

# MålTor™

Taurine-L-Malic Acid Complex



## Introduction

MålTor™ is a new, innovative, patent pending, novel Taurine-L-Malic Acid Complex with an ergogenic (improved physical exercise performance) effect. MålTor™ is designed for both sports performance and active nutrition formulas. This patent pending Taurine-L-Malic Acid Complex is made using a proprietary process that creates readily soluble clusters of taurine and L-malic acid, held together by attractive forces, creating a synergistic interaction.

## Features & Benefits

Pre-workout anabolic sports performance benefits for increased energy and improved muscle recovery

MålTor™ helps to increase the exercise pain threshold, making it ideal for those who need support to reduce pain or muscle soreness often associated with regular intense workouts

Mechanistically it acts differently than creatine; there is no muscle sodium uptake, and thus no weight gain

No loading period is needed – unlike creatine

Designed for daily use to support active nutrition and lifestyle

For both men and women, ideal for active adults of any age

Supports muscle calcium uptake through the taurine mechanism for enhanced endurance

## Survival Study

Preclinical studies on MålTor™ were conducted using a nematode worm (*C. elegans*) animal model using a microfluidic chip system (Figure 1). Worm survival/lifespan is a measure of age-related metabolic and mitochondrial effects. MålTor™ demonstrated increased animal survival versus creatine at the same human equivalent dose of 5 g / day. In addition, animal survival of MålTor™ is greater than the individual components taurine and L-malic acid, indicating a synergistic effect (Figure 2).

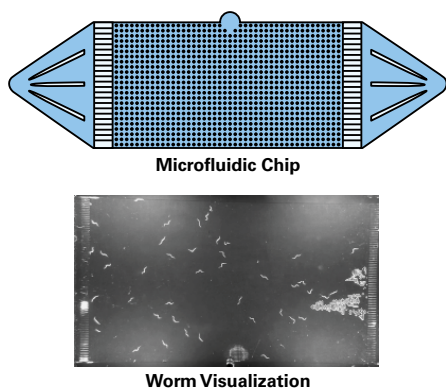


Fig. 1 - Worm Survival

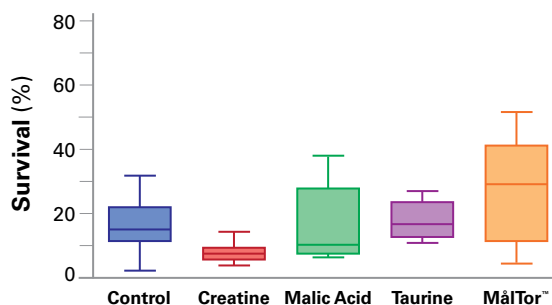


Fig. 2 - Day 18 Survival

## Healthspan/Activity Study

A second preclinical study was conducted to examine the effect of MålTor™ on healthspan/activity. Worm activity was measured by observing worm movements within a defined space (Figure 3). An increase in activity level versus control and similar to 5 g human equivalent dose of creatine was observed (Figure 4).

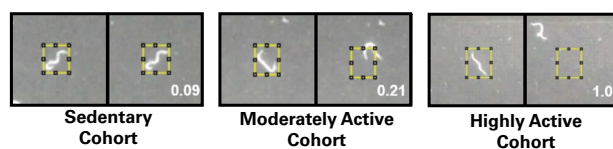


Fig. 3 - Worm Activity

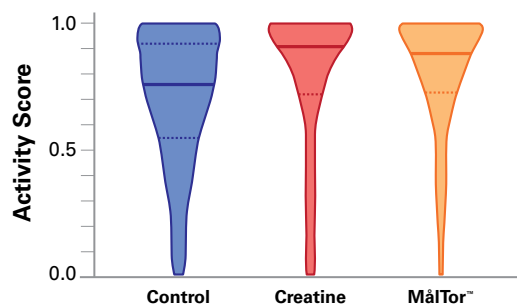


Fig. 4 - Day 15 Activity



## Muscle Fiber Integrity Study

A third preclinical study was conducted to examine the effect of MålTor™ on muscle health, as measured by muscle fiber integrity. The worm has muscle fibers running through most of its body. Muscle fiber integrity was measured by the amount of intact muscle fiber versus broken muscle fiber in the worms (Figure 5). Muscle fiber integrity decreases with age. The results showed a significant improvement in muscle fiber integrity versus controls and also versus creatine at the human equivalent dose of 5 g (Figure 6). The results also demonstrated similar results at a 2.5 g MålTor™ dose compared to 5 g of creatine, supporting a maintenance dose of 2.5 g MålTor™.

