

GFS-10

Glucose-Fructose Syrup

LLC "TH "Krakmaloprodukt"
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Production Technology of the Syrup

Glucose-Fructose syrup – it's a natural sweetener, produced from corn by successive enzymatic dilution and saccharification of starch to a high glucose syrup. After the part of the glucose has been converted to a fructose, the syrup is put to purification by activated carbon and ion-exchange processes, disinfected on bactericidal filters with the dimension of pores 0,45 µm. and

afterwards concentrated. GFS-10 contains glucose, fructose, disaccharide- maltose and high sugars. The syrup doesn't contain artificial or synthetic substances as well as food additives. In the production process it's not used a genetically modified raw material and the final product is of permanent guaranteed quality

Application of the Syrup

GFS-10 combines both properties of the treacle and glucose-fructose syrup as it contains up to 10% of the fructose. Low viscosity, high sweetness and excellent anticrystallizing properties let successfully use this product instead of treacle and partly instead of sugar for the

production of the chewing caramel, fruit paste jelly group, cream fillings. Due to its unique properties to increase the storage period, GFS-10 can be applied in the whole range of pastry products and can be used for candying.

The Advantages of Syrup Application

- | | |
|--|--|
| • Intensification of taste and aroma | • Glossing/glitter/candying |
| • Increase of Shelf-life | • Easy fermentation |
| • Exclusive purity of the syrup | • Cost reduction |
| • Voidstructure/friability/crispy taste | • Softness and plasticity |
| • Giving the product a golden crust | • Presence of texture (for candy fillings) |
| • Stability when storing and in final products | • Hydration/moisture control |
| • Easy of use /processability | • Viscosity control |

- The product is put out as a solution, which is convenient for usage as a raw material.
- The production of GFS-10 is not limited by the period of harvest and can continue for the whole year.
- The syrup can be easily pumped over and stored, there is no problem in automation of GFS dosing.
- The profile of GFS sweetness increases many of fruit, citrus and spicy flavors in bakery and confectionary products.
- GFS holds the moisture and prevents crystallization of sugars in the product after baking and crtystallization in paste jelly fillings, used in chocolate products.
- About 90% percent of sugars in syrup are fermentable. This is very important in bread-baking, the application of GFS is more economical to use than sugar because yeast and enzymatic complexes ferment the monosaccharides easier than saccharose.
- The processing of the liquid product is much cheaper than crystalline, which leads to rational distribution/reduction of time, labor force and energy consumption.



GFS-10 / Glucose-Fructose Syrup

Quality Specification

Physical and Chemical Properties

Dextrose Equivalent (DE)	67
Refractive Index (20°C)	1,4823...1,4876
Density, kg/dm ³ (20°C)	1,3878...1,3996
Viscosity, cP (40°C)	770...800
Total Solids	75,0...77,0
Sulfur Dioxide (SO ₂), ppm	<2
pH	4,0...6,0
Sulfated Ash, %, not more than	0,1
Calories /100g	307

Sensory Characteristics

Appearance	Viscous liquid
Taste	Sweet, without extraneous tastes
Odour	Characteristic, without extraneous odor
Sweetness (saccharose-100%),%	58...64

Typical Carbohydrate Composition (% Dry Basis)

Fructose	8...12
Glucose	22...26
Maltose	37...45
Maltotriose	6...10
Higher Saccharides	10...15

Microbiological Limits

Total Aerobic and Anaerobic Microbial Count	
cfu per g, not more than	1x10 ³
Mold cfu per g, not more than	100
Yeast cfu per g, not more than	100

Storage and Handling of Syrup

To the customer the syrup can be delivered by truck tanks, tuns, pasteboard cans, fiber cans with the capacity: 50, 200 dm³, tanks of 1m³ capacity, designed for application in food industry. Truck tanks are sealed, tuns, cans are corked up.

When transporting by trucks (syrup tankers), the syrup is filled in thermo tank with the capacity of 25 tons at the temperature 32...35 °C, and temperature losses into environment are: in summer – not more than 1 °C, in winter – not more than 2...3 °C. Depending on the weather, the temperature of GFS when dispatching can vary.

For the long term storage of the syrup it's necessary to provide isolated tanks of stainless steel with external electrical heating (for the heating it can be used water jackets too) at the temperature 28...35 °C. The heating is designed to avoid the temperature losses into production facilities or environment in case the storage is performed in outdoor conditions.

