

This is provisional English translation of an excerpt from the original full report.

Risk Assessment Report

Zinc sulfate (Food Additives)

Food Safety Commission of Japan (FSCJ)
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ABSTRACT

FSCJ conducted a risk assessment of zinc sulfate (CAS No. 7446-20-0, as zinc sulfate heptahydrate), an additive for a nutritional enrichment (exclusively used in breast milk substitutes) or a food manufacturing agent, based on results from various studies.

The data used in the assessment include genotoxicity, acute toxicity, repeated dose toxicity, carcinogenicity, reproductive and developmental toxicities, and human data on zinc sulfate, sulfate compounds and/or zinc compounds as the test substances.

FSCJ considered it appropriate to evaluate from view points of the intake of zinc and of an essential nutrient for living organisms in the assessment of zinc sulfate.

From data on pharmacokinetics suggesting high water-solubility of zinc sulfate, zinc sulfate as an additive is reasonably assumed to dissociate and present as sulfate and zinc ions in stomach. In addition many of zinc compounds exist as zinc ions in intragastric environment at sufficiently low pH and then are absorbed in small intestine.

In human intervention researches on zinc gluconate, a decrease in superoxide dismutase (SOD) activity of red blood cells was observed at the dose equivalent to zinc of 65.92 mg/person/day (0.94 mg/kg bw/day). Although the effect is subtle and unlikely to indicate directly the clinical symptoms, FSCJ recognized it as a toxicologically suggestive event linked to the intake of zinc compounds such as zinc gluconate and zinc sulfate. Hence, FSCJ specified a low-observed-adverse-effect level (LOAEL) for toxicity of zinc sulfate as zinc to be 65.92 mg/person/day (0.94 mg/kg bw/day).

FSCJ concluded that zinc sulfate as an additive has no genotoxicity relevant to human health.

On the additive use of zinc sulfate, FSCJ has recognized the necessity to specify an upper limit for intake of zinc in considering with the observed toxicity and the daily intake of 24.6 mg/person/day (0.45 mg/kg bw/day) as zinc estimated on the basis of assumption that revision of the standards for use of zinc sulfate as an additive is approved in Japan.

On the specification of the upper limit, FSCJ considered the following facts as we considered in the assessment of zinc gluconate. FSCJ specified LOAEL for toxicity of zinc sulfate to be 65.92 mg/person/day (0.94 mg/kg bw/day) as zinc based on the decrease in SOD activity in red blood cells, although the decrease in the cell was only a marginal and not detected in the serum level. Zinc is an essential nutrient for living organisms. Consequently, FSCJ specified an upper limit for intake of zinc sulfate to be of 0.63 mg/kg bw/day as zinc dividing 0.94 mg/kg bw/day by an uncertainty factor of 1.5.

Appropriate call for people's attention from relevant organizations to prevent from excess intakes of zinc may be necessary in considering the amount of zinc from ordinary meal.

The above mentioned upper limit for intake of zinc was the value for adults of above 18 years old. Although zinc is a biologically essential nutrient, prevention from the excess intake of zinc in children, infants, pregnant and lactating women shall be drawn through the appropriate calling for attention.