

HydroMax[®]

glycerol powder 65%

A UNIQUELY OPTIMIZED, HIGHLY CONCENTRATED POWDERED FORM OF GLYCEROL DELIVERING NEXT-LEVEL HYDRATION AND NEXT-GEN PRODUCT POTENTIAL

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent disease.

FOR NEXT-LEVEL HYDRATION AND NEXT-GEN FORMULATIONS

ABSTRACT:

A uniquely optimized, highly concentrated powdered blend of glycerol and silica, made for easy inclusion in ready-to-mix and capsule applications, HydroMax[®] from Glanbia Nutritionals offers all the benefits of glycerol without the drawbacks. In rigorous studies glycerol has been shown to improve athletic results through hyperhydration, offer increased endurance, and promote a more pumped physique.

INTRODUCTION

Many of today's consumers are pushing the boundaries of personal fitness, making significant gains in endurance sports such as running, triathlons and swimming, along with traditional weight training and even competitive bodybuilding.

While their success could be attributed to diet, intense exercise and sheer determination, in many cases it's a secret ingredient—sports nutrition products—that spells the difference between ordinary and extraordinary outcomes.

This is one of the many reasons why the sports nutrition market is booming, and why product developers are looking for an edge just as much as the athletes they serve.

HydroMax[®] from Glanbia Nutritionals is scientifically designed to provide that edge.

THE BENEFITS AND LIMITS OF GLYCEROL

Among the thousands of ingredients promising athletic and aesthetic results for consumers, glycerol from powdered glycerol monostearate (GMS) has always been popular due to its ability to provide hyperhydration, increased endurance, along with that engorged look coveted by bodybuilders.

But GMS has its downside. For one, it is very hygroscopic, becoming unstable over time as it absorbs water. Thus, low concentrations of glycerol (5-12%) are required to prevent degradation and promote shelf stabilization of GMS.

HYDROMAX[®] IS GLYCEROL-PLUS

The industry's first highly concentrated yet stable form of powdered glycerol offering next-level hydration in a uniquely optimized blend of glycerol and silica, HydroMax[®] is like glycerol-plus.

HydroMax[™] delivers all the goodness of glycerol in a powdered form with none of the stability drawbacks. Plus, it affords a host of other benefits to help manufacturers boost profits and market share by developing innovative ready-to-mix products to satisfy today's legions of fitness enthusiasts:

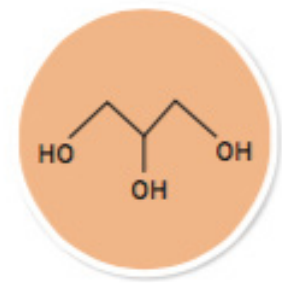
- > Increased stability at a much higher percentage of glycerol
- > A larger dose of active material in a smaller space
- > Greater overall potency

WHAT MAKES HYDROMAX[®] SO SUPERIOR?

- > High potency
- > Enables larger doses in a smaller space
- > Excellent stability
- > Allergen-free
- > Made in the U.S.
- > Three-year shelf life

REAL PROOF1-2: GLYCEROL WORKS. BUT HYDROMAX® WORKS BETTER.

Glycerol monostearate (GMS) in a powdered form has been used extensively over the years as a sports nutrition enhancement—for the pre-, intra- and post-workout category, and typically in the range of 5-12% free molecular glycerol.



Because it contains over 65% free molecular glycerol and involves a special formulation to give it added advantages over straight glycerol alone, HydroMax® is a preferred choice for products aimed at athletes seeking these important benefits:

HYPERHYDRATION

The glycerol present in HydroMax® is easily absorbed and distributed throughout the intracellular space³, increasing the concentration of fluid in the blood and tissues⁴, positively affecting osmolarity and the expansion and maintenance of fluid volume.



2.9 to 3.1 g/kg/d of glycerol supplementation reduces fluid consumption⁵

- Effect seen prior to or during bouts of negative fluid balance (dehydration)
- Lower urine volumes for 32 or 49 hours when compared with water alone
- Supplementation shown to keep athletes hyperhydrated for extended periods of time

This brings potential benefits for endurance and stamina events, including adaptation to environmental heat/humidity stress, along with promoting blood flow associated with resistance training.



