



SOD B Extramel® & Physical Recovery

Driven by new consumer insights, the sport nutrition market is in expansion, and will reach a turnover of US\$ 14.96 billion in 2016. There is a growing interest of urban people in sport nutrition products. People who practice sport occasionally, *i.e.* “recreational” and “lifestyle” users, are highly exposed to muscle fatigue, which delays physical recovery. During a prolonged and intense physical exercise, the metabolism increases, leading to an overproduction of Reactive Oxygen Species (ROS), and a depletion of primary antioxidant defenses. Consequently, an accumulation of muscle oxidative damages is observed, resulting in muscle tiredness. Innovative, natural, and effective ingredients which prevent muscle oxidation are needed. SOD B Extramel® has been clinically proven to improve physical tonus thanks to its high content in 100% natural Superoxide Dismutase (SOD).

Oxidative stress induces muscle fatigue

In the past three decades, 3000 scientific publications have reported the involvement of oxidative stress in the development of muscle fatigue¹. It is well-established that high levels of ROS, especially superoxide anions ($O_2^{\bullet-}$), promote contractile dysfunction, resulting in muscle weakness². A significant increase of ROS has been reported in the muscle of rats subjected to an acute exercise (n=6) compared to rested ones (n=6) (Figure 1)³.

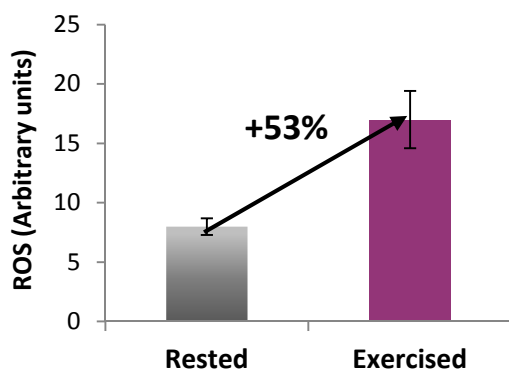


Figure 1: Acute physical activity & muscle ROS production.

Muscles, subjected to repeated and/or prolonged contractions, are altered by oxidative damages highlighting muscle tiredness^{1, 4-6}.

SOD depletion & muscle weakness

Muscular fatigue can result from the depletion of primary antioxidant enzymes, *i.e.* SuperOxide Dismutase (SOD), Catalase (CAT) and Glutathione Peroxidase (GPx), levels observed following an intense

and strenuous exercise⁷. A significant decrease of SOD, CAT and GPx activities has been reported in the gastrocnemius muscle of rats subjected to intense swimming exercises (Figure 2)⁷.

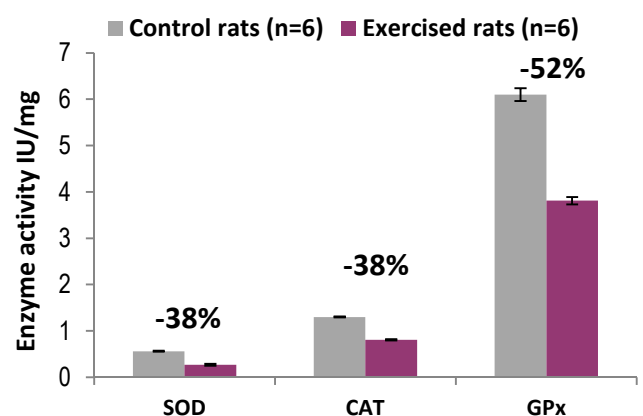


Figure 2: Primary antioxidant enzymes activities in the gastrocnemius muscle of rats under acute exercise.

SOD is essential for muscle integrity

Mice lacking SOD have a dramatic acceleration of age-related loss of skeletal muscle mass: the hind-limb muscle mass is nearly 50% lower than in mice expressing SOD⁸. The reduction in muscle mass has been associated with a 40% decrease of physical performances in SOD depleted mice⁸. The specific administration of SOD has reported to recover the physical performances in SOD depleted mice by increasing the Adenosine Triphosphate (ATP) content in skeletal muscle⁹. Enhancing endogenous SOD expression represents an adapted strategy for preserving skeletal muscle functions⁸.



SOD B Extramel® lowers muscle oxidation

A coated SOD B® oral supplementation (SOD B Extramel® at 500 IU SOD/day), coupled with secondary antioxidants, has been performed on 10 martial arts recreational amateurs subjected to intense training sessions. Authors reported a significant decrease of the ROS production by -36% after one month of supplementation (Figure 3)¹⁰. Through this strong inhibition of ROS production, SOD B Extramel® can prevent muscle oxidation.

