



Sugar usage in the brewing industry

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Belgosuc

Sugar origin (EU):

Beet : sucrose/sacharose

Wheat : Starch => Glucose

<i>million tonnes wse June 2023</i>	2022/23 EU 27 (estimates)		2023/24 EU 27 (DRAFT estimates)	
	Sugar	Isoglucose	Sugar	Isoglucose
Beginning stocks	1.5	0.02	1.3	0.01
Production	14.6	0.46	15.5	0.46
Imports	3.2	0.00	2.7	0.00
as such	2.4		1.9	
in processed products	0.8		0.8	
Total availability	19.3	0.48	19.5	0.48
Consumption/disappearance	14.8	0.43	14.8	0.42
Exports	3.2	0.04	3.4	0.04
as such	0.5		0.7	
in processed products	2.7		2.7	
End stocks	1.3	0.01	1.4	0.01
Total outlets	19.3	0.48	19.5	0.48

Source : DG AGRI, EUROSTAT

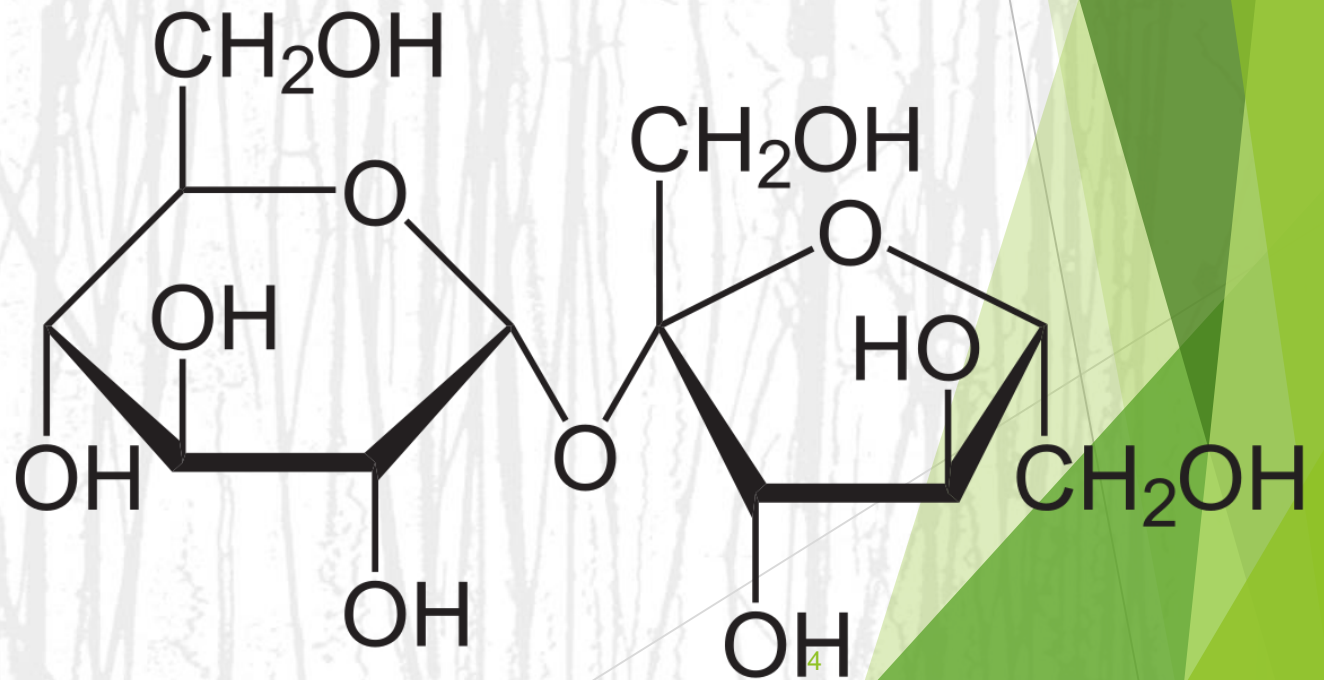
Beet :

Saccharose/sucrose

Liquid sugar

Invert sugar

Candy sugar



Candy sugar:

