GENERAL

# What is Maltodextrin and Is it safe for you

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Maltodextrin (MD) is a polysaccharide, a part of the carbohydrates food group. It has a dextrose i.e., equivalence of less than 20 which signifies prolonged carbohydrate chains along with 2-3% glucose and 5-7% maltose. The calorific value and glycemic index of MDs are 4 kcal/g and 90-110 GI, respectively.

MDs are obtained from starch by the partial enzymatic hydrolysis of starch which is composed of longer chains than glucose. Starch is a carbohydrate that is found in large quantities in rice, corn, wheat, or potato, etc. The degree of hydrolysis is estimated as a Dextrose Equivalent (DE), MDs have a DE of between 3 and 20, Starch has a DE of 0, and dextrose (nearly identical to glucose) has a DE of 100.

MD is a water-soluble (easily dispersible in water and slightly soluble to almost insoluble in alcohol) and unsweetened (slightly sweet almost flavorless & neutral taste) product. MD comes in a white hygroscopic dried powder form.

**Benefits of MD**

MDs are an ingredient of plant origin obtained from corn, wheat, and potato starch. Due to its wide range of benefits, maltodextrin is in great demand. They are ideal carbohydrates for use in certain diets such as infant nourishment foods, sports nutrition, and clinical applications.

MDs also have pharmaceutical and cosmetic benefits, as an adjuvant (non-functioning element) in the manufacture of pharmaceuticals in tablet and powder applications.

Many athletes and people want to gain muscle mass or weight with products containing maltodextrin because it acts as a quick source of energy and helps maintain the normal function of the muscles.

MDs are valued for its textural, gelling, emulsifying, and non-crystallizing properties. MD is an affordable and effective food product that can enhance the texture, flavor, taste, and shelf life of foods without increasing the calorie content.

MDs are used in diet products as a partial fat substitute due to their neutral taste properties and are even used as an incorporating seasoning in dishes. Fats and carbohydrates have a calorific value of 9 kcal/g and 4 kcal/g, respectively. Using MD to replace fats can consequently reduce the calorie content of products.

**Application of Maltodextrins**

Maltodextrins are in substantial demand. It is used in a wide variety of applications. These applications are ?

**Applications Related to Pharmaceutical**

MD is a white and tasteless powder with no pharmacological activity of its own which means it can be used on a large scale as a diluent and as a co-processing of pharmaceutical excipients to produce compatible direct compressions of several drugs. It can be used as a coating material to encapsulate nutraceuticals such as vitamins. MD is known to provide better incorporation efficiency to the drug. It has poor solubility properties in charged mixtures and good solubility in water resulted in ease of hydration.

MD is used in a fast-dissolving oral film due to its ability to form a film and to withstand high temperatures. Due to its fast-dissolving oral qualities, it is conveniently used in dosage form for pediatric and geriatric patients.

Some people with chronic hypoglycemia take maltodextrin medication as part of their regular treatment because it causes a more instantaneous accumulation in blood sugar. it is an effective treatment for those who struggle to keep normal blood sugar levels if people with chronic hypoglycemia's glucose levels reach too low, they bring an immediate solution.

There is some explanation for maltodextrin?s fermentation in the intestines may act as a mechanism that helps prevent colorectal cancer. A contemporary study found that Fibersol-2, a form of digestive-resistant maltodextrin, had an antitumor activity that assist in preventing tumor growth without any observable toxic side effects.

**Infant Nutrition**

Lactose is the main carbohydrate in human breast milk and milk-based formulas for infants, regardless, lactase deficiency causes indigestion that can lead to malabsorption-induced osmotic diarrhea in which about 40% of the provided energy may be relinquished.

In such possibilities, MDs can be used as a replacement for lactose to provide energy. The benefit of MDs as a source of digestible carbohydrates in infant formulas has been recommended to aid in reducing osmotic load and related intestinal distress while having no negative effects on growth.

**Clinical Nutrition**

MDs are used in enteral and parenteral nutrition in clinical nutrition with the combination with protein for use in preoperative nutrition and beverages as a substitute for the traditional method of preoperative fasting in patients who undergo major surgery for gastrointestinal malignancies.

**Applications Related to Oral Health**

Some studies indicated the benefit of using MDs in an oral rehydration solution (ORS) for patients with diarrhea corresponded to the use of glucose. Maltodextrin allows transformations in the osmolarity (i.e. concentration of solution) of beverages, making them ideal for use in hydration products.

**Applications Related to Foods Products**

MDs are a GRAS (Generally Recognized as Safe) food additive approved by the FDA. Maltodextrin is a starchy powder that is commonly used as an ingredient in a wide range of foods and packaged food products, such as pastries, confections, and soft beverages even manufacturers add MD powder in various dishes to improve foods' sensory attributes to give adequate flavor, thickness, or shelf life and other properties such as texturizing, gelling, emulsifying, non-crystallizing properties.