GFS-30

Glucose-Fructose Syrup

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29a, Elektrikov Str., Kiev, 04176 Ukraine
tel.: +38 044 3517380, fax: +38 044 3517381
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Production Technology of the Syrup

Glucose-Fructose syrup – it's a natural sweetener, produced from corn by successive enzymatic dilution and saccharification of starch to a high glucose syrup. After the part of the glucose has been converted to a fructose, the syrup is put to purification by ion-exchange processes, disinfected on bactericidal filters with the

dimension of pores 0,45 µm. and concentrated. GFS-30 contains glucose, fructose, disaccharide- maltose. The syrup doesn't content artificial and synthetic substances as well as food additives. In the production process it's not used a genetically modified raw material and the final product is of permanent guaranteed quality.

Application of the Syrup

GFS-30 is appropriate for partial or full substitution of sugar in the whole group of fruit preparations for industrial usage as well as consumer jams and candied and canned fruit products. The peculiarity of GFS-30 is the content of about 20% of maltose, which allows it to perform both functions of a syrup and sugar. The maltose, according to its properties allows to avoid the crystallization of products, especially in conditions of low temperatures storage (~0°C). The application of GFS-30 in production of high sugary jams and

candied, canned fruit products and fillings will allow to reproduce the carbohydrate content of sugars in product, when optimally correlated for jam, marmalade, etc. with the only difference that disaccharide – saccharose will be substituted by the disaccharide – maltose. Adding of the syrup is performed on the same stage as the adding of the sugar syrup and doesn't require any additional equipment.

The Advantages of Syrup Application

- | | |
|--|--|
| • Intensification of taste and aroma | • Cost reduction |
| • Increase of Shelf-life | • Softness and plasticity (jelly for decoration) |
| • Exclusive purity of the syrup | • Hydration/moisture control |
| • Stability when storing and in final products | • Glossing/glitter |
| • Easy of use /processability | • Viscosity control/presence of texture |
- The product is put out as a solution, which is convenient for usage as a raw material.
 - The production of GFS-30 is not limited by the period of harvest and can continue for the whole year.
 - The syrup can be easily pumped over and stored, there is no problem in automation of GFS dosing.
 - GFS provides sweetness intensity comparable with the sweetness of sugar and can be used for full or partial substitution of sugar, treacle, invert sugar in sugar containing products.
 - The profile of GFS sweetness enhances many of fruit, citrus and spicy flavors in bakery and confectionary products.
 - GFS holds the moisture and prevents crystallization of sugars in the product after baking.
 - About 95 percent of sugars in syrup are fermentable. This is very important in bread-baking, the application of GFS is more economical to use than sugar because yeast and enzymatic complexes ferment the monosaccharides easier than saccharose.
 - The processing of the liquid product is much cheaper than crystalline, which leads to rational distribution/reduction of time, labour force and energy consumption.



GFS-30 / Glucose-Fructose Syrup

Quality Specification

Physical and Chemical Properties

Dextrose Equivalent (DE)	84
Refractive Index (20°C)	1,4677...1,4726
Density, kg/dm ³ (20°C)	1,3543...1,3670
Viscosity, cP (40°C)	215...235
Total Solids (%)	71,0...73,0
Sulfur Dioxide (SO ₂), ppm	0,6
pH	4,0...6,0
Sulfated Ash, %, not more than	0,1
Calories/100g	289

Sensory Characteristics

Appearance	Viscous liquid
Taste	Sweet, without extraneous tastes
Odour	Characteristic, without extraneous odor
Sweetness (saccharose-100%), %	83...88

Typical Carbohydrate Composition (% Dry Basis)

Fructose	28...32
Glucose	35...45
Maltose	17...23
Maltotriose	5
Higher Saccharides	5

Microbiological Limits

Total Aerobic and Anaerobic Microbial Count	
cfu per g, not more than	1x10 ³
Mold cfu per g, not more than	100
Yeast cfu per g, not more than	100

Storage and Handling of Syrup

To the customer the syrup can be delivered by truck tanks, tuns, pasteboard cans, fiber cans with the capacity: 50, 200 dm³, tanks of 0,6 and 1m³ capacity, designed for application in food industry. Truck tanks are sealed, tuns, cans are corked up.

When transporting by trucks (syrup tankers), the syrup is filled in thermo tank with the capacity of 25 tons at the temperature 32...35°C, and temperature losses into environment are: in summer – not more than 1 °C, in winter – not more than 2...3°C. Depending on the weather, the temperature of GFS when dispatching can vary.

For the long term storage of the syrup it's necessary to provide isolated tanks of stainless steel with external electrical heating (for the heating it can be used water jackets too) at the temperature 28...35 °C. The heating is designed to avoid the temperature losses into production facilities or environment in case the storage is performed in outdoor conditions.

