



Risk Assessment of "Other Substances" – L-threonine

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Authors' contributions

This work was carried out in collaboration among all authors. The opinion has been assessed and approved by the Panel on Nutrition, Dietetic Products, Novel Food and Allergy of VKM. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/EJNFS/2020/v12i830264

Grey Literature

Received 03 May 2020

Accepted 09 July 2020

Published 05 August 2020

ABSTRACT

The Norwegian Scientific Committee for Food Safety (Vitenskapskomiteen for mattrygghet, VKM) has, at the request of the Norwegian Food Safety Authority (Mattilsynet; NFSA), assessed the risk of "other substances" in food supplements and energy drinks sold in Norway. VKM has assessed the risk of doses given by NFSA. These risk assessments will provide NFSA with the scientific basis while regulating "other substances" in food supplements.

"Other substances" are described in the food supplement directive 2002/46/EC as substances other than vitamins or minerals that have a nutritional and/ or physiological effect. It is added mainly to food supplements, but also to energy drinks and other foods. In this series of risk

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assessments of "other substances" the VKM has not evaluated any claimed beneficial effects from these substances, only possible adverse effects.

The present report is a risk assessment of specified doses of L-threonine in food supplements, and it is based on previous risk assessments and articles retrieved from literature searches.

According to information from NFSA, L-threonine is an ingredient in food supplements sold in Norway. NSFA has requested a risk assessment of 1000, 1200, 1500, 2000 and 2400 mg/day of L-threonine from food supplements.

L-threonine is an essential amino acid not known to cause any adverse health effects. Previous reports do not indicate a tolerable upper intake level, apart from an approval of a dose of 1150 mg/day by the Scientific Committee of the Spanish Agency for Food Safety and Nutrition (AESAN). Long-term studies in humans were not found. The only available human studies were: a small uncontrolled one-year pilot study with doses ranging from 0.5 to 2.5 g/day, one eight-week randomised controlled trial (RCT) using a dose of 7.5 g/day, and two 2-week RCTs using doses of 6 and 4.5 g/day. No adverse effects (diary method of registration of adverse effects) were reported in the eight-week clinical trial, and the only adverse effects observed in the two-week trials were one case of indigestion and one case of diarrhoea. A four-week rodent toxicity study indicated a no observed adverse effect level (NOAEL) of 854.3 mg/kg bw per day (only dose tested, no adverse effects observed).

The value used for comparison with the estimated exposure in the risk characterisation is the NOAEL defined in an 8-week randomised placebo controlled study in humans, 7500 mg/day. For a 70-kg individual, this corresponds to 107 mg/kg bw per day. Two human two-week studies and a small one-year pilot study support the notion that this dose will be well tolerated. The overall mean threonine intake according to NHANES III (3 g/day) is slightly larger than the doses requested for evaluation in the present risk assessment.

No studies in children (10 to <14 years) and adolescents (14 to <18 years) were identified. Based on the included literature there was no evidence indicating that age affects the tolerance for relevant doses of threonine. Therefore, in this risk characterisation a tolerance as for adults, based on body weight, was assumed for these age groups.

VKM concludes that:

- In adults (≥18 years), the specified doses 1000, 1200, 1500, 2000 and 2400 mg/day L-threonine in food supplements are unlikely to cause adverse health effects.
- In adolescents (14 to <18 years), the specified doses 1000, 1200, 1500, 2000 and 2400 mg/day L-threonine in food supplements are unlikely to cause adverse health effects.
- In children (10 to <14 years), the specified doses 1000, 1200, 1500, 2000 and 2400 mg/day L-threonine in food supplements are unlikely to cause adverse health effects.

Children younger than 10 years were not within the scope of the present risk assessment.

Keywords: *Threonine; food supplement; adverse health effect; negative health effect; Norwegian Food Safety Authority; Norwegian Scientific Committee for Food Safety; other substances; risk assessment; VKM.*

Available: <https://vkm.no/download/18.645b840415d03a2fe8f25c52/1502801716709/Risk%20assessment%20of%20other%20substances%20%E2%80%93%20L-threonine.pdf>

ISBN: 978-82-8259-267-3

NOTE:

This work was carried out in collaboration between all authors. The opinion has been assessed and approved by the Panel on Food Additives, Flavourings, Processing Aids, Materials in Contact with Food and Cosmetics of VKM. All authors read and approved the final manuscript.

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Suggested citation: VKM (2017). Risk assessment of "other substances" – L-threonine Opinion of the Panel on Nutrition, dietetic products, Novel Food an Allergy of the Norwegian Scientific Committee for Food Safety, ISBN: 978-82-8259-267-3, Oslo, Norway.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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