

LETTER TO THE EDITOR

Food-added Monosodium Glutamate does not induce Changes in the Ovaries

Ajinomoto Group is one of the leading global producers of the flavor enhancer monosodium glutamate (MSG). Since early 20th century, Ajinomoto has gathered a substantial amount of data related to MSG safety and use. Based on that database, we are commenting here-below on the recent article by Abbasi et al., entitled "Effect of Vitamin C on monosodium glutamate (Ajinomoto) induced changes in the ovary of rats" (JIIMC 11(2), 2016, 66-70).

The article described a rat study with MSG and vitamin C. The authors extensively speculated that MSG ingestion may cause harmful effects on human female fertility and ovarian functions. We argue that the study by Abbasi et al. was burdened by methodological problems and a lack of reproducibility. In addition, we conclude that the authors neglected glutamate metabolism in mammalian bodies in interpreting the results.

- 1) The doses of MSG or the mode of MSG treatment were not described, thus one cannot conclude if there was any relevance to human nutrition. If MSG was mixed into the experimental diet, the authors needed to explain how that was achieved since conventional rat diets are granulated. If MSG was applied in drinking water, the authors needed to describe how taste was masked.
- 2) No data on diet intake, water intake or body weight were provided, but the authors mentioned that the control group was characterized by a lower terminal mean body weight when compared to body weight of MSG-treated rats. Therefore, the observed ovarian differences could have been attributed to the changes in body weight and not to the treatments per se. In other words, in the absence of body weight information, it is impossible to toxicologically interpret the observed changes.
- 3) It is not clear where the tested MSG was obtained from, who was the producer and whether it contained impurities or other substances which may have affected the observed results.
- 4) The authors indicated that "AJINOMOTO" was a common name of all MSG used in Pakistan.

Indeed, "AJINOMOTO" is a trademark registered by Ajinomoto Co., Inc. in more than 170 countries, including countries in Central and South Asia. However, while the "AJINOMOTO" is one of the most popular seasoning brands worldwide, it is not the only MSG brand on the market. Mentioning "AJINOMOTO" brand name in a title of a scientific article without describing the source of the tested MSG, or its purity, was disparaging and academically unjustified.

- 5) As the authors mentioned, a molecule of MSG contains glutamate and sodium. However, sodium intake from MSG was not controlled for even though the authors attributed all observed changes to glutamate alone. One cannot preclude that at least some effects were attributable to sodium. In that respect, we note that there was no information on how control rats were treated or what control diet was composed of. Adult rats ingest standard diet at approximately 12% of their body weight, thus we suppose the studied female rats ingested daily approximately 30 – 40 g of a chaw diet. If that diet was based on milk casein, as is usually the case, it contained 10% glutamate, so the rats were eating 3 – 4 g of glutamate from the diet alone without MSG added (i.e., 1). No attention was given to that "diet-contained" glutamate source.
- 6) Authors extensively speculated on MSG use in humans. Adult humans ingest about > 10 g glutamate per day from a normal diet. This volume includes 0.5 – 1.0 g per day of glutamate added to food as a flavor enhancer, whether in a form of MSG or included in other condiments rich in glutamate (bouillon cubes, soy sauces, mushrooms etc.). In simple words, MSG is only a small portion of ingested glutamate. Considering that all food free glutamates are metabolized identically, it is disproportionate to speculate solely on MSG – especially if the speculation is based on a rodent study only.
- 7) Importantly, histopathological evaluation of the tissues was not described. Specifically, was the evaluation done visually only; and were the persons conducting the observations blinded?

8) Finally, the authors selectively used references and omitted scientific papers on the lack of dietary MSG effect on reproductive functions (2-4). Instead, the authors used pharmacological studies with MSG or non-scientific articles published online (See Ref. 17 in the original article). At this point, it is appropriate to mention that less than 5% of orally ingested glutamate from food (including MSG) is absorbed from the gut into the systemic circulation. The rest is used as an oxidative substrate by the intestinal mucosa (5-8). Other food components, which are inevitably ingested along with food-added glutamate, further suppress circulating glutamate levels (9-10) and therefore increasing blood glutamate levels by food-added MSG is extremely difficult. In the absence of a high circulating glutamate, any changes in ovarian physiology are impossible to attribute to food-derived glutamates, such as MSG.

Key Words: *Monosodium Glutamate, Metabolism, Ovaries.*

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COMMENTS BY AUTHOR

Effect of Vitamin C on MSG induced Changes in the Ovaries of Rat

- The dose of MSG was 0.08 mg per kg body weight.¹⁻³ And it was mixed in their pallet diet. Daily diet intake of one rat is 10-12grams. Weight of one rat is approximately 300grams. So the weight of fifteen rats in experimental group A was 15 * 300 = 4500gm/4.5kg. The estimated dose of MSG for fifteen rats was 0.08 * 4500 = 0.036grams. Approximate dose of MSG per rate per day will be 0.024grams. The dose of MSG for four weeks was 0.024 * 30 = 0.72grams. High quality MSG free from impurities was obtained from Asia Scientific Traders, Rawalpindi manufactured by Zinef Company China. I followed the tradition in academic literature where MSG is commonly known as Ajinomoto.⁴⁻⁶ The major component of MSG is glutamate that is 78%⁷ and literature showed that glutamate is harmful component of MSG not the sodium.5 Indeed glutamate is a major component of protein rich food like tomatoes, fermented beans, soya sauce and fish sauce. Histopathological evaluation was done microscopically under the supervision of histopathologist.

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