GFS – 42

Glucose-Fructose Syrup

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Production Technology of the Syrup

Glucose-Fructose syrup – it's a natural sweetener, produced from corn by successive enzymatic dilution and saccharification of starch to high glucose syrup. After the part of the glucose has been converted to fructose, the syrup is put to purification by ion-exchange processes, disinfected on bactericidal filters with the dimension of pores 0,45 µm. and concentrated. Taking into

consideration the content of GFS, it is practically identical to saccharose by its physical chemical and organoleptic properties and furthermore doesn't content artificial and synthetic substances as well as food additives. In the production process it's not used a genetically modified raw material and the final product is of permanent guaranteed quality.

Application of the Syrup

The substitution for the sugar by the glucose-fructose syrup is appropriate for the whole group of bakery and confectionary products. GFS-42 is the analogue of the invert sugar and can be used for the substitution

of glucose syrup, invert sugar, artificial honey, sugar and adding of the syrup can be done on the same stage as sugar is added and doesn't need any additional equipment and technological operations.

The Advantages of Syrup Application

- Intensification of taste and aroma
- Increase of shelf-life/freshness improver
- Exclusive purity of the syrup
- Void structure/friability/crispy taste
- Giving the product golden crust
- Stability when storing and in final products
- Easy of use/processability

- Easy fermentation
- Cost reduction
- Softness and plasticity (jelly for decoration)
- Hydration/moisture control
- Glossing/glitter
- Viscosity control/presence of texture

- The product is put out as a solution, which is convenient for usage as a raw material.
- The production of GFS-42 is not limited by the period of harvest and can continue for the whole year.
- The syrup can be easily pumped over and stored, there is no problem in automation of GFS dosing.
- GFS provides sweetness intensity equivalent to sugar and can be used for full or partial substitution of sugar, in sugar containing products.
- The profile of GFS sweetness enhances many of fruit, citrus and spicy flavors in bakery and confectionary products.

- GFS holds the moisture and prevents crystallization of sugars in the product after baking.
- About 98 percent of sugars in syrup are fermentable. This is very important in bread-baking, the application of GFS is more economical to use than sugar because yeast and enzymatic complexes ferment the monosaccharides easier than sucrose.
- The processing of the liquid product is much cheaper than crystalline, which leads to rational distribution/reduction of time, labour force and energy consumption.



Quality Specification

Physical and Chemical Properties

Dextrose Equivalent (DE)	98
Refractive Index (20°C)	1,4632...1,4656
Colour (RBU unit), not more than	
initial	25,0
after 30 days (t=30°C)	50,0
Turbidity (90°/25°), EBC units	
(10% solution), not more than:	0,1/0,2
Density, kg/dm³ (20°C)	1,3454...1,3515
Viscosity, cP (40°C)	95...105
Total Solids (%)	70...71
Sulfur Dioxide (SO₂), ppm	0,6
pH	4,0...6,0
Sulfated Ash, %, not more than	0,1
Calories/100g	284

Sensory Characteristics

Appearance	Viscous Liquid
Taste	Sweet, without extraneous tastes
Odor	Characteristic, without extraneous odor

Typical Carbohydrate Composition (% Dry Basis)

Fructose	40...44
Dextrose	50...54
Maltose	2...3
Maltotriose	2
Higher Sacharides	1

Microbiological Limits

Total Aerobic and Anaerobic Microbial Count cfu per g, not more than	1×10³
Mold cfu per g, not more than	10
Yeast cfu per g, not more than	10

Storage and Handling of Syrup

To the customer the syrup can be delivered by truck tanks, tuns, pasteboard cans, fiber cans with the capacity: 50, 200 dm³, tanks of 0,6 and 1 m³ capacity, designed for application in food industry. Truck tanks are sealed, tuns, cans are corked up.

When transporting by trucks (syrup tankers), the syrup is filled in thermo tank with the capacity of 25 tons at the temperature 32...35 °C, and temperature losses into environment are: in summer – not more than 1 °C, in winter – not more than 2...3 °C. Depending on the weather, the temperature of GFS when dispatching can vary.

For the long term storage of the syrup it's necessary to provide isolated tanks of stainless steel with external electrical heating (for the heating it can be used water jackets too) at the temperature 28...35 °C. The heating is designed to avoid the temperature loss into production facilities or environment in case the storage is performed in outdoor conditions.



Production Technology of the Syrup

Glucose syrup, IG-42, is produced from corn starch by decomposition of the polysaccharide by enzymatic hydrolysis method using different enzymes, which let achieve the appropriate carbohydrate content. The syrup is put to purification by activated carbon and ion-exchange processes and afterwards is getting concentrated. IG-42 has low

viscosity and colour in comparison with the syrup got by the acidic method and doesn't contain artificial or synthetic substances as well as food additives. In the production process it's not used a genetically modified raw material and the final product is of permanent guaranteed quality.

