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Research Article

Tasting Salt (Monosodium Glutamate) in Food Products: Discussion on Health Concerns and Ethical Business Practices

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Abstract: Tasting salt or Monosodium Glutamate was invented by the Japanese over a century ago. The flavour profile known as Umami, or the fifth taste, after the four tastes of sweet, salty, sour and bitter, was discovered whilst working with sea weed. Umami is a meaty taste that is naturally present in cheese and ripe tomatoes. For more than a 100 years, the flavour of Umami has been artificially manufactured in factories all over the world, starting in Japan. The flavour profile presented by tasting salt offers both packaged and non-packaged food producers with an affordable and openly accessible alternative to flavouring their foods. Home cooks are also offered the product as they are able to openly purchase the salt off the shelf. Hence, a lack of regulation. Presently, tasting salt is present in thousands of food items all over the world, and its use is only increasing. Restaurants use the salt in their dishes as an inexpensive alternative to building complex flavour profiles using meat stock. At the same time, health concerns about the product's wide spread use have also been made apparent over the last two decades. Despite the legal system of almost all countries in the world not having put any restriction on tasting salt, the use of the product has been shown to lead to serious health concerns for humans. Hence, the need for ethical business practice to promote public health by going above and beyond legal compliance.

Keywords: Monosodium Glutamate, Umami taste, flavour profile.

INTRODUCTORY BACKGROUND

The use of preservatives, taste enhancers and flavours in modern food products have become a common practice. Preservatives by their very nature are essential in many food products due to the demands from a huge global population. The requirement to maintain huge stocks and inventories of food products due to the fast moving nature of packaged foods means that preservatives are an essential component. However, flavour enhancers are a completely different matter as these are somewhat important but not essential items in packaged foods. A wide variety of artificial flavours emulating natural flavours have been developed by industry to complement the taste of naturally occurring packaged foods. The distinguishing characteristic about these flavour enhancers are that they are added with the food products at their respective factories, and consumers have no control over the quantities added. However, Monosodium Glutamate is one unique flavour enhancer that can be added to food products at their source factory by manufacturers, as well as by the consumer by using a powdered form of the substance from off the shelf supplies.

Monosodium Glutamate has been used by chefs, both amateurs and professional, in restaurants and households to acquire a unique umami taste, similar to the meaty taste found in most meats. This means that the product is a good candidate for use in savoury dishes. Additionally, the product has acquired popularity in the preparation of Asian cuisine in general, such as Chinese and Thai cuisines. In general, the product has been known to be used in many Eastern, South Eastern, and Southern Asian dishes. The product is especially popular in the preparation of restaurant dishes, as chefs are easily able to replicate a savoury umami taste very easily without having to prepare complicated flavour profiles from scratch using broths and chicken or beef stocks; which is a time consuming and expensive process. This is due to the fact that the product is an excitotoxin, meaning that the product does not have any taste by itself by tricks the tongue into thinking that the food being consumed has more protein than it actually does. Monosodium Glutamate is also preferred over natural flavour bases, as it is relatively very cheap, easily available over the counter at most grocers, and comes in a powdered form, hence easy to use. Additionally, more importantly, unlike other flavour enhancers, purchasing the product does not require any special permits or import licenses, as is required with other flavour enhancers. In addition to the uses described above, Monosodium Glutamate is found in the following products:

Table 1: Foods that Always and/or Often contain Monosodium Glutamate, source: Mercola [1]

Autolyzed Yeast	Calcium Caseinate	Gelatin	Natural Beef Flavoring
Glutamate	Glutamic Acid	Hydrolyzed Protein	Bouillon
Monopotassium Glutamate	Monosodium Glutamate	Sodium Caseinate	Barley Malt
Textured Protein	Yeast Extract	Yeast Food	Enzymes
Yeast Nutrient	Anything Ultra-Pasteurized	Powdered Milk	Anything Protein Fortified
Flavors and Flavorings	Seasonings	Natural Flavors and Flavorings	Natural Pork Flavoring
Natural Chicken Flavoring	Soy Sauce	Soy Protein Isolate	Soy Protein
Stock	Broth	Malt Extract	Malt Flavoring
Anything Enzyme Modified	Carrageenan	Maltodextrin	Pectin
Protease	Corn Starch	Citric Acid	

In addition, Monosodium Glutamate may be used in products such as Barbecue sauce, Prepared food, Salad dressing, Seasoning mixtures, Snacks, Chicken or other Meat Stock cubes, Dehydrated soups, Canned meat, Fish, Soups, Gravies, Sausage, Fast foods, Ketchup, Mayonnaise, Soy sauce, and Shellfish, International Starch Institute [2] Moreover, Monosodium Glutamate is known under many trade names globally, such as:

- Monosodium glutamate
- L(+)-Monosodium glutamate monohydrate
- L(+)-Monosodium glutamate anhydrous
- MSG
- E621 (European Union E-number)
- Third spice (After salt and pepper)
- Natural Flavoring (Common product label)
- Accent (Trade name)
- Aji-no-moto (Trade name)
- Vetsin (Trade name)
- Hydrolyzed Vegetable Protein (rich in MSG)
- Autolyzed Yeast (rich in MSG)
- Yeast Extract (rich in MSG)

The case of Monosodium Glutamate is unique as the quantity of substance that can be sold per person is not restricted. Additionally, the quantities of Monosodium Glutamate that is appropriate per serving is not indicated with the packaging either. This makes the consumption of Monosodium Glutamate a concern for doctors, health experts, and industry observers from around the world. Though Monosodium Glutamate is not a new development, as it has been around since as early as 1908, health concerns surrounding the product have only surfaced over the last two decades, concurring with a general concern over the health concerns associated with all processed packaged foods in general. The US Food and Drug Administration has stated that Monosodium Glutamate

LITERATURE REVIEW

The use of this product has been associated with a host of harmful side effects. Though the product is naturally occurring in foods such as cheese and tomatoes, the artificial alternative is of particular concern. In 2011 a new study was conducted to ascertain the effects of Monosodium Glutamate on human health. According to a paper, which has been published in the American Journal of Clinical Nutrition, more than 10,000 adults in China were observed for around 5.5 years on average. Men and women who ate the most Monosodium Glutamate (a median of 5 grams a day) were about "30 percent more likely to become overweight by the end of the study than those who ate the least amount of the flavoring (less than a half-gram a day)," the researchers found, He *et al* [3]. Moreover, it was also stated that after excluding people (test subjects) who were, at the start of the study, already overweight, that particular risk rose to an astounding 33 percent.

Ka He, nutrition expert at the University of North Carolina, Chapel Hill, and also lead researcher who led the study, stated in the report that although the risk of gaining weight that could be individually attributable to Monosodium Glutamate was modest at best, the implications for public health were substantial because everybody ate it on a regular basis. According to Marcus [4], by then several studies had already examined the relationship between Monosodium Glutamate and body weight. According to him, scientists have speculated that people may eat larger servings of food flavoured with Monosodium Glutamate because the product just makes the food tastier. Moreover, other evidence suggests that Monosodium Glutamate might "interfere with signaling systems in the body that regulate appetite," Marcus [4].

According to the report published by Boonnate *et al* [5], the uptake of Monosodium Glutamate through processed foods has been increasing around the world. Their report indicated that this increase in the uptake of Monosodium Glutamate coincided with an increase in

the worldwide epidemic of metabolic syndrome. As part of their controlled experiments on rodents in a laboratory, Monosodium Glutamate was found to induce "obesity, hyperglycemia, hyperlipidemia, insulin resistance, and type 2 diabetes," Boonnate *et al* [5]. Moreover, dietary consumption of Monosodium Glutamate was scientifically shown to be associated with reduced pancreatic cell mass, and greater numbers of hemorrhages and fibrosis. The study concluded that a high uptake of Monosodium Glutamate "may exert a negative effect on the pancreas and such effect might become functionally significant in the presence or susceptibility to diabetes or NaCl."

Similar results were presented by researchers from Khon Kaen University Thailand. Insawang *et al* [6] found out that every 1 g increase in Monosodium Glutamate intake significantly increased the risk of having the metabolic syndrome or being overweight, "independent of the total energy intake and the level of physical activity." Their research in plain English concluded that higher amounts of individual Monosodium Glutamate consumption were associated with the risk of having the metabolic syndrome and being overweight, independent of other major determinants.

According to New York Times bestselling author Dr. Joseph Mercola, some common negative side effects that are precipitated as a result of regular consumption of includes "obesity, eye damage, headaches, fatigue and disorientation, depression, rapid heartbeat, tingling and numbness," Mercola [1]. Additionally, according to neurosurgeon and author of "*Excitotoxins: The Taste that Kills*." Dr. Russell Blaylock, as reported by Mercola [1], has stated that Monosodium Glutamate overexcites human cells to the point of "damage or death." It has also been stated that this function causes brain damage to varying degrees; "potentially even triggering or worsening learning disabilities, Alzheimer's disease, Parkinson's disease, Lou Gehrig's disease and more."