Oversaturated sugar solution

Oven to form big sugar crystals: mietten

Run off

=> cassonade

=> liquid candi



Wheat :

Starch

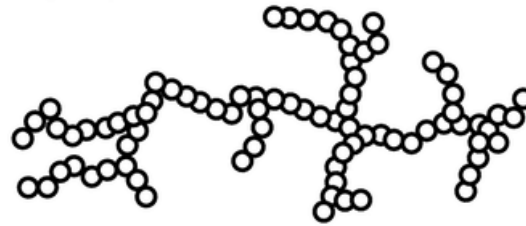
Maltodextrine

Confiserie

High maltose

Dextrose/ High Fructose Syrup

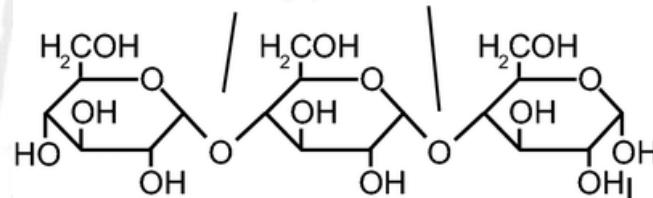
amylopectin



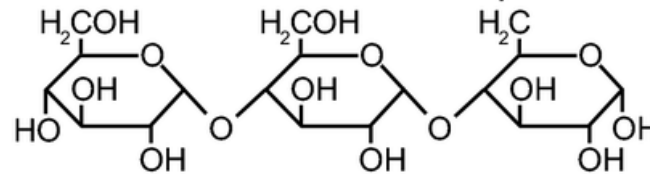
amylose



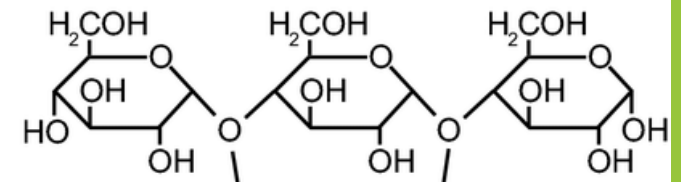
α -1,4-glycosidic bonds



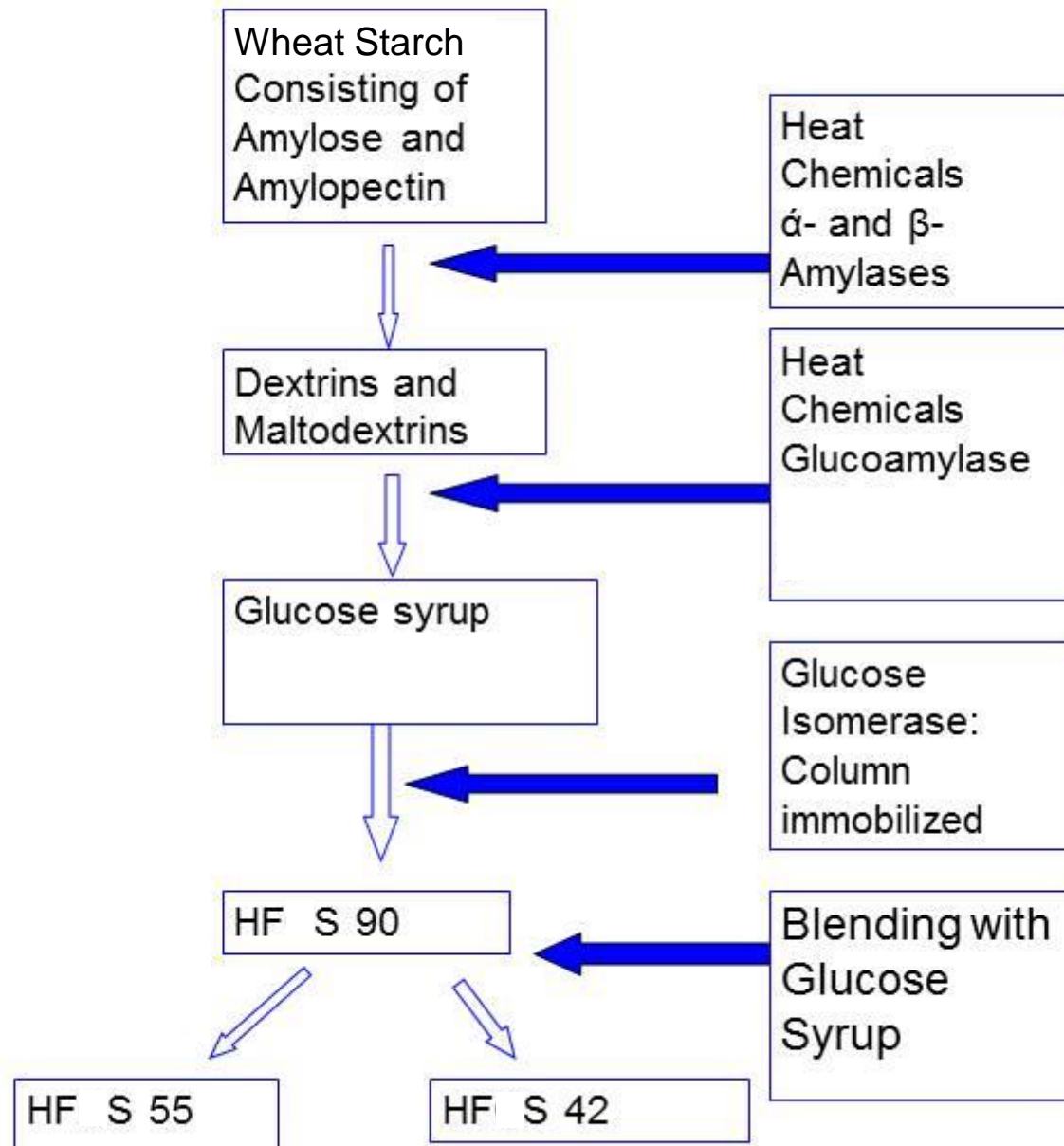
α -1,6-glycosidic bond



O = single glucose unit



α -1,4-glycosidic bonds



Caramels colour/flavour :

E150A Burnt sugar : (Caramel (flavour) or Caramel E150A (colour))

only by heating, no charge so they can only be used in the brewing kettle

E150C : (Caramel E150C)

presurised heating with ammonia present to result in high colour and positive charge
