SAMe & TMG
Methyl Donors

S-adenosyl-L-methionine (SAMe) is a naturally occurring substance formed in the body from the amino acid methionine and the “energy molecule” adenosine triphosphate (ATP). Formation of SAMe is catalyzed by methionine adenosyltransferase and depends on cofactors including vitamin B6, vitamin B12, folate, and magnesium. SAMe has been studied as a supportive nutrient in liver health, joint comfort, metabolic reactions, and healthy mood.\[1-4\]

Methylation SAMe is the “universal” methyl donor for biochemical reactions throughout the body.\[5\] This methyl transfer, or “transmethylation,” is critical to reactions involving proteins, phospholipids, DNA, RNA, creatine, hormones, development of cell membranes, degradation of histamine, and formation of norepinephrine and dopamine.\[6,7\] Eighty-five percent of transmethylation takes place in the liver, and healthy SAMe levels appear to be essential to liver health and function.\[8,9\]

Antioxidant and Liver Support SAMe is considered to be “critical” for synthesis of glutathione, a principal component of antioxidant and detoxification systems in the body.\[10\] Following donation of a methyl group, SAMe is converted to S-adenosyl-homocysteine (SAH). This biochemical reaction promotes the transulfuration pathway in the liver that generates glutathione. Further metabolism of SAH involves trimethylglycine (TMG), also known as betaine anhydrous. TMG plays an important role in maintaining a healthy SAMe:SAH ratio in the liver.\[11\]

During a national symposium, the roles of SAMe and TMG in supporting liver health were reviewed with a focus on their participation in the vital processes of transmethylation and transulfuration, their ultimate contribution to increased glutathione synthesis and its hepatoprotective effects, their promotion of a balanced SAMe:SAH ratio, their activation of phosphatidylycerolamine methyltransferase, and the increase in phosphatidylethanolamine synthesis as a result of their administration.\[12\] Ongoing animal studies suggest that SAMe supports liver health\[13,14\] and that exogenous SAMe may positively affect cell-life regulation of hepatocytes.\[15\] In certain human cohorts, researchers recommend further research into combining SAMe with nutrients such as vitamin B6 to optimize outcomes.\[16\]

Healthy Mood Supplemental SAMe appears to support a healthy mood, possibly due to its active role in methylation and its involvement in the formation of monoamine neurotransmitters.\[1,11,12\] Meta-analysis of earlier studies suggested that SAMe showed greater support of a healthy mood when compared to placebo with an effect comparable to that of other treatments.\[1,4\] A 30-day, double-blind, placebo-controlled, randomized study of 80 women suggested that there was a significant improvement in mood after the women received an oral dose of 1600 mg/d of SAMe compared to placebo.\[17\] Another study of 143 subjects who received an oral dose of 1600 mg/d of SAMe suggested that SAMe yielded positive results that were comparable to other treatments for supporting a healthy mood, but SAMe was better tolerated.\[18\] In a small (N=26), four-week, double-blind, randomized protocol comparing oral SAMe with other treatments, 62% of the SAMe group showed significant improvement in mood. The study revealed a significant correlation between plasma SAMe levels and the degree of healthy mood support, regardless of treatment type.\[11,17\]

TMG Trimethylglycine is a naturally occurring compound (glycine attached to three methyl groups) that is found in food (estimated intake 0.5-2 g/d) and can be produced in the body from the precursor choline.\[19\] TMG is thought to protect liver cells, support homocysteine metabolism and cardiovascular health, and may also support a healthy mood due to its role in SAMe metabolism.\[20,13,14,18\] When TMG donates a single methyl group, it is converted to dimethylglycine (DMG), which is capable of donating two methyl groups. TMG is thought to stimulate activity of the enzyme betaine-homocysteine methyltransferase (BHMt). BHMt, found in abundance in a healthy liver,\[20,21\] is used by TMG to donate a methyl group to homocysteine. Once TMG adds a methyl group to homocysteine to produce methionine, the methionine can then be converted to SAMe. A randomized, double-blind, crossover study of healthy volunteers suggested that TMG supplementation (at doses of 3 g and 6 g/d) has a dose-dependent effect on serum TMG levels and a significantly positive effect on maintaining healthy homocysteine levels.\[22\] Together, SAMe and TMG provide an abundant source of methyl groups and ultimately support a wide variety of biochemical reactions in the body.\[23\]

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**How to Use**

**Clinical Applications**

- Supports Biochemical Reactions Requiring Methyl Groups*
- Supports Neurotransmitter Synthesis and Healthy Mood*
- Facilitates Conversion of Homocysteine to Glutathione*
- Supports Liver Health and Function*
- Promotes Joint Comfort*

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>SAMe without coating</th>
<th>SAMe coated</th>
<th>XYMOGEN's SAMe &amp; TMG</th>
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<tbody>
<tr>
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Premixed bioavailability data demonstrating the superior absorption 20 minutes after administration of the SAMe ingredient in SAMe with TMG™ compared to competing coated/uncoated SAMe formulations. Printed with permission from Gnosis S.p.A

*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.
SAMe & TMG Supplement Facts

Serving Size: 1 Stick Pack (about 2.6 g)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
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<tbody>
<tr>
<td>Betaine Anhydrous (trimethylglycine)</td>
<td>600 mg</td>
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<tr>
<td>S-adenosyl-L-methionine (as s-adenosyl-L-methionine 1,4-butanediol)</td>
<td>400 mg</td>
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** Daily Value not established.

Other Ingredients: Xylitol, calcium carbonate, citric acid, malic acid, stearic acid, calcium chloride, calcium oxide, silica, natural lemon flavor, and turmeric extract (for color).

DIRECTIONS: Consume one stick pack daily away from meals, or as directed by your healthcare practitioner. Preferably pour a small amount of the contents of a stick pack directly into the mouth and allow contents to dissolve. Then repeat process until contents of the entire stick pack have dissolved in the mouth. Alternatively, contents may be added to 2-4 oz of water or preferred liquid; stir and drink within 15 minutes.

Consult your healthcare practitioner prior to use. Individuals taking medication should discuss potential interactions with their healthcare practitioner. Use special caution in individuals with bipolar disorder. Do not use if tamper seal is damaged.

DOES NOT CONTAIN: Wheat, gluten, corn, yeast, soy, animal or dairy products, fish, shellfish, peanuts, tree nuts, egg, ingredients derived from genetically modified organisms (GMOs), artificial colors, artificial sweeteners, or artificial damaged.

STORAGE: Keep closed in a cool, dry place out of reach of children.

References


Additional references available upon request