

The Safety of Stearic acid and Magnesium Stearate

Stearic acid is a normal component of both the daily diet, and of the immune system, including both the lymphocytes and red blood cells. It is found in significant amounts in many food sources, including meat, poultry, vegetable and animal oils, beef fat, fish, eggs, butter, grains, milk products, and cocoa butter. Chocolate contains cocoa butter, and about one-third of the fat in chocolate is in the form of stearic acid. Stearic acid constitutes 7% of the total fat content of Flaxseed oil, and 7.7% of the total fat content of breast milk.¹

Stearic acid is created by the reaction of sodium stearate with the inorganic salt magnesium sulfate. It contains two equivalents of stearate (the anion of stearic acid) and one magnesium cation (Mg^{2+}). It has the chemical formula $\text{Mg}(\text{C}_{18}\text{H}_{35}\text{O}_2)_2$, and its molecular weight is 284.47 g/mol. Sodium stearate possesses both hydrophilic and hydrophobic parts, and is thus able to form micelles. Magnesium stearate, $\text{C}_{36}\text{H}_{70}\text{MgO}_4$, is the salt of stearic acid, and has a molecular weight of 591.27 g/mol.

Magnesium stearate is often used in the manufacturing of nutritional supplements, due to its lubricating properties. It also assists in preventing ingredients from sticking to the manufacturing equipment. Some websites, however, contain misleading information regarding the safety of Magnesium stearate, or products that contain Magnesium stearate. **There is no evidence of truth in the claims that Magnesium stearate is dangerous, particularly in the minute amounts found in dietary supplements.**

Biotics Research Corporation's supplements contain only a few milligrams of magnesium stearate per tablet, ranging from 0.5% to 2% per tablet/capsule. Assuming a magnesium stearate content of between 1-5% of the total supplement mass as magnesium stearate, then for every 1000mg (1g) of supplement capsules, the total content of magnesium stearate would equal **10-50mg**. Thus, even taking up to 100 tablets per day, considering the high percentage of magnesium stearate (2.5%), the total intake of magnesium stearate is still only **250mg**. This is **58 times less** magnesium stearate than the amount implicated in toxicity (14.5g) ($14.5\text{g}/0.25\text{g} = 58$).

High doses of stearic acid have been found to suppress the action of the immune system's T-cells (a type of lymphocyte/white blood cell). However the required dosage to achieve toxicity levels has been estimated to be in the range of **14.5 grams per day** of Magnesium Stearate.

According to the FDA's Database of Select Committee on GRAS Substances (SCOGS), "there is no evidence in the available information on ... magnesium stearate ... that demonstrates, or suggests reasonable grounds to suspect, a hazard to the public when they are used at levels that are now current and in the manner now practiced, or which might reasonably be expected in the future." This document also states that, "the administration of magnesium sulfate in very high doses to humans occasionally has resulted in severe and even fatal episodes, especially in the presence of pre-existing disease. These

¹ <http://www.medicalinsider.com/nutritional.html#stearate>

occurrences should not be prejudicial to the use of magnesium salts as foods ingredients, since the dosages given were orders of magnitude greater than the daily intake of magnesium added to food.”² The average daily estimated intake of stearic acid is 5.7g/day for women and 8.2g/day for men.³

There is limited evidence that stearic acid activates components of the immune system (i.e., neutrophils) as opposed to suppressing it. A high dose of stearic acid (19 g/day) had “beneficial effects on thrombogenic and atherogenic risk factors in males.”⁴ This study further noted that the “results from this study indicate that stearic acid (19g/day) in the diet has beneficial effects on thrombogenic and atherogenic risk factors in males.”

Finally, there is no credible evidence to suggest that magnesium stearate as used in dietary supplements is toxic, either as (1) an inhibitor of the immune system, (2) a biofilm hazard or (3) an inhibitor of nutrient absorption.

² FDA's Database of Select Committee on GRAS Substances (SCOGS); Report No. 60; ID Code: 557-04-0; 1979.

³ <http://www.beefnutrition.org/CMDocs/BeefNutrition/StearicAcid.pdf>

⁴ Kelly FD, Sinclair AJ, Mann NJ, Turner AH, Abedin L, Li D. A stearic acid-rich diet improves thrombogenic and atherogenic risk factor profiles in healthy males. *Eur J Clin Nutr.* 2001 55:88-96