Application of the Syrup

The glucose syrup reduces the velocity of sugar syrups crystallization and when dosing it in huge quantities the crystallization doesn't appear at all. This syrup property is used for caramel, toffee and other noncrystalline masses production. The syrup can change the hygroscopicity of confectionary semi-prepared goods and products

(spice cakes etc.), which prevents them from fast drying. The glucose syrup helps to increase the volume of yeasty products, to increase the void structure and elasticity of crumb, slows down the process of hardening of final products, gives the colour and appears to be a good anti-crystallizer.

Application of the Glucose Syrup

- | | |
|-------------------------------------|------------------------------|
| • Intensification of taste | • Easy fermentation |
| • Increase of Shelf-life | • Easy of use/processability |
| • Exclusive purity of the syrup | • Glossing/glitter/candying |
| • Void structure | • Hydration/moisture control |
| • Giving the product a golden crust | • Cost reduction |
- The production of IG-42 is not limited by the period of harvest and can continue for the whole year.
 - It increases the fermentative action of yeast.
 - It decreases the time of rest. Reduces the viscosity of dough. The volume of products is slightly enlarged.
 - It improves the elasticity, form stability, void factor of the products.
 - The application of the IG-42 doesn't require any changes of technology or manufacturing process.
 - The application of the glucose syrup doesn't influence on the processes of coloration, aromatization, acidation, kneading of a caramel, formation and cooling of the final product.
 - Low viscosity of IG-42 lets improve the formation of jelly candies, produced on the traditional receipt.



IG-42 / Glucose Syrup

Quality Specification

Physical and Chemical Properties

Dextrose Equivalent (DE)	38...42
Refractive Index (20°C)	1,4866...1,4893
Density, kg/dm ³ (20°C)	1,4105...1,4173
Viscosity, cP (45°C)	4900...5100
Total Solids, %	78...79
Sulfur Dioxide (SO ₂), ppm, not more than	20,0
Acidity (0,1 mol/dm ³ NaOH (0,1n)/100g DS) (cc) not more than	10
pH	4,0...6,0
Sulfated Ash, %, not more than	0,1
Glass transition temperature (°C), not less than	145
Calories/100g	320

Sensory Characteristics

Appearance	Viscous liquid
Taste	Sweet, without extraneous tastes
Odour	Characteristic, without extraneous odor
Sweetness (saccharose-100%), %	30

Typical Carbohydrate Composition (% Dry Basis)

Glucose	12...18
Maltose	12...20
Maltotriose	13...20
Higher Saccharides	42...63

Microbiological Limits

Total Aerobic and Anaerobic Microbial Count	
cfu per g, not more than	1x10 ³
Mold in 1g, not more than	100
Yeast in 1g, not more than	100

Storage and Handling of Syrup

To the customer the syrup can be delivered by truck tanks, tuns, pasteboard cans, fiber cans with the capacity: 50, 200 dm³, tanks of 0,6 and 1 m³ capacity, designed for application in food industry. Truck tanks are sealed, tuns, cans are corked up.

When transporting by trucks (syrup tankers), the syrup is filled in thermo tank with the capacity of 25 tons at the temperature 50...55 °C, and temperature losses into environment are: in summer – not more than 1 °C, in winter – not more than 2...3 °C. Depending on the weather, the temperature of IG-42 when dispatching can vary.

For the long term storage of the syrup it's necessary to provide isolated tanks of stainless steel with external electrical heating (for the heating it can be used water jackets too) at the temperature 50...55 °C. The heating is designed to avoid the temperature loss into production facilities or environment in case the storage is performed in outdoor conditions.



IM-50

Maltose Syrup

LLC "TH "Krakhmaloprodukt"

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Production Technology of the Syrup

Maltose syrup – it's a natural substance, main component of which is disaccharide maltose. IM-50 is produced from corn starch by decomposition of the polysaccharide by acidic and/or enzymatic hydrolysis method using different enzymes, which let to achieve an appropriate carbohydrate content. The syrup is put to purification by activated carbon and ion-exchange processes and afterwards

is getting concentrated. The maltose syrup has a high sweetness and doesn't contain artificial or synthetic substances as well as food additives. In the production process it's not used a genetically modified raw material and the final product is of permanent guaranteed quality.

Application of the Maltose Syrup

At enterprises the maltose syrup is used on the same production stage as caramel syrup, invert syrup, artificial honey. High maltose syrup, combining in itself both properties of the common syrup and high sweetness, can be used for full substitution of the common starch syrup and full or partial substitution of sugar in products with its low content (bakery and pastry products). This syrup has successfully

recommended its properties in caramel production, jelly products, fruit paste jelly group and fillings for candies. The syrup improves the taste, density and texture if essentially substitutes the sugar and at the same time counteracts the browning reaction, moisture absorption and crystallization of final products, such as caramel. In the result, the final products gain unique stability, purity and glitter.

