ZARFRUCTOSE

Zar Fructose

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Corn Starch

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SCAN ME!

Zar Grain Refinery:

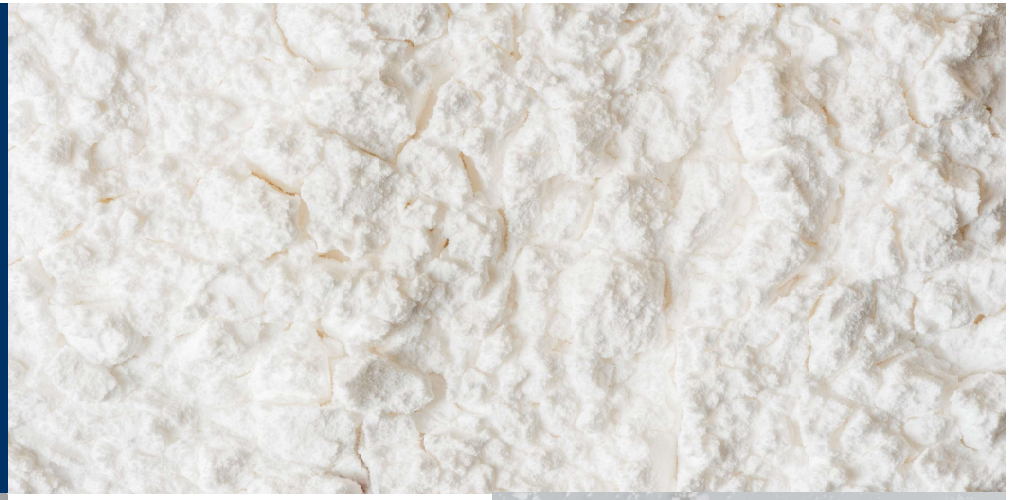
The First Grain Refinery and Dry Port of Iran

In accordance with the concept of Resistive Economy, a super project with various sectors of development was started close to Tehran and the preliminaries of the largest grain refinery in Middle East and the first grain refinery in Iran were established.

The first phase of this Refinery was started in president Rouhani's presence in December, 2016. Due to the advantages of raw material supply and strategic geographical location, this Refinery can process thousands of tons of cereal and produce raw materials of other food and drug industries.

This company has a new plant for producing various starches in where various starches with the application in food, pharmaceutical, paper and other industries are produced.

NATIVE CORN STARCH



Starch is a white odorless powder that can be found in roots or stems of many plants. Corn, wheat and potato are the main sources of starch. About 80% of world's starch production is carried out from corn in the wet milling process. Starch is formed in the granular shape at the size of 2-30 µm in plant. About 64-70% of corn kernel consists starch which after separation from other parts of kernel, is dried and packed. Due to its gel forming and viscosifying properties, corn starch has found many applications in food industry. Sometimes corn starch undergoes physical and chemical modification in order to improve its properties and increase its range of application. These starches are called modified starches. Due to its unique properties, starch has a wide application in food, papermaking, cardboard, and textile industries. In food industry, starch is used in the formulation of bakery products, various sauces, snacks, meat products, soups and frozen products. In these products, starch is mainly used as texturizing agent, stabilizer, filler, gel forming agent and a raw material of edible films.

Applications of native corn starch:

- Viscosifying agent in food products;
- Excipient in pharmaceutical industry;
- Adhesive in cardboard industry;
- Increasing the strength and printability of papers;

Properties of Zar native corn starch			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	80
Sulphated ash	% db	-	0.3
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	0.5
Protein	% db	-	0.7
pH	-	4.5	7.5

MODIFIED STARCH (1422)

Due to inherent limitations, native starch cannot be used in some applications. For this reason, native starch undergoes modifications and the resulting product is called modified starch. Following are some limitations of native starch:

Limitations of native starch:

- Low stability of the starch paste to retrogradation and therefore syneresis and gelling of the paste;
- Low stability of starch paste to high shear forces (homogenizer);
- Low stability to freeze-thaw;
- Low stability in acidic pHs;

Zar modified starch (1422) does not have these limitations and owing to the modification on it, this starch has following properties:

Properties of Zar modified starch (1422):

- High stability to shear forces (Homogenizers);
- High stability to acidic pHs;
- Higher stability to retrogradation and subsequently higher stability of the paste to syneresis and gelling;
- Higher viscosity of the paste;
- High stability to freeze-thaw;
- Higher clarity of the paste compared to native starch;

Properties of Zar modified starch (1422)			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	50
Total ash	% db	-	0.3
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	2 .5
Protein	% db	-	0.5
pH	-	4.5	7.5

According to the aforementioned advantages,

Zar modified starch (1422) can be used for various food applications and can improve physicochemical and organoleptic properties of the products. Followings are examples of Zar modified starch applications:

- Hot pasting sauces (Ketchup);
- Soups;
- Dairy products;
- Fillings;

Zar Modified starch (1422 cold swelling)

This modified starch has all the advantages of Zar Modified starch (1422) as well as the ability of forming paste with water at ambient temperature.