no risk of flakes when used in filtered beer



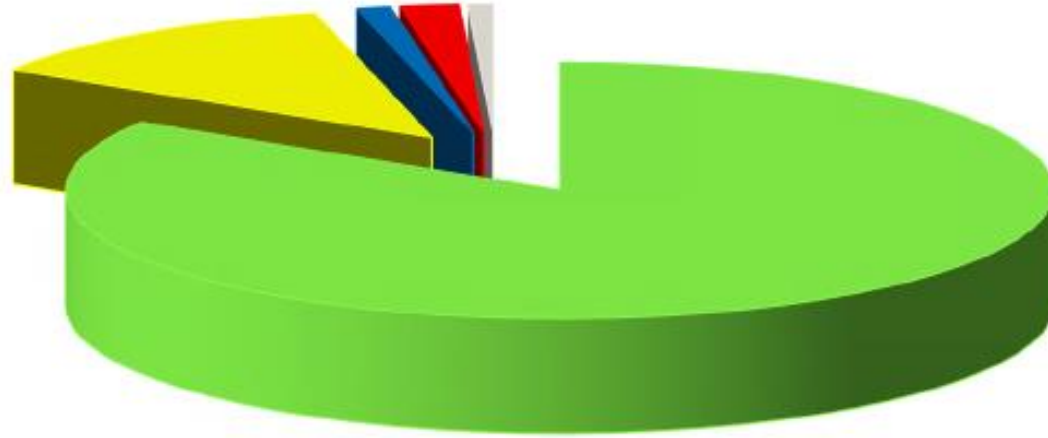
Some key figures

- Founded in 1994
- Private capital, family-owned company
- No links with sugar producers, beet farmers nor starch and glucose producers, 100 % independent
- Volume **2022: 145 700 T**
- Volume 2021 : 129 000 T
- Turnover: 110 millionEUR
- Personnel: 79 people
- Growth 2017 –2022 (5y): + 46,9 %
 - 2020 –2021 : +16 %
 - 2021 -2022 : + 12,3 %**
- New productionhall 4 ready in 2022
- New production line for soft brownsugars, cassonades and coated sugars installed.
- Investments: 2022 : 4 million Euro
 2023 : 7 millionEuro

Modern production plant and warehouse



Sales results geographically



Belgosuc ingredients are found in ...