The Advantages of Syrup Application

- Intensification of taste and flavors
- Increase of Shelf-life
- Exclusive purity of the syrup
- Void structure/friability/crispy taste
- Giving the product a golden crust

- Easy fermentation
- Easy of use/processability
- Glossing/glitter/candyng
- Hydration/moisture control
- Cost reduction

- The product is put out as a solution, which is convenient for usage as a raw material.
- The production of maltose syrup is not limited by the period of harvest and can continue for the whole year.
- The syrup can be easily pumped over and stored, there is no problem in automation of dosing.
- The substitution by the maltose syrup doesn't influence on the humidity and acidity of the pastry.
- It increases the fermentative action of yeast.
- It decreases the time of rest. Reduces the viscosity of dough. The volume of products is slightly enlarged.
- There is a possibility of the full substitution of sugar by the maltose syrup in products which contain 2% of sugar.

- There is a possibility of 50% substitution of sugar by the maltose syrup in products which contain 4...6% of sugar.
- It doesn't change the elasticity, form stability, void factor of the products.
- The application of the maltose syrup doesn't require any changes of technology or manufacturing process.
- The ability of a higher (up to 70% on goods) substitution of the sugar when preparing caramel/fondant, which significantly makes the final product cheaper.
- The application of the maltose syrup doesn't influence on the processes of coloration, aromatization, acidation, kneading of a caramel, formation and cooling of the final product.
- Low viscosity of the maltose syrup lets improve the formation of jelly candies.



IM-50 / Maltose Syrup

Quality Specification

Physical and Chemical Properties

Dextrose Equivalent (DE)	47
Refractive Index (20°C)	1,4859...1,4886
Colour (EBC units), not more than	1,0
Turbidity (90°/25°), EBC units:	0,85/0,85
Density, kg/dm ³ (20°C)	1,4083...1,4150
Viscosity, cP (45°C)	1500
Acidity (0,1 mol/dm ³ NaOH (0,1n)/100g DS) (cc) not more than	5
Total Solids, (%)	78...79
Sulfur Dioxide (SO ₂), ppm, not more than	10
pH	4,0...6,0
Sulfated Ash, %, not more than	0,1
Calories /100g	314

Sensory Characteristics

Appearance	Viscous liquid
Taste	Sweet, without extraneous tastes
Odour	Characteristic, without extraneous odor
Sweetness (saccharose-100%), %	50

Typical Carbohydrate Composition (% Dry Basis)

Glucose	2...5
Maltose	48...53
Maltotriose	20...26
Higher Saccharides	14...30

Microbiological Limits

Total Aerobic and Anaerobic Microbial Count	
cfu per g, not more than	1x10 ³
Mold cfu per g, not more than	100
Yeast cfu per g, not more than	100

Storage and Handling of Syrup

To the customer the syrup can be delivered by truck tanks, tuns, pasteboard cans, fiber cans with the capacity: 50, 200 dm³, tanks of 0,6 and 1 m³ capacity, designed for application in food industry. Truck tanks are sealed, tuns, cans are corked up.

When transporting by trucks (syrup tankers), the syrup is filled in thermo tank with the capacity of 25 tons at the temperature 50...55 °C, and temperature losses into environment are: in summer – not more than 1 °C, in winter – not more than 2...3 °C. Depending on the weather, the temperature of IM-55 when dispatching can vary.

For the long term storage of the syrup it's necessary to provide isolated tanks of stainless steel with external electrical heating (for the heating it can be used water jackets too) at the temperature 50...55 °C. The heating is designed to avoid the temperature loss into production facilities or environment in case the storage is performed in outdoor conditions.



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Production Technology of the Syrup

Maltose syrup – it's a natural substance, main component of which is disaccharide maltose. IM-55 is produced from corn starch by decomposition of the polysaccharide by acidic and/or enzymatic hydrolysis method using different enzymes which let to achieve the appropriate carbohydrate content. The syrup is put to purification by activated carbon and ion-exchange processes and afterwards

is getting concentrated. The maltose syrup has a high sweetness and doesn't contain artificial or synthetic substances as well as food additives. In the production process it's not used a genetically modified raw material and the final product is of permanent guaranteed quality.

Application of the Maltose Syrup

At enterprises the maltose syrup is used on the same production stage as caramel syrup, invert syrup, artificial honey. High maltose syrup, combining in itself both properties of the common syrup and high sweetness, can be used for full substitution of the common starch syrup and full or partial substitution of sugar in products with its low content (bakery and pastry products). This syrup has successfully

recommended its properties in caramel production, jelly products, fruit paste jelly group and fillings for candies. The syrup improves the taste, density and texture if essentially substitutes the sugar and at the same time counteracts the browning reaction, moisture absorption and crystallization of final products, such as caramel. In the result the final products gain unique stability, purity and glitter.