Properties of cold swelling Zar modified starch (1422):

- High stability to shear forces (Homogenizers);
- High stability to acidic pHs;
- Higher stability to retrogradation and subsequently higher stability of the paste to syneresis and gelling;
- Higher viscosity of the paste;
- High stability to freeze-thaw;
- Higher clarity of the paste compared to native starch;

This product can be used as thickening agent and fat replacer in sauces that do not undergo the thermal process during production (such as mayonnaise). It is also used in soups, dairy products, filling and other food products that needs a stable stabilizer exerting viscosity at ambient temperatures.

Properties of Zar modified starch (1422 cold swelling)			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	80
Sulphated ash	% db	-	0.3
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	0.5
Protein	% db	-	0.7
pH	-	4.5	7.5

Oxidized starch

Since 1850, oxidized starch is used in paper making industry in size press to improve the mechanical strength and printability of the paper. It also acts as binder for fibers, pigments and filler. Various oxidizing agents can be used for starch oxidations. During oxidation, breakage of starch chain and introduction of carbonyl and carboxyl groups into the polymeric starch chain are occurred. Due to the changes occurring in the structure of starch, oxidized starch can be used in the industries such as paper making, textile and drilling. One of the distinct properties of oxidized starch is its lower viscosity of paste compared to native starch, therefore in the size press of paper making industry, starch paste can penetrate into the paper structure and exert mechanical strength to it.

Oxidized starch has following applications:

- Paper industry;
- Textile industry;
- Puddings;
- Frozen foods;
- Biodegradable packages;

OXIDIZED STARCH

Properties of Zar oxidized starch			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	50
Total ash	% db	-	0.5
Insoluble ash in acid	% db	-	0.05
Carboxyl group	% db	-	1.1
Protein	% db	-	0.5
pH	-	4.5	7.5

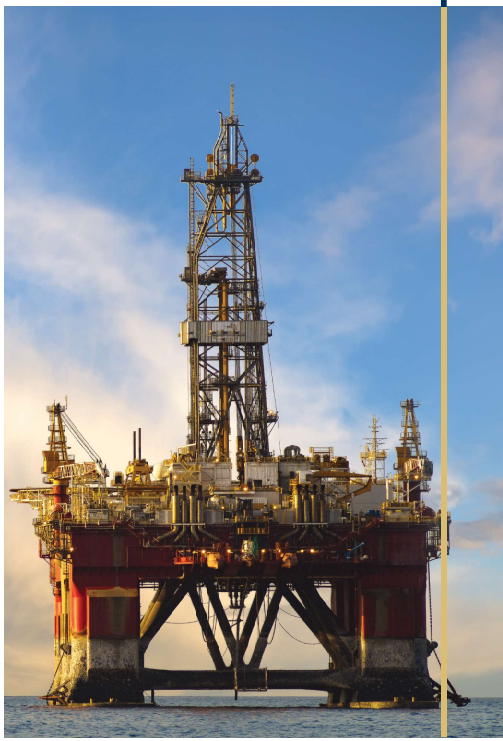
PREGELATINIZED STARCH

Starch granules are insoluble in water at room temperature therefore it cannot exert viscosity. But when a starch slurry is heated (temperatures higher than 60 °C), starch granules can absorb water and swell. This property of starch (insolubility in water at room temperature) limits its application in processes and formulations that do not undergo heating. Therefore, for such processes, pregelatinized starch is used which has the ability of forming gel at room temperature.