When it is used in packaged foods, it will usually feature on the food label. The use of MD correspondingly depends on the DE (Dextrose Equivalent) content, for example, MD with a low DE value is stickier so it is used in thick or gelatinous products such as syrup and jam, while MD with a high DE value is better used as filler like in ice cream.

MDs are occasionally used in beer brewing to raise the specific gravity of the final product improve the mouth-feel of the beer, improve head retention, and lessen the dryness of the drink. Maltodextrin does not increase the alcohol content of the brew because of poor fermentation properties by yeast. It is also used in some snacks like potato chips and sometimes used in peanut butter to reduce the fat content while keeping the texture.

**Sports Energy Drinks**

Maltodextrin is a good source of energy for athletes, as it can be easily digested by the human body which converts it into instant energy similar to a simple carbohydrate conversion. Maltodextrin has no nutritional value but due to its fast-digesting carbohydrate properties, it is used in sports drinks and super-quick (instant) energy sacks for endurance athletes.

**Potential Concerns about Maltodextrin**

Some potential concerns about maltodextrin are

**Genetically modified (GM) ingredients -** Maltodextrin may be obtained from corn that may be genetically modified. While the FDA instigates that GM crops are just as safe as traditional ones, some people are deeply concerned about avoiding products made from GM corn.

**Allergies and intolerances -** People with celiac disease and other food sensitivities, particularly those with inflammatory bowel disease and allergic reactions such as rash or skin irritation, asthma, etc.

**Gut problems -** The gut is a fragile ecosystem of bacteria, and the balance can be upset by some unwelcome bacteria such as Salmonella (leading to gastroenteritis), Ecoli (development of Crohn?s disease and other inflammatory bowel diseases) that happen to thrive on maltodextrin and other processed carbohydrates and sugars.

**Weight gain -** Maltodextrin is a carbohydrate generally found in pasta, frozen dinners, cereals, desserts, and instant foods. So limited intake must be for weight-conscious people.

**Diabetes and blood sugar spikes -** Maltodextrin is similar to table sugar on the GI, which indicates eating an excess can cause a spike in blood sugar. Limit those processed snack foods where MDs are common.

**Is maltodextrin safe?**

The FDA has approved maltodextrin as a safe food additive and dietary supplement. It is also included in the nutritional value of the food as part of the total amount of carbohydrates.

For people with diabetes or insulin resistance, doctors recommend a low-carb diet, however, maltodextrin is usually only found in small amounts in foods with no significant impact on total carbohydrate intake. Still, you should include every maltodextrin you consume in your total carbohydrates for the day.

Maltodextrin has a high glycemic index (GI), which means it can cause your blood sugar to rise. It is safe to consume in very small amounts, but diabetics should be very careful. A diet consisting mainly of low-GI foods is good for everyone, not only diabetics.

Many processed foods contain MDs; a diet high in maltodextrin is probably also high in sugar and salt, and low in fiber resulting in such a diet that may lead to weight gain, & higher levels of cholesterol issues.

**Limit of MD Intake**

MD's limit is 10 grams a day.

MD limit is necessary to prevent side effects such as gastrointestinal gas, flatulence, and bloating. Other side effects may include allergic reactions such as rash or skin irritation, asthma, cramping, difficulty breathing, weight gain, cholesterol, and type 2 diabetes.

**Claims of Use of MDs**

Scientific opinion on justification of health-related claims with respect to maltodextrin resistance and reduction of postprandial glycemic reactions (ID 796), maintenance of normal LDL cholesterol levels (ID 2927), maintenance of normal (fasting) blood triglyceride levels (ID 2927), and changes in bowel function (ID 797 ) according to Article 13(1) of Regulation (EC) 1924/2006.

The nutrient that is the issue of health claims is maltodextrin-resistant and the Panel thinks that maltodextrin resistance is adequately illustrated concerning the claimed effect on the target population by the Panel who recorded that the claimed effect is not an effect of resistant maltodextrin. Based on the data proposed, the Panel concludes that a cause-and-effect relationship has not been established between the consumption of resistant maltodextrin and reduction of postprandial glycemic reactions, maintenance of normal LDL cholesterol levels,

maintenance of normal blood triglyceride levels, or changes in bowel function, respectively.

**Conclusion**

As a result of advances in science and technology, knowledge concerning the possible (functional) uses of MD in food, beverage, and drugs has increased significantly over the past 20 years. MD is recognized to be safe and non-toxic. People use maltodextrin as a synthetic food additive or a carbohydrate supplement to boost energy levels and performance.

Specialists consider MDs to be safe for the majority of people, although they may also carry some risks, particularly for people with diabetes. Eating too many processed foods with MD additives can cause health problems.

People with celiac disease should be aware that maltodextrin may contain a small amount of gluten if wheat, barley, rye, or triticale are a source of starch. However, maltodextrin is gluten-free as long as the ingredient list does not include the words wheat, barley, rye, or triticale. It is best to aim for a more healthful diet and limit intake of MD-related edible materials.

## Competing interests

The authors declare that they have no competing interests.

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