The Advantages of Syrup Application

- Intensification of taste and flavors
- Increase of Shelf-life
- Exclusive purity of the syrup
- Void structure/friability/crispy taste
- Giving the product a golden crust

- Easy fermentation
- Easy of use/processability
- Glossing/glitter/candyng
- Hydration/moisture control
- Cost reduction

- The product is put out as a solution, which is convenient for usage as a raw material.
- The production of maltose syrup is not limited by the period of harvest and can continue for the whole year.
- The syrup can be easily pumped over and stored, there is no problem in automation of dosing.
- The substitution by the maltose syrup doesn't influence on the humidity and acidity of the pastry.
- It increases the fermentative action of yeast.
- It decreases the time of rest. Reduces the viscosity of dough. The volume of products is slightly enlarged.
- There is a possibility of the full substitution of sugar

- by the maltose syrup in products which contain 2% of sugar.
- There is a possibility of 50% substitution of sugar by the maltose syrup in products which contain 4...6% of sugar.
- It doesn't change the elasticity, form stability, void factor of the products.
- The application of the maltose syrup doesn't require any changes of technology or manufacturing process.
- Low viscosity of the maltose syrup lets improve the formation of jelly candies.



IM-55 / Maltose Syrup

Quality Specification

Physical and Chemical Properties

Dextrose Equivalent (DE)	57
Refractive Index (20°C)	1,4859...1,4886
Colour (EBC units), not more than	1,0
Turbidity (90°/25°), EBC units:	0,85/0,85
Density, kg/dm ³ (20°C)	1,4083...1,4150
Viscosity, cP (45°C)	2200
Acidity (0,1 mol/dm ³ NaOH (0,1n)/100g DS) (cc) not more than	5,0
Total Solids, (%)	78...79
Sulfur Dioxide (SO ₂), ppm, not more than	10
pH	4,0...6,0
Sulfated Ash, %, not more than	0,1
Calories /100g	314

Sensory Characteristics

Appearance	Viscous liquid
Taste	Sweet, without extraneous tastes
Odour	Characteristic, without extraneous odor
Sweetness (saccharose-100%), %	50

Typical Carbohydrate Composition (% Dry Basis)

Glucose	15...20
Maltose	55...58
Maltotriose	6...10
Higher Saccharides	12...24

Microbiological Limits

Total Aerobic and Anaerobic Microbial Count	
cfu per g, not more than	1x10 ³
Mold cfu per g, not more than	100
Yeast cfu per g, not more than	100

Storage and Handling of Syrup

To the customer the syrup can be delivered by truck tanks, tuns, pasteboard cans, fiber cans with the capacity: 50, 200 dm³, tanks of 0,6 and 1 m³ capacity, designed for application in food industry. Truck tanks are sealed, tuns, cans are corked up.

When transporting by trucks (syrup tankers), the syrup is filled in thermo tank with the capacity of 25 tons at the temperature 50...55 °C, and temperature losses into environment are: in summer – not more than 1 °C, in winter – not more than 2...3 °C. Depending on the weather, the temperature of IM-55 when dispatching can vary.

For the long term storage of the syrup it's necessary to provide isolated tanks of stainless steel with external electrical heating (for the heating it can be used water jackets too) at the temperature 50...55 °C. The heating is designed to avoid the temperature loss into production facilities or environment in case the storage is performed in outdoor conditions.



Corn Oil

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Oil Production Technology

Corn oil – it's a natural substance, which is produced in the process of corn germ pressing. The corn germ, extracted during the corn starch production process is separated, crushed and heated at the temperature of 100...105 °C in special roasters. Heated and crushed germ goes to two-stage pressing. Received oil is purified from crude and

small particles and then filtrated. In the result we receive an unrefined (crude) corn oil. For receiving the refined deodorized oil, crude one is getting hydrated, neutralized and afterwards filtrated deodorized and cooled. Final corn oil both crude and refined are produced according to State Standard of Ukraine 8808:2003 "Corn Oil. Technical Terms".

Application

- Crude oil is used for getting the refined oil and for the purpose of technological processing – when producing soap, paints, films, lubricating oils, synthetic rubber, leather goods production, chemicals and pesticides production.
- The main application of the corn oil in the food industry is divided into two directions: household application and using with food products, in particular:
 - Production of margarine both separately and in mixture with the other vegetable fats.
 - The production of mixtures with dairy butter (40% of butter and 60% of the corn oil of margarine type).
 - The production of mayonnaises and dressings.
 - As ingredients for chips and snack products.
 - As ingredients for bakery and flour confectionary products.
- Preparation of salads and when frying.