Belgosuc Brewing Sugars (1)

	100% Fermentable
	Partially Fermentable
	Not Fermentable

	Colour		glucose	sacharose				Shelf life
	EBC*	fructose	dextrose	sucrose	maltose	Trios.	Higher sugars	
		%	%	%	%	%	%	
CANDY SUGARS								
				99,5				Unlimited
	350			99,5				Unlimited
				99				Unlimited
	225			97,5				Unlimited
	700			97				Unlimited
	900			95				Unlimited
		15	15	70				Minimum 4 months
	225	15	15	70				Minimum 4 months
	1900	30	30	40				Minimum 6 months
CARAMEL (ammonium)								
	P32 E150C +	32.000						Minimum 18 months
BURNT SUGAR								
	Burnt syrup BS 5000	4.500						Minimum 18 months
	Burnt sugar syrup N16 -	15.000						
SUCROSE SYRUPS								
	Sirosuc 67			100				Minimum 3 months
	Invertsuc 70	47	50	3				Minimum 3 months
MIXED SYRUPS								
	Siromix 80	13,5	25	14	7,5	5	35	Minimum 6 months
	Trisuc 73	33	33	33				Minimum 4 months

*EBC: is a measure for the beer and wort colour.

Belgosuc Brewing Sugars (2)

	100% Fermentable
	Partially Fermentable
	Not Fermentable

		glucose	sacharose				Shelf life	
		fructose	dextrose	sucrose	maltose	Trios.	Higher sugars	
		%	%	%	%	%	%	
FRUCTOSE SYRUPS								
	Fructomix F50-71	52	43		3		2	Minimum 6 months
	Fructomix F85-73	84	15			1		Minimum 4 months
GLUCOSE SYRUPS								
	Belgogluc CF 81		17		13	13	57	Minimum 12 months
	Belgogluc HM70-75		2		69	17	12	Minimum 12 months
DRY								
	Crystal sugar 600 and 400 µ			100				Unlimited
	Dextrose Monohydrate		99,5					Minimum 24 months
	Maltodextrine		1		5	8	86	Minimum 18 months
	Crystalline Fructose	99,8						Minimum 24 months

Belgosuc Brewing Sugars (3)

	100% Fermentable
	Partially Fermentable
	Not Fermentable

			glucose	sacharose				Shelf life
		Colour	fructose	dextrose	sucrose	maltose	Trios.	Higher sugars
		EBC	%	%	%	%	%	%
ORGANIC								
	Organic cane sugar (white, Thailand)				100			Unlimited
	Organic cane sugar (light-coloured, Brazil)				100			Unlimited
	Org. Sirosuc cane 67 (Min. 5 Ton)!				100			Minimum 3 months
	Organic invertsuc 75		29	31	40			Minimum 4 months
	Organic Beet sugar				100			Unlimited
	Organic Caramel SLBA 197	12.000						Minimum 24 months

