

MONOSODIUM GLUTAMATE (MSG) - INFORMATION SHEET

THE COMPOUND

Monosodium glutamate (MSG) is the sodium salt of the non-essential amino acid glutamic acid. Glutamic acid is one of the most abundant amino acids in human foods. When glutamate is present in a free form, not as a component of proteins or peptides, it has a flavour-enhancing effect and for this reason it is added to foods as its purified monosodium salt.

SOURCES

As one of the most abundant amino acids, glutamate is present in virtually all foods, with highest levels in protein-rich foods. Glutamate may be present in a bound form, as a component of proteins and peptides or as free glutamate. Levels of free glutamate in foods of animal origin are generally quite low (e.g. beef 33 mg/100 g, cows' milk 2 mg/100 g). Higher levels are seen in vegetables (30-200 mg/100 g) and in seasonings, sauces and restaurant meals (FSANZ, 2003; Rhodes *et al.*, 1991).

POTENTIAL HEALTH EFFECTS

MSG has been claimed to be the cause of a range of adverse reactions, including the symptom complex known as Chinese restaurant syndrome (CRS) and bronchoconstriction in some asthmatic individuals. CRS or MSG symptom complex is most often characterised by headaches, numbness/tingling, flushing, muscle tightness and generalised weakness.

ESTIMATES OF DIETARY EXPOSURE

Estimated average daily dietary MSG exposures in developed countries have been reported to be in the range 0.3-1.0 g/day (Geha *et al.*, 2000). Data from the UK estimates an average daily dietary exposure of MSG of approximately 0.6 g/day, with extreme consumers having exposures of more than 2 g/day (Rhodes *et al.*, 1991).

FACTORS INFLUENCING RISK

Peak plasma concentration of glutamate are decreased if MSG is consumed as a component of a food, rather than in isolation, particular if the food or meal contains metabolisable carbohydrate (JECFA, 1988).

SAFETY ASSESSMENTS

Safety of salts of glutamic acid, including MSG, have been reviewed by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) on several occasions, most recently in 1988 (JECFA, 1988). JECFA assigned a group ADI for all glutamate salts of 'not specified'. This decision indicates that glutamate salts are of low toxicity, do not



represent a hazard to health and the establishment of a numerical ADI is not deemed necessary.

The Scientific Committee on Food (SCF) of the EU reached an equivalent conclusion to JECFA in establishing a ‘group ADI not specified’ for L-glutamic acid and its salts (SCF, 1991).

In 1995 the Federation of American Societies for Experimental Biology (FASEB) carried out an analysis of adverse reactions to MSG for the US Food and Drug Administration (Raiten *et al.*, 1995). The FASEB Expert Panel concluded that ‘there is a subgroup of presumably healthy individuals within the general population that responds, generally within one hour of exposure, with manifestations of the MSG Symptom Complex to an oral bolus of MSG ≥ 3 g in the absence of food’. The Panel also noted that there was ‘evidence to support the existence of a subgroup of asthmatic responders to MSG’.

Food Standards Australia New Zealand (FSANZ) carried out a safety assessment of MSG, including summarisation of the JECFA and FASEB reports and publications in the scientific literature (FSANZ, 2003). The FSANZ assessment concluded that ‘there is no convincing evidence that MSG is a significant factor in causing systemic reactions resulting in severe illness or mortality. The studies conducted to date on CRS have largely failed to demonstrate a causal association with MSG. Symptoms resembling those of CRS may be provoked in a clinical setting in small numbers of individuals by the administration of large doses of MSG without food. However, such affects are neither persistent nor serious and are likely to be attenuated when MSG is consumed with food. In terms of more serious adverse effects such as the triggering of bronchospasm in asthmatic individuals, the evidence does not indicate that MSG is a significant trigger factor’.

SAFETY AND REGULATORY LIMITS

Safety limits are levels of dietary exposure that are without appreciable risk for a lifetime of exposure. Regulatory limits define the maximum amount of a substance that is permitted in a particular food.

Source	Limit Type	Limit
<i>Safety Limits</i>		
JECFA	Acceptable Daily Intake	Not specified
<i>Regulatory Limits</i>		
Australia New Zealand Food Standards Code	Maximum Permitted Level	Processed foods, except where expressly excluded GMP*

* Monosodium glutamate is permitted in a range of processed foods at levels consistent with Good Manufacturing Practice.

REFERENCES



FSANZ. (2003) Monosodium Glutamate. A safety assessment. Technical Report Series No. 20. Canberra: Food Standards Australia New Zealand.

Geha RS, Beiser A, Ren C, Patterson R, Greenberger PA, Grammer LC, Ditto AM, Harris KE, Shaughnessy MA, Yarnold PR, Corren J, Saxon A. (2000) Review of alleged reaction to monosodium glutamate and outcome of a multicenter Double-Blind Placebo-Controlled study. *Journal of Nutrition*; 130(4): 1058S-1062S.

JECFA. (1988) L-glutamic acid and its ammonium, calcium, monosodium and potassium salts. *Toxicological Evaluation of Certain Food Additives and Contaminants*. Geneva: World Health Organization.

Raiten DJ, Talbot JM, Fisher KD. (1995) Executive summary from the report: Analysis of adverse reactions to Monosodium Glutamate (MSG). *Journal of Nutrition*; 125(11): 2892S-2906S.

Rhodes J, Titherley AC, Norman JA, Wood R, Lord DW. (1991) A survey of the monosodium glutamate content of foods and an estimation of the dietary intake of monosodium glutamate. *Food Additives and Contaminants*; 8(5): 663-672.

SCF. (1991) First series of food additives of various technological functions (Opinion expressed on 18 May 1990). Report EUR13416 EN. Luxembourg: Office of Official Publications of the European Communities.