Pregelatinized starch has following application:

- Infant formula;
- Soups;
- Bakery products;
- As stabilizer;
- As excipient in pharmacology;
- As binder in wet granulation;
- Drilling industry;

Properties of Zar pregelatinized starch			
Parameters	Unit	Minimum	Maximum
Moisture	%	5	10
SO_2	ppm	-	80
Total ash	% db	-	0.5
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	0.5
Protein	% db	-	0.7
pH	-	4.5	7



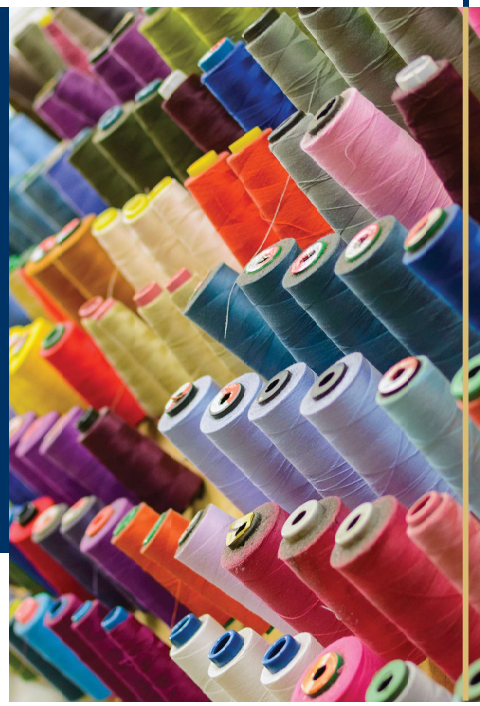
Cationic starch

Cationic starch is a modified starch which is mainly used in the wet-end of paper making industry. Due to the positively charged ions, cationic starch is absorbed to the negatively charged cellulose fibers and fillers. Therefore, paper's mechanical strength, filler and fine retention is increased. Increased mechanical strength of paper, increased water drainage, filler and fine retention and therefore lower BOD and COD of sewage and improved quality of the paper are the advantages of cationic starch in paper industry. Moreover, application of this starch results in a decrease in the incidence of paper breakage in the production line.

- Cationic starch has received following applications:
- Paper making industry;
- Textile industry;
- Waste water treatment;
- As binder in wet granulation;

CATIONIC STARCH

Properties of Zar cationic starch			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	80
Total ash	% db	-	0.3
Fat	% db	-	0.15
pH	-	4.5	7.5



Starch Adhesive

In corrugated board industry adhesive is used for binding of paper layers. In this process, the adhesive is applied on the tip of corrugated paper and then a liner is placed on it. From a long time ago, starch is the main component of corrugated adhesive. The suitable adhesive for this purpose should have a proper bonding properties and a stable viscosity during the operation.