Packaging

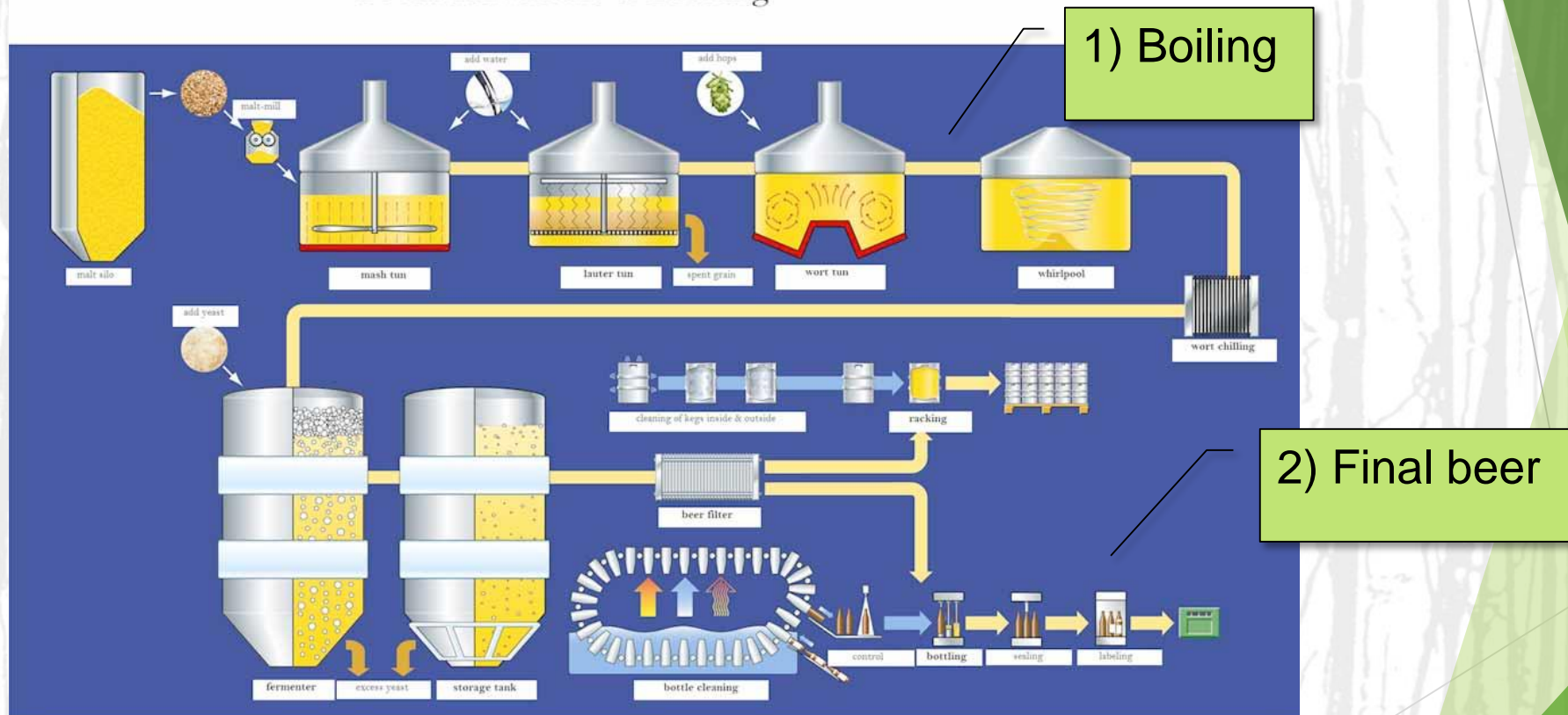
	Small packaging	Returnable Container	OW* Container	Bulk
Dry	Bag 25kg	Big bag 800 - 1000kg		
Liquid	Jerry can / Pail 25kg	Cont. 500kg-1300kg	OW cont. 1300kg	Bulk



*OW = one-way

Brewing Process

The Brewing Process:
From Brewhouse to Bottling



Gesellschaft für Öffentlichkeitsarbeit der Deutschen Brauwirtschaft e.V.

1) Boiling: Increase gravity

	Colour		glucose	sacharose			
	EBC	fructose	dextrose	sucrose	maltose	Trios.	H.S.
Candy sugars		%	%	%	%	%	%
Sugar pieces white				99,5			
Sugar pieces dark	350			99,5			
Cassonade white				99			
Cassonade-light 225	225			97,5			
Cassonade-dark 700	700			97			
Cassonade-dark 900	900			95			
Candimic light 73 (white)		15	15	70			
Candimic-dark 73	225	15	15	70			
Candimic dark 78	1900	30	30	40			
SUCROSE SYRUPS							
Sirosuc 67				100			
Invertsuc 70		47	50	3			
MIXED SYRUPS							
Siromix 80		13,5	25	14	7,5	5	35
Trisuc 73		33	33	33			
GLUCOSE SYRUPS							
Belgogluc HM70 75			2		69	17	12
ORGANIC							
Organic cane Sugar (Thailand or Brazil)				100			
Organic beet Sugar				100			
Organic Sirosuc cane 67 (min. 5 Ton)				100			
lorganic nvertsuc 75%		60		40			
DRY							
Crystal sugar 600 and 400 µ				100			
Dextrose monohydrate			99,5				
Maltodextrine			1		5	8	86

