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Popular Article

Glycerol Monostearate (GMS): An Important Agent in Food Industry

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Introduction

Glycerol monostearate, commonly known as GMS, is an organic molecule used as an emulsifier. It is a flaky, white, odorless, slightly sweet powder that is used in the food industry to give whipped and ice cream its texture and body. It also helps thicken products and stabilize gels. It is also used as an anti-staling agent in bread.

Glycerol monostearate is routinely used in foods as an emulsifier. When products contain both water and oil, the ingredients separate. But an emulsifier helps to combine them. It reduces the liquid's surface tension and stabilizes the mixture. It can also interact with other ingredients, inducing air into them and preventing them from crystallizing.

Glycerol Monostearate as a foaming agent

Foam-mat drying is one of the simple methods of drying in which a liquid concentrate along with a suitable foaming agent is subjected to dehydration in the form of a mat of foam at relatively low temperature. Rate of drying in this process is comparatively very high because of an enormous increase in the liquid–gas interface, in spite of the fact that the heat transfer is impeded by a large volume of gas present in the foamed mass. Drying occurs in multiple constant rate periods due to periodic bursting of successive layers of foam bubbles, thus exposing new surfaces for heat and mass

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transfer as the drying progresses. This method is suitable for any heat sensitive, sticky and viscous materials which cannot be dried by spray drying. The dehydrated powder/flakes are superior to drum and spray dried products because of its honeycomb structure and better reconstitution properties. The dried product has desired properties such as rehydration, controlled density and retain volatiles that would be lost during the drying of non-foamed materials.

Glycerol monoesters synthesized from glycerol have many applications, such as emulsifying agents in food, pharmaceuticals, cosmetics, or in detergents.

1) Monoglycerides are generally obtained from the (i) glycerolysis or (ii) hydrolysis of triglycerides, or (iii) the direct esterification of glycerol with fatty acids.

2) The industrial processes involved generally use homogeneous acid or basic catalysts, which lead to a mixture of mono-, di-, and triglycerides in general (40 : 50 : 10) after direct esterification.

Benefits of Glycerol Monostearate

GMS originates from glycerol, which may also be a useful method to help treat a variety of health conditions. It has a slightly different structure, but like GMS, glycerol is used in many different consumer products.

- **Advances Athletic Performance**

In recent years, glycerol monostearate has gained a lot of attention for its benefits to athletes by stimulating hydration and muscle building. For any athlete, a well-hydrated body is key. Most sports enthusiasts know that it is important to drink a lot of water. But during intense workouts, it may be harder to get enough. They may start feeling fatigued, the muscles may start to cramp and the athlete may even be forced to cut the workout short.

However, GMS may be a unique solution to this problem. Glycerol monostearate supplements are hyper-hydrators, forcing muscle cells to absorb more water. This helps athletes maximize performance, preserve energy and build endurance. Increasing blood flow through the body may reduce sore and cramping muscles. Finally, GMS can help an athlete to stay hydrated in heated or intense workouts.

Previously, the World Anti-Doping Agency (WADA) formerly banned glycerol monostearate. However, as of January 1, 2018, the organization now considers it safe for athletes.

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- **Maximizes Muscle Growth**

Bodybuilders may benefit from GMS because its hydrating properties stimulate more blood flow to the muscles. This process is called hyperemia. Increased blood flow also sends more nutrients throughout the body and helps the body absorb other supplements that the athlete may use. Besides the physical benefits, many athletes may enjoy the feeling of fuller muscles that results from increased blood flow.

With increased blood flow comes muscle growth and not only does the blood carry nutrients, but it also removes lactic acid and carbon dioxide waste products. The process also creates more blood vessels to stimulate further growth.

- **Improves Food Production**

Glycerol monostearate is routinely used in foods as an emulsifier. When products contain both water and oil, the ingredients separate. But an emulsifier helps combine them. It reduces the liquid's surface tension and stabilizes the mixture. It can also interact with other ingredients, inducing air into them and preventing them from crystallizing.

GMS is a flaky, white, odorless, slightly sweet powder that the food industry uses to give whipped and ice cream its texture and body. It also helps thicken products and stabilize gels. In baked products, GMS helps improve the texture of bread and cakes and keeps them from going stale.

- **Emulsifies Industrial Products**

Glycerol monostearate emulsifies waxes, oils and solvents. It is also used as a plastic lubricant, an anti-static component for plastics and an anti-fogging ingredient. Some manufacturers also use hygroscopic GMS with polyethylene because it may slow deterioration from air humidity and help boost insulation.

Side Effects of Glycerol Monostearate

The U.S. Food and Drug Administration (FDA) labels GMS as generally safe. However, inhaling pure glycerol monostearate is toxic and it may irritate the skin, eyes and respiratory and digestive tracts.

Although it is generally safe, overusing glycerol monostearate may cause side effects. Because it draws fluid from the brain and eyes into the muscles and other parts of the body, excessive

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amounts of GMS may cause headaches or blurred vision. Some other side effects of glycerol may include:

- Excessive thirst
- Diarrhea
- Vomiting
- Dizziness
- Bloating
- Stomach pain
- Inflammation in the GI tract

Conclusion

Glycerol monostearate (GMS) is one of the most value-added products employed in industrial applications in the food industry, pharmaceutical, and non-ionic surfactants. Thus, glycerol monostearate is a high economic value product and has a bright market prospect in this globalization era.

References

Hart MR, Graham RP, Ginnette LF, Morgan AI. Foams for foam-mat drying. *Food Technol*. 1963;17(10):90–92.

Morgan AI, Graham RP, Ginnette LF, Williams GS. Recent developments in foam-mat drying. *Food Technol*. 1961;15(1):37–39.

Berry RE, Bissett OW, Lastinger JC. Method for evaluating foams from citrus concentrates. *Food Technol*. 1965;19(7):144–147.

Kudra T, Ratti C. Foam-Mat drying: Energy and cost analysis. *Can Biosyst Eng*. 2006; 48:3.27–3.32.

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