1 gram/kg b.w. of glycerol reduces the thermal burden of moderate exercise in the heat⁶⁻⁷

- Urine volume prior to exercise was decreased
- Moderate exercise in hot, dry conditions triggered elevated sweat rate and lower rectal temperature⁸
- Thermal burden reduced

IMPROVED ENDURANCE

Glycerol has also been shown to help athletes store extra water, delaying the need for hydration.⁹ This suggests improved efficiency in exercise, thermoregulation and decreased physiological stress.¹⁰

In addition, pre-exercise ingestion of glycerol has been clinically proven to lower heart rate and prolong endurance time.



1.2 gm/kg of glycerol pre-exercise lowers heart rate¹¹ and prolongs endurance time¹²

- Mean heart rate lowered 2.8-4.4 beats/min compared with placebo
- MWithout a carbohydrate drink: 93.8 +/- 14 min (w/ glycerol) vs. 77.4 +/- 9 min (w/o glycerol), p = 0.049
- With a carbohydrate drink: 123.4 +/- 17 min (w/ glycerol) vs. 99.0 +/- 11 min (w/o glycerol), p = 0.03

“PUMPED” PHYSIQUE

After many hours pumping iron, bodybuilders look for that cherished “pump” effect. Sports nutrition products containing the special glycerol formulation in HydroMax™ can help them achieve that.



At 700-2000 mg dosage, glycerol enhances plasma and intramuscular volume expansion, producing a more engorged muscular appearance

- “Pump” response accentuated after 8-15 repetitions

HEAD-TO-HEAD: HYDROMAX® BEATS GLYCEROL MONOSTEARATE (GMS)

Glycerol Monostearate (GMS)	HYDROMAX® Powdered Glycerol
Traditional powdered form of glycerol	Proprietary powdered blend of glycerol and silica
Typically 5-12% glycerol by weight	65% glycerol by weight
Limited shelf stability due to hygroscopic nature	Highly shelf-stable powder provides a more stable glycerol powder
Large material requirement for relevant glycerol doses limits use; takes 8-10x more GMS to get the same dose of glycerol from HydroMax®	High glycerol concentration allows larger doses of glycerol to fit in a smaller space and expands use into powders and supplements
Potential for waxy residue when used in ready-to-mix powdered products	Water dispersible

IMPROVED ENDURANCE

Glycerol is also often used in conjunction with other “pump” ingredients, such as creatine, taurine, agmatine, “nitric-oxide-enhancing” extracts and botanical dietary nitrates, to further enhance the benefits of these bioactive compounds.

Thus, as clinical studies suggest, combining HydroMax® with creatine holds the potential to further improve athletic performance by reducing thermal and cardiovascular strain during exercise in the heat without negatively impacting running endurance.



1 g/kg b.w. of glycerol + 11.4g of creatine reduces thermal and cardiovascular strain during exercise in the heat¹³

- Significantly lowers core temperature and RPE (rating of perceived exertion) at 35° C
- No negative impact on running economy

CONCLUSION: HYDROMAX® DELIVERS BREAKTHROUGH RESULTS

lycerol monostearate (GMS) has been used to improve athletic performance for many years. But just as today’s runners, triathletes and bodybuilders expect more of themselves, they also expect more from their sports nutrition products.

A uniquely optimized, highly concentrated powdered form of glycerol delivering next-level hydration, HydroMax® is that product, specially formulated to help manufacturers:

- > Capitalize on the current demand for sports supplements
- > Boost revenues
- > Expand market share
- > Increase brand loyalty

Designed and manufactured by Glanbia Nutritionals, the world’s leading performance nutrition and ingredients group, HydroMax® offers a three-year shelf life, is allergen-free, and proudly made in the U.S.A.

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WHY GLANBIA NUTRITIONALS

Glanbia Nutritionals is a premier provider of ingredient solutions including customized premixes and nutritional ingredients for the food, beverage and supplement industries. Look to us for:

- > **AGILITY:** Solutions customized to meet your individual, complex and evolving needs
- > **QUALITY:** Careful adherence to standards of excellence
- > **SERVICE:** Passionate loyalty to your company and products

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REFERENCES

1. These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
2. The clinical studies listed herein were performed at servings far higher than what is utilized in currently marketed products. In addition, with servings above two grams/day, products containing HydroMax™ will require a Prop 65 warning for lead (Pb) if sold in California. An example of this warning is, "This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm."
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