Calculate gravity increase

- ▶ To increase 1 °Plato/hl :
- ▶ $1\text{g}/100\text{g} \Rightarrow 1\text{ hl} \Rightarrow 100\text{ kg} = \text{add } 1\text{ kg}$
- ▶ Technical sheet total solids w%w (example Invert 70)
- ▶ $\text{Add } 1\text{ kg}/0,7 = 1,43\text{ kg}$

1) Boiling : Increase colour/flavour

		Colour	glucose		sacharose			
		EBC	fructose	dextrose	sucrose	maltose	Trios.	H.S.
Candy Sugars			%	%	%	%	%	%
	Sugar pieces dark	350			99,5			
	Cassonade-light 225	225			97,5			
	Cassonade-dark 700	700			97			
	Cassonade-dark 900	900			95			
	Candimic-dark 73	225	15	15	70			
	Candimic dark 78	1900	30	30	40			
Caramel (ammonium)								
	P32 E150C +	32.000						
Burnt Syrup								
	Burnt Syrup BS 5000	4.500						
	Burnt Syrup N16	15.000						
Organic caramel								
	Organic Caramel SLBA 197	12.000						



Calculate colour increase

- ▶ To increase 10 EBC/hl :
- ▶ 1 hl => 100 kg increase with 1000 EBC
- ▶ Technical sheet sugar EBC example : candimic 78 : 1900 EBC
- ▶ Add $1000/1900 = 0,53$ kg/hl

2) Final Beer

► Colour correction

			Colour
			EBC
Caramel (ammonium)			
P32	E150C	+	32.000

► Increase sweetness

		Colour	glucose		sacharose			
		EBC	fructose	dextrose	sucrose	maltose	Trios.	H.S.
CANDY SUGARS			%	%	%	%	%	%
	Candimic light 73 (white)		15	15	70			
SUCROSE SYRUPS								
	Sirosuc 67				100			
	Invertsuc 70		47	50	3			
MIXED SYRUPS								
	Trisuc 73		33	33	33			
FRUCTOSE SYRUP								
	Fructomix F50 71		52	43		3		2
	Fructomix F85 73		84	15			1	
ORGANIC								
	Sirosuc cane 67 (min. 5 Ton)				100			
	Invertsuc 75%		60		40			



Relative sweetness RS

relative sweetness RS = sweetness of a natural « sugar » in watery solution in comparison with a standard sucrose (=saccharose) solution

Standard solution : in general 10% sucrose = 100

Quality and intensity are dependent upon :

<u>Concentration</u>	higher concentration	->	higher RS
<u>Temperature</u>	lower temperature	->	lower RS
<u>PH value</u>	lower pH	->	lower RS
<u>Synergistic effects</u>	combination of sugars	->	higher RS

The resultant sweetening power of a mixture of fructose with other sweeteners is superior to the sum of their respective sweetening powers

