

ZarPharma



Corn Syrups

In pharmaceutical industry, a wide range of sugars are used for different purposes as sweetening agent and providing functional properties.

Sucrose is one of the nutritive sweeteners used in the pharmaceutical industry. Due to some limitations such as the gradual formation of crystals in edible syrups this sugar has been gradually replaced by sweeteners with different chemical and physical characteristics.

Glucose and fructose syrups with unique functional characteristics have different applications in pharmaceutical industries as follows:

1

An alternative sweetener for sucrose in the production of edible syrups, with the aim of preventing crystal formation, creating a desirable consistency, reducing free water and increasing shelf life.

2

In the production of sugar-coated tablets in the two stages of preliminary and supplementary coating.

3

Glucose syrups as a source of carbohydrate for antibiotic producing microorganism (Fermentation processes)



| Glucose Syrup Specification | | |
|--|-------------------------|---|
| Test | | Acceptance Criteria |
| Physical | | |
| Description | | Clear aqueous solution sweet and odorless |
| Identification A | | It meets the requirements in the Assay for Reducing Sugars (Dextrose Equivalent). |
| Chemical | | |
| ASSAY- anhydrous basis (%) | | 90%-110% of the labeled value on the anhydrous basis |
| Impurities | Residue on Ignition (%) | NMT 0.5 |
| | Sulfite | A blue color is produced. |
| | Starch | No blue color is produced. |
| Acidity | | NMT 0.60 mL of 0.10 N sodium hydroxide is required to produce a pink color |
| Water determination (%) | | NMT 21.0 |
| Microbiological | | |
| Total Aerobic Microbiological Count (cfu/g) (TAMC) | | NMT 10 ³ |
| Total Combined Yeasts/Molds Count (cfu/g) (TYMC) | | NMT 10 ² |

| Fructose Syrup Specification | | |
|--|---------------------------------|--|
| Test | | Acceptance Criteria |
| Physical | | |
| Description | | Clear aqueous solution sweet and odorless |
| Identification | alkaline cupric tartrate test | a copious red precipitate of cuprous oxide is formed |
| | Solubility in water | A thin, cloudy mucilage is formed |
| | Assay | It meets the requirement of Assay |
| Chemical | | |
| ASSAY | Total saccharides (%) | NLT 95 |
| | Monosaccharaides (%) | NLT 94 |
| | Fructose (%) | 54.0-60.0 |
| | Other saccharides (%) | NMT 6.0 |
| Impurities | Residue on Ignition (%) | NMT 0.05 |
| | Limit of Lead (µg/g) | NMT 0.1 |
| | Limit of SO ₄ (µg/g) | NMT 30.0 |
| Total solid (%) | | NLT 76.5 |
| Microbiological | | |
| Total Aerobic Microbiological Count (cfu/g) (TAMC) | | NMT 10 ³ |
| Total Combined Yeasts/Molds Count (cfu/g) (TYMC) | | NMT 10 ² |

Maltodex trin in microencapsulation

Microencapsulation is a technology in which the target compounds are covered by a wall to form microcapsule particles. These capsules can release their contents at a controlled or defined rate under certain conditions. In this technique, flavors, essential oils, enzymes, microorganisms, etc. can be covered by biopolymer compounds such as carbohydrates, proteins, or fats.

Microencapsulation is a physicochemical or mechanical operation to enclose a component in a coating and produce particles with a very small size. In this process mainly a hydrophobic core is protected by a hydrophilic wall.

Maltodextrin is one of the most common carbohydrates used in the encapsulation process and so far, it has been used in the encapsulation of various compounds such as vitamin C, carotenoids, antibiotics and fat-soluble vitamins.

Maltodex trin in sports supplement powders

Maltodextrin plays an important role in strengthening muscles for intense exercise and restoring the lost glycogen level immediately after training.

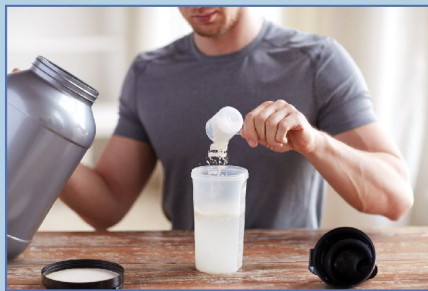
Maltodextrin can also be consumed in energy drinks before the start of training and provide more energy for training.

In the case of post-workout consumption, maltodextrin should be mixed with protein powders to increase muscle growth and shorten the recovery time.