Corn Oil

Quality Specification

Physical and Chemical Properties	Refined Oil	Crude Oil
Moisture and volatile substances, %	0,03	0,10
Colour Index, mg iodine	8,0	60,0
Acidity Index, mg KOH/g	0, 25	4,0
Iodine Value, mg/100 g	111...133	-
Phosphorus containing substances, %, counted on Stearic & Oleinic Lecithin	0,05	1,0
Non-fat additives, %	absent	0,02
Soap (qualitative test)	absent	not normalized
Peroxide index, mmol/kg $\frac{1}{2}$ O ₂	absent	2,0
Non-saponifiable substances, %	not normalized	2,0
Flash Point of extracted		
Oil, °C, not lower than	234	225
Tocopherol content, ppm	1500	1500
Specific Gravity, 15 °C	0,922...0,928	-
Nutritive value, 100 g of product	99,9	-
Calories, kcal, 100 g of product	899	-

Sensory Characteristics	Refined Oil	Crude Oil
Transparency	transparent without a sediment light	over the sediment it's observed a turbidity
Taste and Odour	without odour, taste of the featureless oil	taste is peculiar to corn oil

Packaging, Storage and Transportation

Refined and deodorized oil is filled in polyethylene bottles with the capacity of 1 dm³ and mass 910±10 g, which are packed in polymeric film up to 12 bottles.

Having been packed, the corn oil can be transported by all means of transport according to the laws of cargoes transportation or by the open transport with general covering from atmospheric precipitation and sun rays. Unpacked and unrefined oil can be transported in rail tanks, tank trucks or by other pure tare, which is appropriate for transportation of vegetable oils.

Warranty term of storage of the refined and deodorized oil is one year after the production date but only if transportation and storage conditions are strictly followed.



LLC "TH "Krakhmaloprodukt"

Starch Production Technology

Corn starch – it's a natural substance, carbohydrate polymer which consists of two structurally different fractions of amilose and amilopectin with the general formula $(C_6H_{10}O_5)_n$. The technological process of starch production consists of the following steps: steeping of corn grains for segregation of extractive substances; grain refinement and extraction of a corn germ, which goes for the oil production; fine grinding of grain with getting a grain mush, which is washed and

then a corn fiber is separated. The corn fiber is used for the foodstuff production. Afterwards a corn gluten and a starch milk are separated. The starch milk is centrifugally dewatered and then dried. Final product, the native corn starch, is produced according to the State Standard Technical Terms 3976-2000 "The dry corn starch. Technical Terms."

Application

The native starch as a natural polymer is one of the main organic source of raw materials for the food, chemical and other fields of industry. The native starch can be used separately and in mixture with a modified edible starch for getting a thick and dense structure in sauces, deserts and dry mixes. It has a fast solidifying structure and therefore can be used in bakery industry for the control of dough density and giving crumble properties to dry sponges and crackers.

The starch helps to control the crust in products which are baked. It increases the friability of dough and breadcrumbs and helps to control the viscosity of dough. This starch can be as well used for the forming as a form filler when drying fruit gelatinous, jelly sweets and

can be used for the chocolate substitution. It also provides the ability to decrease the chocolate content in solid chocolate formula for the regions with hot climate. In the result of boiling the starch paste can be used as a binding agent while moist granulation in thick masses which are used in paints. The corn starch might be applied as a absorbent of moisture for the talcum powder and other pharmaceutical powders. One can use it in cheese production as a substance that prevents the conglutination of cheese flakes and as a substance that prevents the conglomeration of the crystalline sugar. The native corn starch serves as a source of carbohydrates during the fermentation in conditions of preheating and hydrolysis before its application.

In food industry the corn starch is used for:

- the preparation of kissels, puddings, ketchups, it is added to the dough when preparing sponges, cakes and other products;
- the production of dragée, cakes, cookies, waffles, cups for ice-cream;
- the formation of cream, liqueur and chocolate kinds of sweets;
- the production of yoghurts, ice-cream, some kinds of sausages.

The technical application of the corn starch is important for:

- the paper industry when manufacturing the coated paper, cardboard, paper tare;
- the textile industry for the smoothing, dressing of fabrics, as a stiffener of printing inks;
- the textile industry for the smoothing, dressing of fabrics, as a stiffener of printing inks;
- the building when field painting and trimming;
- the flotation way of ore concentration, the oil-well drilling;
- the pharmaceutical industry when manufacturing medicines;
- the tanning, printing, tobacco and other industries.

Packaging and Storage

The corn starch is packed in multilayer paper bags with the capacity of 25-30 kg, which are palletized forming big bags with the total capacity 850-1000 kg.