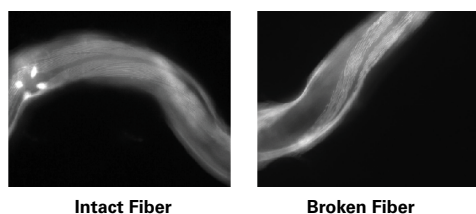


Fig. 5 - Fiber Integrity

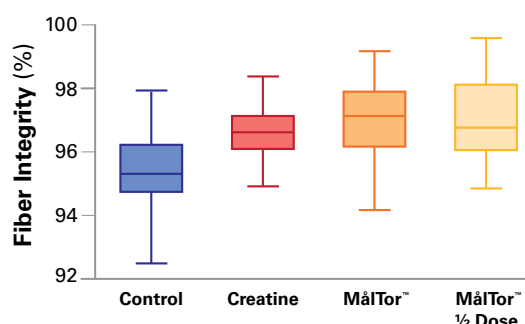


Fig. 6 - Day 12 Muscle Fiber Integrity

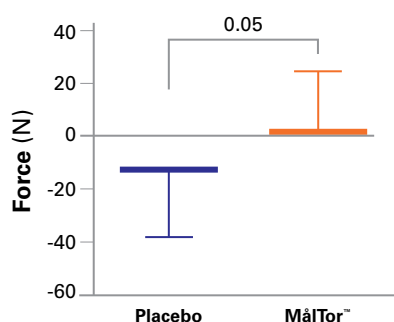


Fig. 7 - Pain Threshold Change pre/post-DOMS

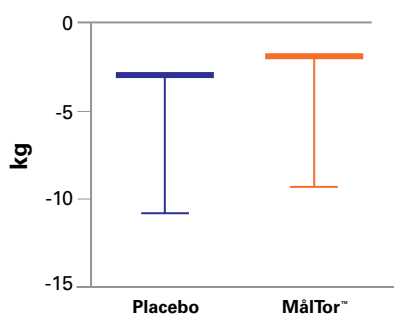


Fig. 8 - 1-RM Change pre/post-DOMS

## Human Clinical Study

An initial pilot clinical study on MålTor™ has been published<sup>1</sup>. This study was designed as a randomized, placebo-controlled, double blind crossover DOMS (delayed onset muscle soreness) protocol clinical study. The study was conducted on 15 healthy trained men with no restrictions on diet or exercise.

Participants consumed 5 g MålTor™ or placebo daily for 2 weeks, with a washout period and then cross-over. A DOMS protocol was followed doing 70 bicep extensions after taking the placebo or MålTor™. Two days later, they tested how much weight study participants could lift with a single bicep curl (one repetition maximum, or 1-RM). If their ability to lift the maximum weight didn't decrease much, it showed improved performance. Muscle soreness was measured using an algometer.

The results as shown in Figures 7 and 8 to the left show a significant reduction in threshold pain and a trend towards a smaller reduction in 1-RM versus control. Since each participant also consumed the placebo in this cross-over study, we also looked at 1-RM on an individual basis. Out of the 15 participants, 8 improved their max bicep weight with MålTor™ versus placebo, 3 had no change, and 4 decreased. These numbers support the overall trends in 1-RM observed.

## Product Characteristics and Formulating with MålTor™

MålTor™ is a white to off-white powder. Shelf life is > 2 years. MålTor™ has no odor. It has a sour taste characteristic of diluted malic acid or can be described as somewhat similar to citrulline-malate. MålTor™ is designed to be taken daily either by itself or in combination with other powder supplements or beverages to enhance physical exercise and performance. MålTor™ readily dissolves in water and can be added to aqueous beverages such as juices and pre-workout formulas. Combinations with caffeine, whey protein concentrate, whey protein isolate, collagen, etc. may provide enhanced effects. The MålTor™ dose is 5 g powder daily. A recommended combination or maintenance dose is 2.5-5 g powder daily.

## Mechanism of Action

Based on the MålTor™ pre-clinical and clinical studies, and on the known science of taurine and malic acid, the mechanism of action for MålTor™ is a synergistic combination of taurine and L-malic acid. MålTor™ works by multiple mechanisms based on its taurine and L-malic acid components:

- MålTor's antioxidant effect improves recovery and reduces muscle damage
- As a vasodilator, MålTor's taurine component allows for greater oxygen and nutrient take-up and helps eliminate waste from plasma
- Taurine also uses fat instead of glycogen and produces more energy
- Taurine can enhance calcium uptake and release into muscle fibers, together with increased mitochondrial buffering
- L-malic acid can promote energy production via cellular respiration and generation of ATP
- MålTor™ also improves the absorption of taurine and the elimination of waste from plasma during exercise
- The L-Malic Acid component of MålTor™ counters muscle fatigue by reducing the build up of lactic acid.

## Structure/Function Claims

Provides pre-workout anabolic performance benefits to support increased energy, muscle recovery and endurance

Reduces muscle soreness and increases the intensity and frequency of subsequent workouts, by improving the pain threshold after exercise

Supports active nutrition and lifestyle for both men and women

Supports an active lifestyle in adults of all ages

Increases average and peak power output

Increases time to exhaustion and decreases perceived exertion during hot weather training

## Safety

MålTor™ is safe for daily consumption. The safety of MålTor™ is based on the known safety of its components – taurine and L-malic acid. The first clinical study with randomized blinded consumption of MålTor™ for 2 weeks recorded no tolerability issues.

Tel: (203) 372-8877 | [Sales@NutriScienceUSA.com](mailto:Sales@NutriScienceUSA.com)

NutriScienceUSA.com | Fax: (203) 372-9977

## Certifications & Quality Assurance

Vegan

Non-GMO

Gluten-Free

Allergen-Free

WADA Compliant

MålTor is manufactured in the USA

## Applications

Powdered Supplements

Sachets

Powdered Beverages

## Label Transparency

MålTor™ is clean label and is labeled as "MålTor™ (Taurine-L-Malic Acid Complex)". No excipients, additives, processing aids, or bulking agents are used.

## Regulatory

MålTor™ is an ODI (old dietary ingredient) based on its physical complex of taurine and L-malic acid. Both taurine and L-malic acid are also GRAS ingredients.

