/cellulase complex for the extraction of vegetable mashes
	Vegazym P	Special pectinase for vegetable extraction

ERBSLÖH Geisenheim GmbH • 65366 Geisenheim • Tel.: +49 6722 708-0 • www.erbsloeh.com

ERBSLÖH

Progress is our future