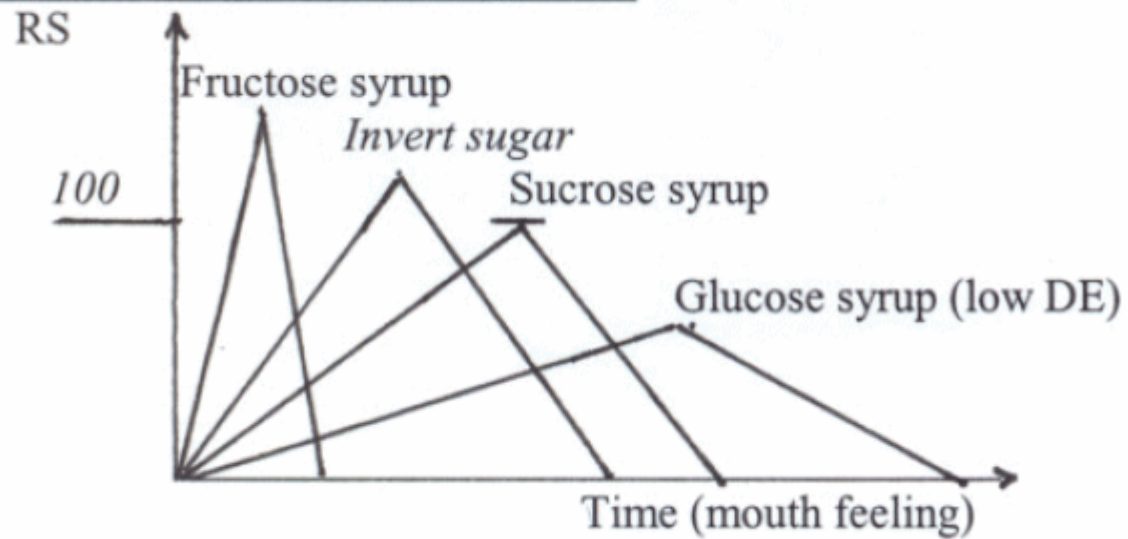
RS For Different Sugars at 10 % dry matter at 20 °C

▶ Fructose	130
▶ Sucrose	100
▶ Dextrose (Glucose)	75
▶ Maltose	50
▶ Maltotriose	25
▶ Higher sugars	15



RS and Mouth Feeling Effects

RS AND MOUTH FEELING EFFECTS



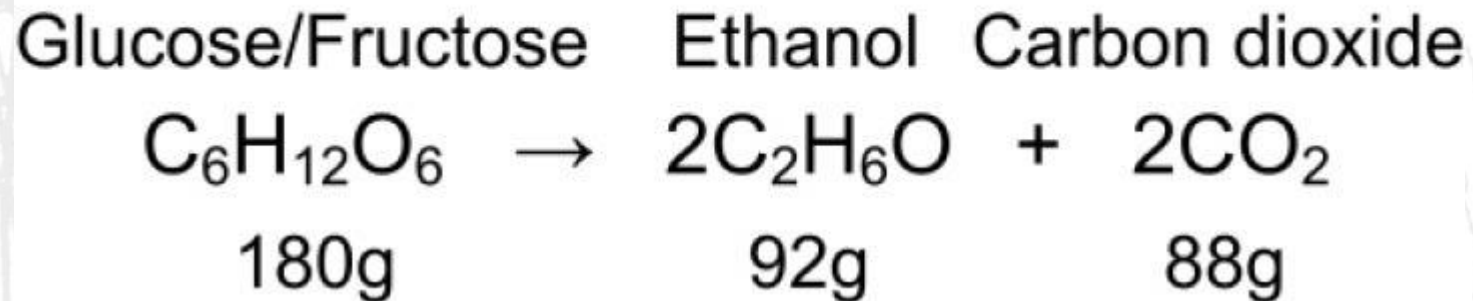
2) Final beer

► Bottle/cask conditioning

	Colour	glucose	sacharose				
	EBC	fructose	dextrose	sucrose	maltose	Trios.	H.S.
CANDY SUGARS		%	%	%	%	%	%
Candimic light 73 (white)		15	15	70			
SUCROSE SYRUPS							
Sirosuc 67				100			
Invertsuc 70		47	50	3			
MIXED SYRUPS							
Trisuc 73		33	33	33			
ORGANIC							
Sirosuc cane 67 (min 5 Ton)				100			
Invertsuc 75%		60		40			

Calculate CO2 increase

Fermentation



- ▶ To increase 5 g CO2/l :
- ▶ 5 g CO2 you need 10,23 g/sugar
- ▶ Technical sheet total solids w%w (example Invert 70)
- ▶ Add $10,23 \text{ g} / 0,7 = 14,61 \text{ g/l}$

product number :	604008	GN code :	17029095
product name :	Candimic dark-78 - jc 25 kg		
version:	19	Valid from:	30-05-2023