Maltodextrin can be used in recovery powders with a ratio of 1:2 with protein (2 parts of maltodextrin and 1 part of protein).



| Maltodextrin Specification | | |
|--|-----------------------------------|---------|
| Test | Acceptance Criteria | |
| Physical | | |
| Description | White Powder, Odorless, Non-sweet | |
| Chemical | | |
| Assay (Dextrose Equivalent) | NMT 20 | |
| Identification | Residue on Ignition (%) | NMT 0.5 |
| | Limit of protein (%) | NMT 0.1 |
| | Limit of Sulphur dioxide (ppm) | NMT 20 |
| pH | 4.0-7.0 | |
| Loss on drying (%) | NMT 6.0 | |
| Microbiological | | |
| Total Aerobic Microbiological Count (cfu/g) (TAMC) | NMT 10 ³ | |
| Total Combined Yeasts/Molds Count (cfu/g) (TYMC) | NMT 10 ² | |
| Salmonella | Absence | |
| Escherichia Coli | Absence | |



Maltodextrin

Maltodextrin is a non-sweet, nutritive saccharide mixture of polymers that consists of D-glucose units, with a Dextrose Equivalent less than 20.

Maltodextrin has some unique properties such as solubility in cold water, low viscosity, and low and negligible sweetness, and is used in a wide range of food and pharmaceutical products due to its functional properties.

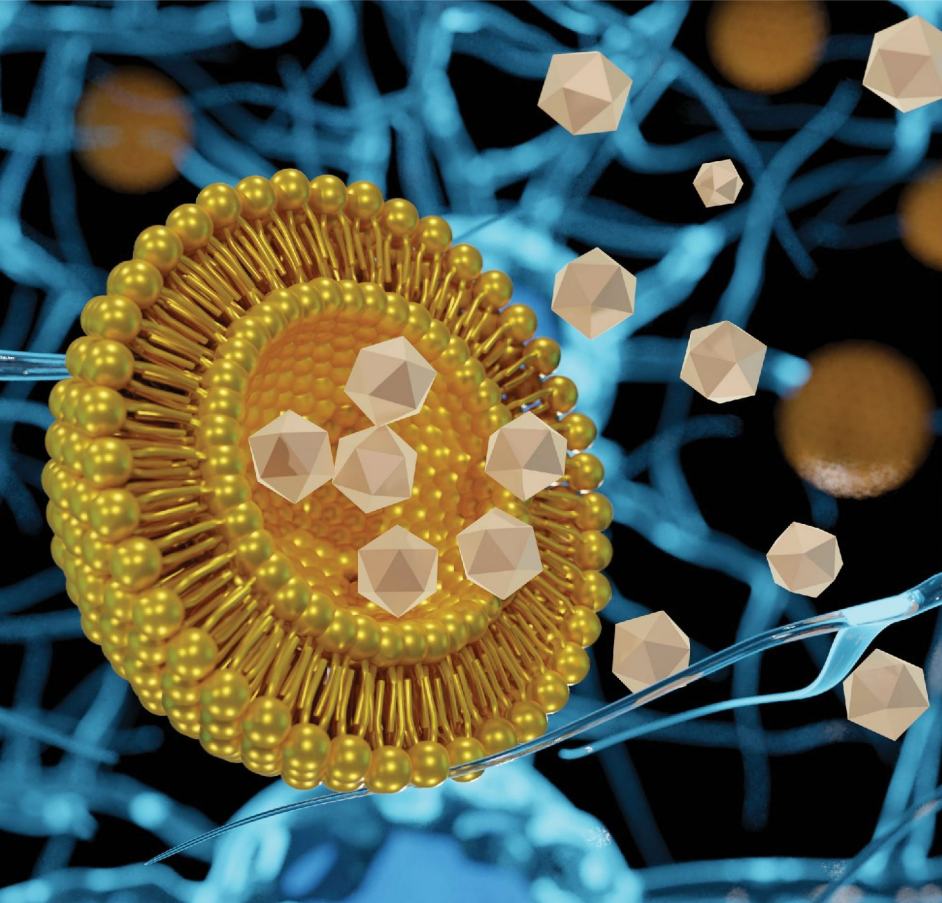
Maltodextrin is used in different pharmaceutical industries due to its low viscosity, high dry matter, good solubility in water, desirable mouthfeel, gelling properties and emulsion stabilization. Followings are some applications of maltodextrin in pharmaceutical industry:

- + excipient in tablets
- + Preparation of edible films
- + Facilitating the direct compression of active drugs that are difficult to compress
- + Prebiotic function
- + Microencapsulation
- + Formulation of energy drinks and sports supplement powders