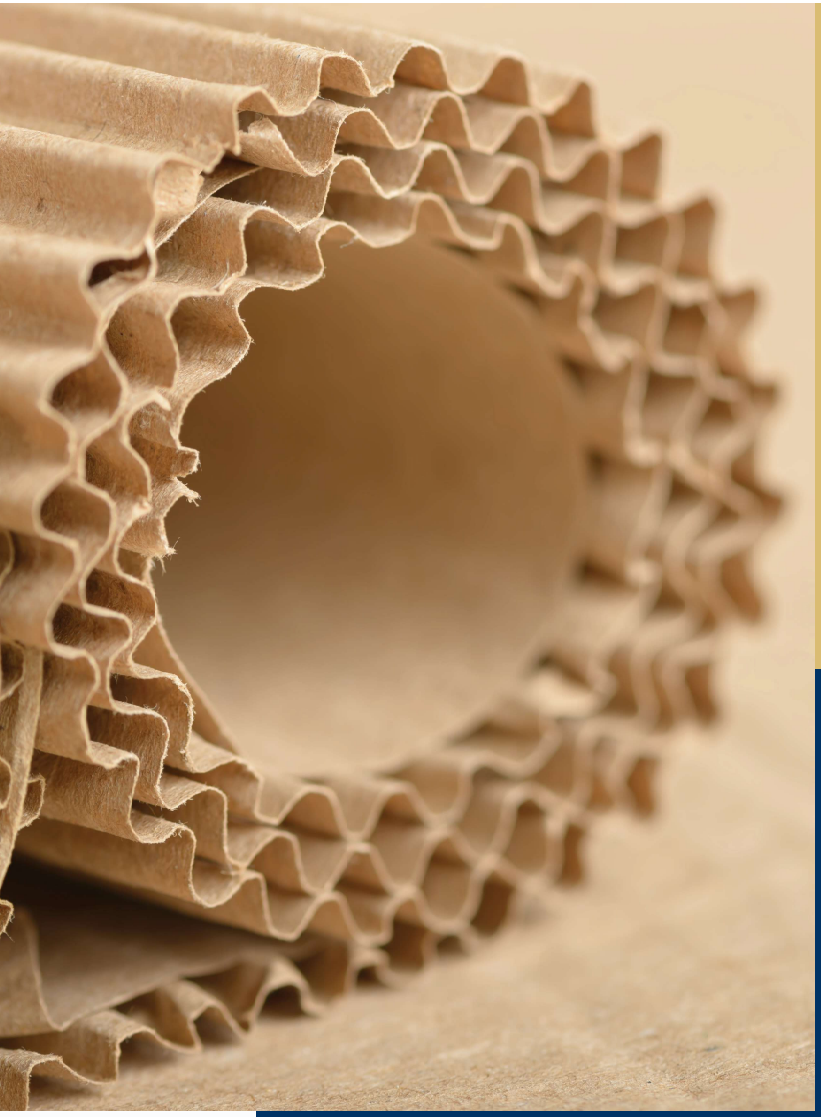
Zar Starch Adhesive

Most starch adhesive are produced in plant. In this method, different batches of adhesives are produced and then it is transferred to the processing section. The most challenging issue in this regard is the fluctuation in the quality of different batches. Zar starch adhesive can be easily mixed with appropriate amount of water and then be used for the production of various corrugated boards.

Following is the advantages of Zar starch adhesive:

- Proper bonding strength;
- Stability of the viscosity during the operation;
- Convenient application;

STARCH ADHESIVE



MODIFIED STARCH FOR CORRUGATED CARDBOARD

Zar Modified Starch for corrugated cardboard

In corrugated cardboard production process different layers of sheets are attached together by the application of adhesive. Starch is the main component of adhesive for this process. In most cases, native starch is used for the production of starch adhesive. But sometimes for improving the quality of adhesive and performance of the process, modified starches are used for the production of adhesive. These modified starches can increase the adhesion power of adhesive and can increase the speed of machine and therefore increase the productivity of operation.

Zar Co. has developed a special modified starch for corrugated cardboard. This starch has several advantages compared to other adhesives and is used for the production of starch adhesive. The resulting adhesive can improve the quality of corrugated cardboard and increase the speed of cardboard production machine.

Followings are the advantages of Zar modified starch for corrugated cardboard:

- Increasing the production yield by increasing the speed of machine
- Increasing the adhesion power of adhesive
- Increasing the stability of adhesive viscosity
- Lowering the costs of production

Properties of Zar modified starch for corrugated cardboard			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	80
Sulphated ash	% db	-	0.3
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	0.5
Protein	% db	-	0.7
pH	-	4.5	7.5

Zar Gypsum board starch

Gypsum boards are walls that are made from calcium sulfate for construction purposes. They have different names but usually are called gypsum board, gypsum panels or drywall. Calcium sulfate as the main ingredient is mixed with other additives and after the addition of water, the resulting paste is placed between thick paper sheets and then they undergo the drying process. Starch is one the important ingredient in the production of gypsum board. Starch functions as an adhesive for attaching paper to the board. Strong attachment of paper to the board is very critical in the strength of the panel. The suitable starch for this purpose is a modified starch that have the ability of uniform dispersion in the paste and also have a strong stickiness.

Zar gypsum board starch is a modified starch that protects the calcium sulfate crystals located on the edge of the board and therefore increases the stability of bond between paper and board. These crystals are prone to over dehydration and breakage at elevated temperatures in the kiln during the drying process. This over dehydration decreases the strength of bond and results in the peel off of the paper. Zar gypsum board modified starch retains the moisture during kiln process and protects the crystals from over dehydration.

GYPSUM BOARD STARCH

Properties of Zar gypsum board starch			
Parameters	Unit	Minimum	Maximum
Moisture	%	-	14
SO_2	ppm	-	80
Sulphated ash	% db	-	0.3
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	0.5
Protein	% db	-	0.7
pH	-	4.5	7.5

AM STARCH

Zar AM starch

Zar AM starch is a modified starch that has various applications due to its unique properties. In food industry it is mostly used in the production of starch gum candies. This starch can be mixed with water, corn syrup and sugar. The resulting mixture is cooked and a jelly paste is obtained which upon cooling and aging in the molds, forms a gum confection.

Followings are properties of Zar AM Starch:

- Lower paste viscosity compared to native starch
- Producing a gummy texture upon cooling of the paste
- Improved binding properties

Properties of Zar AM starch			
Parameters	Unit	Minimum	Maximum
Moisture	%	5	10
SO_2	ppm	-	80
Sulphated ash	% db	-	0.3
Insoluble ash in acid	% db	-	0.05
Fat	% db	-	0.5
Protein	% db	-	0.7
pH	-	4.5	7.5