According to the report by Sharma [7], titled 'Monosodium Glutamate-induced Oxidative Kidney Damage and Possible Mechanisms: A Mini-Review,' it has been stated that during the last decade (2005-2015) it had become quite evident that the regular uptake of Monosodium Glutamate has had potential negative effects on human peripheral organs, such as the kidneys. The report concludes that, based on animal studies, it may be suggested that chronic monosodium glutamate (MSG) intake induces kidney damage by oxidative stress.

According to the paper presented by Husarova and Ostatnikova [8], Monosodium Glutamate has been shown to have toxic effects on the central nervous system, adipose tissue, hepatic tissue and reproductive organs in numerous animal studies. According to their report, 'Monosodium Glutamate Toxic Effects and Their Implications for Human Intake: A Review,' some animal studies also showed that led to "disturbances in metabolism" with increases in parameters such as insulin, fatty acids and triglycerides, Husarova and Ostatnikova [8]. Additionally, Monosodium Glutamate was also shown to affect the liver function and bile synthesis, as well as facilitating pathological changes in the ovaries and fallopian tubes of women.

ETHICAL ISSUES

The consequences of regular consumption of tasting salt, either directly or indirectly, may be characterized as a threat to public health. The studies outlined above show that tasting salt, (Monosodium Glutamate), has a direct harmful effect on human health, based on animal studies. These revelations however have not been heeded to by the food industry, both restaurant and packaged. Tasting salt continues to be used as a food flavour enhancer worldwide, with the product now being the most frequently and abundantly used food flavouring in the world for quite some time now. The scope of use, as highlighted in the table above, tells us that individuals may be consuming tasting salt without even knowing about it in most cases.

The severe health alert provided by health experts worldwide about this product has failed to galvanize the scientific industry to introduce alternatives to tasting salt. Since the 1900s this product has been used worldwide, without any form of restriction on quantities used or distribution. Although issues with Monosodium Glutamate have been widely reported on, according to the U.S Food and Drug Administration has concluded that Monosodium Glutamate is "safe for most people at moderate and customary levels in combination with food," FDA Monosodium Glutamate [9]. The Food and Drug Administration has given the product the label of GRAS or Generally Recognised as Safe for consumption.

However, the uncontrolled use of Monosodium Glutamate in almost all types of processed foods means that it is not too difficult for someone to consume the product at frequent intervals and in large quantities, without even knowing that they are ingesting it. According to Marcus [4], in America, a typical daily intake of Monosodium Glutamate is "estimated to be only about half a gram." To put that into context, estimates for Japanese and Korean diets put average intakes of Monosodium Glutamate at somewhere between 1.5 grams and 10 grams daily. Hence, it is the immoderate and frequent intake of Monosodium Glutamate that concerns the public's health. Till date no government body or industry association had come out with documented accusations against the use of Monosodium Glutamate in food or as a flavouring.

Despite no legal restriction on the use of tasting salt, there have been some organisations who have voluntarily abandoned tasting salt from their restaurants, products, etc. They have proudly declared this fact on posters at the entrance to their restaurants. Additionally, some organisations have recently made the exclusion of tasting salt from their products the centerpiece of their marketing strategies, garnering admiration from the public. Recently, a new brand of noodles, called Chopsticks, was launched in Bangladesh, that would directly compete with the likes of Nestle and some giant Asian competitors.

The specialty of the product lay in the fact that the noodles was free from Monosodium Glutamate. The marketing campaign for the product made this the main attraction of the product. The television adverts for the campaign aired a famous local star who started the advert by openly questioning viewers about their awareness vis a vis tasting salt, and how it was harming their health. The target markets were health conscious consumers who were alert about the consequences of Monosodium Glutamate, as well as conscious mothers, who wanted their children to have the best pro-health oriented product. Due to this development, there has now developed a greater consciousness about the existence of Monosodium Glutamate in our diets, whether we like it or not. These organisations have went beyond what was required of them from the law, and excluded a product harmful for the public from their menus or products.

This kind of behaviour may be labelled as ethical business practice, as they went beyond compliance and initiated action simply because they thought it was wrong to do so. In this sense, it may be observed that business ethics begins where compliance with the law ends. According to the Markkula Centre for Applied Ethics, ethical behaviour does not only entail following the law. Simply following the law is known as compliance. According to their interpretation, the legal system of a particular country may usually be built around many ethical standards, but the law may meander from what may be considered ethical. Law can become ethically corrupt, and may be a function of power alone and designed to serve the commercial or political objectives of special interest groups or industry lobbyists. Moreover, it has been stated that the legislative system running in a country may have "a difficult time designing or enforcing standards in some important areas, and may be slow to address new problems," Velasquez *et al* [10].