Maltodextrin as a prebiotic substance

Probiotic bacteria keep the balance of intestinal microbial flora and prevent the growth of harmful bacteria. Probiotics affect the balance of beneficial and harmful bacteria in the gut and change this balance in favor of increasing the population of beneficial bacteria. Prebiotics are indigestible carbohydrates that are necessary to stimulate the growth of probiotic bacteria. These components selectively provide a suitable environment for probiotic bacteria in the body which favors their growth so they can exert their positive effects on the host. Maltodextrin as a prebiotic substance stimulates the growth of probiotic bacteria. Moreover, in the spray drying of some types of bacteria such as bifidobacterium, application of maltodextrin exerts a protective effect for bacteria against temperature stress. This combination of probiotic and prebiotic action is called symbiotic effect.





| Modified Starch Specification | | |
|--|--|---|
| Test | Acceptance Criteria | |
| Physical | | |
| Description | White powder, Odorless | |
| Definition | Modified Starch is Starch modified by chemical means. Food Starch may be acid-modified, bleached, oxidized, esterified, etherified, or treated enzymatically to change its functional properties | |
| Chemical | | |
| ID | shape of starch granules | Polygonal, rounded, or spheroidal granules up to 35 µm in diameter and usually having a circular or several-rayed central cleft |
| | Characteristics of starch in %2 soda solution | The final solution is translucent to opaque with a fluid consistency. A yellow tint of the final solution is acceptable |
| | Iodine Test | A water slurry of the Modified Starch is colored orange-red to deep blue by iodine TS. |
| Impurities | Residue on Ignition (%) | NMT %1.5 |
| | iron (ppm) | NMT 20 PPM |
| | SO ₂ (ppm) | NMT 50 PPM |
| | Oxidizing Substances(ppm) | NMT %0.018 |
| pH | 3-9 | |
| Loss on drying | NMT %15.0 | |
| Microbiological | | |
| Total Aerobic Microbiological Count | NMT 10 ³ CFU/gr | |
| Total Combined Yeasts/Molds Count(cfu/g) | NMT 10 ² CFU/gr | |
| Escherichia Coli | Absence | |
| Salmonella Species | Absence | |

Starch

Starch is a white, odorless powder found in seeds or underground stems of many plants. Corn, wheat and potato are main sources of industrial starch production. Starch constitutes %70 of the dry matter of corn grain. Starch powder is produced through mechanical dehydration of starch slurry by centrifuges or vacuum filters followed by hot air drying.

Raw starch has several functional properties such as gel formation, viscosity increase, texture improvement and moisture adjustment, which allow it to be used widely in various industries.

In order to improve the properties of starch, some modifications are done on its physical and chemical structure.

Below are some uses of starch in the pharmaceutical industry:

- + Tablet hardening agent during compression operation
- + Controlling agent for the release of the active pharmaceutical ingredient after taking the pill
- + Suitable material for encapsulation
- + Resistance to retrogradation and syneresis
- + Creating a stable colloidal dispersion (viscosity increaser)
- + Common excipient in tablets, especially tablets that dissolve quickly in the mouth

| Native Corn Starch Specification | | |
|---|------------------------------------|---|
| Test | Acceptance Criteria | |
| Physical | | |
| Description | White Powder | |
| Identification | shape of starch granules | Meets the requirement |
| | Solubility in water | A thin, cloudy mucilage is formed |
| | Iodine Test | An orange-red to dark blue color is produced, which disappears upon heating |
| Chemical | | |
| Impurities | Residue on Ignition (%) | NMT 0.6 |
| | Limit of iron (ppm) | NMT 10 |
| | Limit of SO ₂ (ppm) | NMT 50 |
| | Limit Of Oxidizing Substances(ppm) | NMT 1.4 ml of 0.002 N Sodium thiosulfate is required.(20ppm) |
| PH | 4 – 7 | |
| Loss on drying | NMT 15.0 | |
| Microbiological | | |
| Total Aerobic Microbiological Count (cfu/g)(TAMC) | NMT 10 ³ | |
| Total Combined Yeasts/Molds Count(cfu/g)(TYMC) | NMT 10 ² | |
| Escherichia Coli | Absence | |





Farhikhtegan Zarnam Industrial & Research Group started the production site of pharmaceutical raw materials and auxiliary materials with the most up-to-date facilities and production equipment and knowledge and expertise of the personnel in 2022.

This site has a clean room with GMP-compliant conditions, and its purpose is to provide the raw materials needed with the highest quality and with the approval of IFDA.

With the benefit of young and expert human resources, strategic geographical location, and overall infrastructure by pharmaceutical GMP, this company can take a big step towards meeting the needs of the pharmaceutical industry by producing dozens of tons of raw materials for the pharmaceutical industry.

The first output of this knowledge-based pharmaceutical company is a product called starch. According to the purpose of use, this product is offered in raw form or with the changes made in it (under the name of modified starch). Starch is the raw material of products such as fructose, glucose, and maltodextrin syrups.



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🌐 www.zarpharma.co

📍 Alborz-Hashtgerd-Zar Grain Refinery