

Read the article and choose from the list A-M the best phrase to fill each of the spaces 1-13.

THE MONOSODIUM GLUTAMATE STORY

Adapted from *The Monosodium Glutamate Story: The Commercial Production of MSG and Other Amino Acids*
by Addison Ault

<http://www.cornellcollege.edu/chemistry/cstrong/512/MSG.pdf>

Monosodium glutamate (MSG), first isolated as glutamic acid in 1866, has since become both the basis of a trillion-dollar worldwide industry and a presence in the diet of a **1.**

History

Glutamic acid was first isolated as a pure substance in 1866 by the German chemist Ritthausen through **2.**, a component of wheat gluten. It was not until 1908, however, that the Japanese chemist Kikunae Ikeda found that glutamic acid was responsible for **3.**, or *Laminaria Japonica*, that had been used for many centuries in Japan in the preparation of soup stocks. By extracting 40 kilograms of the seaweed with hot water, Ikeda obtained 30 grams of (S)-glutamic acid, which he then identified as the taste-enhancing component of konbu. Ikeda immediately **4.**, and in 1909 the first monosodium glutamate was produced commercially under the trade name Ajinomoto (Aji no moto; 'at the origin of flavor').

Glutamic acid has now been isolated **5.**, of which the most practically useful have included wheat gluten, soybean meal, casein, and the residue from the Steffen process for the production of beet sugar, the so-called 'Steffen waste'.

Since 1908 the sodium salt of glutamic acid, or MSG, has come into use around the world as **6.** MSG is usually used in combination with salt, and, in general, a suitable quantity of MSG is 10–20% of the quantity of salt to be added.

The Flavor Properties of Monosodium Glutamate

The taste threshold for monosodium glutamate is about 0.3 grams in a liter of water, considerably **7.** (2 g L) or sugar (sucrose; 5 g L). The optimum salt concentration for soup is about 10 g L; less than 8 g L tasting "flat" and more than 12 g L being 'too salty'. The minimum useful concentration of MSG is 1 g L (about 1/10 that of salt); the usual range

of concentration is from 2 to 3 g L, and MSG is not too concentrated at 5 g L. This wide range of useful concentrations is **8.**

The flavor sensation of MSG is **9.** of sweet (sucrose), sour (lemon juice), salt (sodium chloride), bitter (quinine), or pungent (mustard or chili peppers). The flavor sensation of MSG is often described as 'meaty' and has been given the name 'umami' (deliciousness). Cohnheim stated that (...) 'Glutamic acid does not taste sweet, but insipid and only weakly sour.' In addition, MSG has the ability to **10.** At a concentration of about 0.2 g L it gives an effective improvement in the quality of sake, the traditional Japanese rice wine. MSG also has a strong synergistic effect with **11.**, which are found in meat, fish, vegetables, and mushrooms. These substances are almost **12.**, but addition of even a small quantity of MSG to food that contains these nucleotides produces an umami that is as much as six or eight fold greater than that to be expected from the quantity of MSG added. Not surprisingly, small quantities of the nucleotides have been added to MSG **13.**

- A. the flavor-enhancing properties of the kelp-like seaweed, 'konbu'
- B. unusual for a seasoning
- C. majority of the inhabitants of the world.
- D. unlike that of any of the other four or five basic flavor sensations
- E. the acidic hydrolysis of gliadin
- F. tasteless in the absence of MSG
- G. enhance natural taste
- H. to create an enhanced source of umami
- I. patented a process for isolating monosodium glutamate from wheat flour
- J. from innumerable vegetable sources
- K. lower than the taste thresholds for salt
- L. an additive, or seasoning, to enhance the flavor of foods
- M. disodium inosinate and disodium guanylate