Under the circumstances hanging over the present packaged food industry, there is little momentum or desire, for that matter, to initiate some form of restriction on the mass use of Monosodium Glutamate. The packaged food industry globally is a big industrial giant with significant political outreach in many countries. The cost and utility of tasting salt means that packaged food producers are unlikely to move away from the product, and will fight for its continued use in myriad food products. Additionally, the longtime use of the product means that production recipes and structures have been already established, and any change would be costly as it would entail significant research and development costs. The Monosodium Glutamate industry itself is also geared for production to supply masses. There are thousands of jobs associated with its supply chain all over the world, from Brazil to Vietnam to Japan. Hence, the implications for future policy is that it must be the industry as a whole that must slowly move away from Monosodium Glutamate. However, in order to impose controls on the product, the ultimate consumers need to be educated about the ill effects of Monosodium Glutamate as well. The scope of use of the product means that all genres of individuals are exposed to its potential ill effects.

It has been noted that pregnant women in particular have become exposed to the ill effects of Monosodium Glutamate. According to Fitnesspell [11], issues related to female sterility have been raised in relation to the ingestion of Monosodium Glutamate. According to them, during the phase of pregnancy, pregnant women should be especially cautious about the constituents of their diet, as the body and the unborn child are more sensitive to food items containing flavouring salts such as Monosodium Glutamate. As per report, excessive intake of Monosodium Glutamate allows for a reaction that frees chemicals known as glutamates in the body.

This is a potentially negative development as it facilitates breaking down the placental barrier that exists between the mother and fetus. This barrier also acts as the barrier of food supply to the baby. The malfunction of this barrier results in the baby being exposed to all substances in the mother's blood; both good as well as bad substances. This could potentially very well spell disaster for the fetus as the undeveloped and fragile immune system of the fetus is unable to fight off any "external allergens and illness triggering germs," Fitnesspell [11]. It has also been reported that the free glutamates could also get to the baby's brain neurons and potentially trigger inductions.

RECOMMENDATIONS

The use of tasting salt flavouring in packaged foods is a result of the modern urban lifestyle. Individuals are short of time to cook at home, or cook using proper technique. As a result, individuals resort to using food flavourings such as tasting salt to enhance their home cooked meals. Being short on time also results in people buying more food from restaurants or ordering food. Additionally, the new modern culture of dining out is also to blame for people ingesting too much flavourings on a regular basis. Deciding to eat at home may well stave off exposure to tasting salt, as

well as other flavours as home cooked meals have the benefit of having their ingredients carefully vetted by the cook. As a result, the intake of tasting salt is likely to be eliminated or drastically reduced.

The presence of tasting salt in foods also needs to be controlled at source, as it is almost impossible to stay away from outside foods indefinitely. There needs to be a consumer call from all quarters of society to boycott goods that contain tasting salt. There needs to be a message sent to food producers that consumers are aware about the negative consequences of ingesting Monosodium Glutamate and that food producers must stop using the product, or minimise using the product, or else face consumer boycott. Persuading restauranteurs of the need to cut down use of tasting salt may be much easier, as restaurants have a wide option of materials to build their flavour profiles from. Consumers should express their desire for tasting salt free food by giving business to those restaurants who have openly declared to have removed tasting salt from their recipes.

The government should as well declare through their health ministry the desire to reduce the exposure of their populations to tasting salt. This may be done using a preferential system of tariffs where foods that have been imported and containing tasting salt should be taxed higher than those that do not have tasting salt. Additionally, the government could reduce taxes on those restaurants that have openly removed tasting salt from their menu items. This could drastically reduce the intake of tasting salt from the diets of the general population. Special health shows could be aired on television to discuss the negative consequences of the product as well. The risks to children and pregnant women could be especially highlighted in these programmes. Tips on how to avoid Monosodium Glutamate by bypassing certain foods, as well as how best to identify Monosodium Glutamate from the list of ingredients in packaged foods could be taught to people.

The issue of tasting salt requires special government attention, as completely making the product illegal can create problems for the packaged foods industry. What is required is restriction and control in certain areas, which will effectively reduce the uptake of the substance from diets. The other half of the equation will come from consumer action. Consumers will need to show businesses that they greatly appreciate ethical business practices, especially when it concerns their food choices, and that they will penalize those businesses that use excessive Monosodium Glutamate in products that might as well do with less, or no Monosodium Glutamate at all.

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