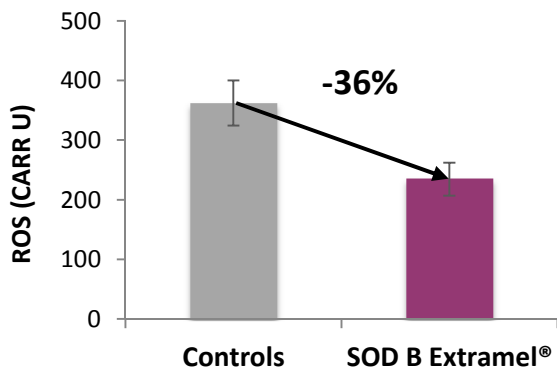


Figure 3: Effect of an oral SOD B Extramel® supplementation on ROS production in athletes (n=10).

Coated SOD B® prevents muscle damages

Muscle damages following unaccustomed exercise have been well-described in racehorses, which represent a relevant model for studying variables associated with muscle injuries¹¹. An oral coated SOD B® supplementation (at 520 IU SOD/day) has reported to prevent the increase in Creatine Kinase (CK) activity in racehorses subjected to intense training sessions (n=24) (Figure 4)¹². Coated SOD B® can maintain muscular integrity by reducing the increase in muscular membrane permeability, and by controlling the release of CK, a well-known indicator of muscle damages. This daily dosage corresponds to a human dose of 150 IU SOD/day, according to the guidance of U.S. DHHS FDA¹³.

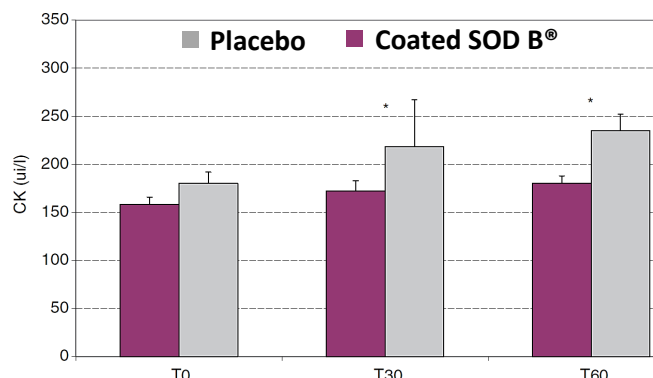


Figure 4: CK activity before (T0), 30 (T30) and 60 (T60) days after an oral coated SOD B® supplementation. *P< 0.05¹².

SOD B Extramel® improves muscle tone

A double-blind placebo controlled clinical study, performed on 61 active urban people, has evaluated the effect of an oral SOD B® supplementation (SOD B Extramel® at 140 IU SOD/day) on physical tonus. The physical fatigue has been determined by using the validated Prevest Subjective Fatigue scale. Results reported a significant reduction of physical fatigue by -9.4% after 84 days of supplementation (Figure 5)¹⁴.

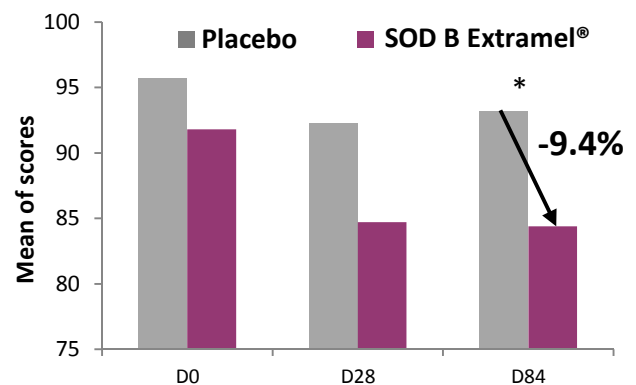


Figure 5: Effect of an oral SOD B Extramel® supplementation on physical fatigue. *P< 0.05.

During a strenuous exercise, an accumulation of ROS in muscle fibers, and a significant depletion of SOD lead to muscle fatigue. As SOD is essential for preserving muscle integrity, increase its SOD levels is an efficient strategy for improving muscle tone.

Both animal and clinical studies have demonstrated the efficiency of SOD B Extramel® in:

- Inhibiting muscle oxidation
- Preventing muscle damages
- Improving muscle tone

Daily dosage: 140 to 520 IU SOD/day, depending on the exercise intensity.

Bibliography

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