The dry corn starch must be stored in well ventilated, clean ware-

houses without an extra odour. It must be kept at the temperature not higher than 40°C and relative humidity not higher than 75%.

The warranty period of fitness for the dry corn starch, when keeping at normative conditions is two years from the date of production.



Corn Starch (Native)

Quality Specification

Physical and Chemical Properties

Moisture, %, not more than	13,0
Total Ash (on dry substance), %, not more than	0,11
Including ash soluble in 10% solution of hydrochloric acid (in starch which is of food purpose), %, not more than	0,040
Protein (on dry substance), %, not more than	0,40
Sulfur Dioxide (SO ₂), ppm, not more than	50,0
Acidity (cc), not more than	16,0
pH	4,0...6,0
Bulk density (loose), g/l:	
After drying	400
After additional grinding (fine-dispersed)	600
Viscosity (see the Brabender profile)	
Nutritive value of 100g of product (carbohydrates content), g	86
Energy value of 100g of product, kkal	344

Sensory Characteristics

Appearance	Homogeneous Powder
Colour	White
Odour	Peculiar to starch

Typical Content (% on dry substance)

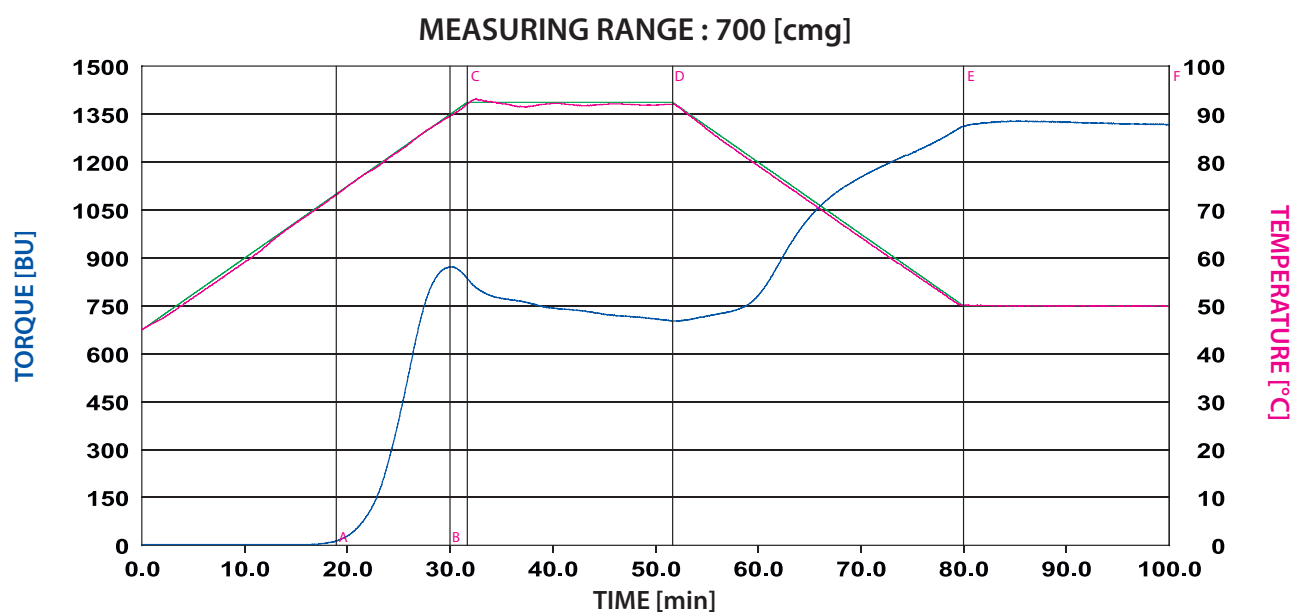
Amylose, %	25...35
Amylopectin, %	65...75

Microbiological Rates

Total Aerobic and Anaerobic Microbial Count	
cfu per g, not more than	1x10 ³
Mold cfu per g, not more than	5,0
Yeast cfu per g, not more than	1,0

The Functional Properties

- Adds crumble properties
- Moisture control
- Hygroscopic properties
- Aerating agent properties
- Viscosity control
- Jelly forming properties



Evaluation*

Point	Name	Time (HH:MM:SS)	Torque [BU]	Temperature °C
A	Beginning of gelatinization	00:19:05	14	73,4
B	Maximum viscosity	00:30:45	798	90,6
C	Start of holding period	00:31:40	793	91,9
D	Start of cooling period	00:51:40	688	92,0
E	End of cooling period	01:20:00	1287	50,2
F	End of final holding period	01:40:00	1284	50,0
B-D	Breakdown		110	
E-D	Setback		598	

* CRA Standard Analytical Methods B-9 Draft ICC-Standard No. 169