Product description

Darkbrown candy syrup, partly inverted

Ingredients

invert sugar syrup , sugar , candy syrup

Origin

sugar beet

Properties

PHYSICAL AND CHEMICAL PROPERTIES

	<u>Min</u>	<u>Max</u>	<u>Typical</u>	<u>Unit</u>	<u>Method</u>
Brix	77.0	78.0		°Bx (20°C)	BSCH011
Total solids	77.3	78.3		w%w (20°C)	BSCH011
pH	4.0	5.5		sol. 1:1	BSCH001
Colour (CIE)	1800	2000		EBC (CIE)	BSCH027
Sulphated Ash		2.5		%	BSCH053
Water activity (aw)			0.69	~ temp.	BSCH111
Density			1.40	kg/dm ³ 20°C	BSCH014

MICROBIOLOGICAL PROPERTIES

	<u>Max</u>	<u>Typical</u>	<u>Unit</u>	<u>Method</u>
Total mesophylic count	200		/10g ds 30°C	BSMI001
Yeasts	10		/10g ds 25°C	BSMI011
Moulds	10		/10g ds 25°C	BSMI011

COMPOSITION

	Avg.	Unit	Method
Fructose	29	w%w on ds	BSCH036
Dextrose	31	w%w on ds	BSCH036
Sucrose	36	w%w on ds	BSCH036

Nutritional values

Average nutritional value per 100 gram product (calculated)

Energy	:	300	kcal
Energy	:	1273	kJ
Fats	:	0	g
Carbohydrates	:	75	g
Sugars	:	73	g
Polyols	:	0	g
Starch	:	0	g
Protein	:	0.1	g
Fibre	:	0	g
Salt	:	0.7	g



Technical sheet

product number :	604008	GN code :	17029095
product name :	Candimic dark-78 - jc 25 kg		
version:	19	Valid from:	30-05-2023

Shelf life

General	Shelf life of this product is minimum 9 month(s) after production.
Extra info	At a lower temperature the product will be more sensitive to crystallisation and this may reduce shelf life.

Storage conditions

	Min	Max	Optimum
Temperature °C	15		
Rel. humidity %		nvt / na	
Advice	Keep dry in closed original packaging in a clean environment. The 'first-in, first-out' stock management principle should be followed.		

Shelf Life : risk is infection due to condensation of moisture that results in droplets on the surface of the sugar, low concentration of sugar gives risk of growth of yeast/fungi so store in an environment with stable temperature

If the product is past best before date you can still use it if you see that the quality is still acceptable

Compliance to European Regulations

- Council Directive 2001/111/EC of 20 December 2001 relating to certain sugars intended for human consumption and amendments;
- Regulation (EC) No 178/2002 of the European parliament and of the council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety and amendments;
- Regulation (EC) No 852/2004 of 29 April 2004 as amended on the hygiene of foodstuffs;
- Regulation (EC) No 1935/2004 of 27 October 2004 on materials and articles intended to come into contact with food and amendments;
- Regulation (EC) No 396/2005 of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amendments;
- Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs and amendments;
- Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food and amendments;
- Regulation 2023/2006/EC of 22 December 2006 and amendments on good manufacturing practice for materials and articles intended to come into contact with food;
- Regulation 10/2011/EC of 14 January 2011 and amendments relating to plastic materials and articles intended to come into contact with foodstuffs;
- Regulation (EU) n°1169/2011 of 25 October 2011 as amended on food information to the consumers;

Quality guarantees

GMO-Declaration: We confirm that this product does not contain any ingredient, additive or flavour extracted or derived from genetically modified organisms. Therefore, no additional specific GMO labelling is required according to the current European regulation.

Declaration of non-ionisation: Nor this product, nor its ingredients, have been treated by ionising radiation.

Food safety: Belgosuc NV is FSSC 22000 certified by an external body.

The information contained herein is, to the best of our knowledge and belief, accurate on the date of publication. In all cases, it is the responsibility of the customer to determine the applicability of this information or the suitability of any product for their own particular purpose. All information is valid until revision. This document is printed electronically and has therefore not been signed.

Questions