STUDIES ON MONOSODIUM L-GLUTAMATE(MSG): HARMFUL EFFECTS OF PROLONGED AND HIGH DOSE ADMINISTRATION OF MSG ON ANIMAL BODY.

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ABSTRACT
Monosodium L-g glutamate(MSG), familiar as Ajinomoto is low priced and easily available in the market. It is basically flavour enhancer. The increasing use of MSG has serious side effects on health. Recent research activities and experimental data has established the deleterious and toxic effect of MSG on different body organs like heart, kidney, liver etc. This study has briefly represented the increasing use of MSG in different food items and harmful effects on important body organs.

KEYWORDS: Ajinomoto, Monosodium glutamate, Toxic, Flavour enhancer, excitotoxin, Neurotoxic.

INTRODUCTION
Sweet odour, good taste and attractive colour always motivate us to pay our attention to the food. This the general nature of our sense organs. To create more interest to food, external or artificial food additives are often used. MSG or monosodium glutamate or Ajinomoto is very popular food additive or specifically flavour enhancer around the world. It has been used as flavour enhancer since 1907. It has excellent bleaching property also. In Nigeria, MSG is applied as bleaching material to remove stain from cloth and various textile materials.

The molecular formula of Monosodium L-glutamate (MSG), is C₅H₈NO₄Na and molar mass is 169.11g/mol. Its melting point is 232°C. IUPAC name of MSG is Sodium-2-Aminopentanedioate. MSG is one of the most popular food additives. Excessive use of MSG has dangerous toxic effects on health. Current study established the very harmful effects of...
MSG on various body organs and tissues. MSG is an excitotoxin. It overactivates cells to the point of damage or death. Current study on albino rats reveals the effect of variable doses of MSG on the morphometric and histological changes of the thyroid gland as well as change of size of heart. Higher dose of MSG is neurotoxic. All these facts created interest to undertake the study on MSG and its harmful effect on animal body.\textsuperscript{[1,2]}

**Source of MSG**

Glutamate is one of the important amino acid derivative. It is the core constituent of tissue proteins and peptides. There are two sources of glutamate. Firstly, Body can form it as it plays a critical role in human metabolism. Second source is the protein rich food products like fish, milk, meet, mushroom and tomato etc. This ingredient is increasingly found in many prepared foods. Previously only Chinese food contained this salt. But, now it has moved from Chinese restaurants to our kitchen shelves. Canned vegetables, soups, processed meat, many items of fast-food restaurants particularly chicken items, commercially packaged food products including flavoured chips and crackers, instant noodles, seasoning salt, bouillon cubes, salad dressing, gravy mixes or pre-made gravies, cold cuts and hot dogs, including soy-based varieties contain MSG.\textsuperscript{[2]}

**MSG symptom complex**

The food and drug administration has classified MSG as a food ingredient that’s generally recognised as safe if it is added in ideal amount or proper amount but its use remain controversial. MSG as a flavour enhancer has been subjected to several investigations. There happen to a wide range of reports unfavourable side effects from MSG consumption more than years. Naturally question arises it’s easy to control the proper amount always in the busy restaurant !.

Food additives make the food more colourful, attractive, palatable and can be stored for longer period without any degradation in quality. During processing of food products, the flavour become sometimes very weak as modern method of food processing requires heating, boiling, concentrating and drying. During these processing the natural flavours are lost either partially or completely. So to replenish the lost flavour synthetic flavours are used in higher dose or higher than ideal amount.

Some people find that consuming MSG especially in large quantities, can trigger various side effects and symptoms, Including: headache, nausea, dizziness, rapid or irregular heart beat,
flushing or excessive sweating, skin rash, numbness, intense thirst, lethargy or sleepiness, ringing ears, tingling in the mouth etc.\textsuperscript{[3]}

**Cause behind the harmful role of MSG**

If any one doesn’t have any symptoms as noted above then consumption of MSG may be safe. Otherwise, taking of MSG will be unsafe and it will be dangerous health pollutant. Report of side effects of MSG first appeared in the medical literature in 1968 and included numbness at the back of neck and arms, weakness and heart palpitations. MSG over excites cells to the point of damage or death, causing brain damage to varying degrees and potentially even triggering or worsening learning disabilities, Alzheimer’s disease, Parkinson’s disease and more. Injection of MSG in laboratory animals have resulted in damage to nerve cells. It is neurotoxic substance as it can destruct neurons in the hypothalamic nuclei.\textsuperscript{[4]}

Larger ingestion of Ingestion of MSG leads to a greater risk of getting metabolic syndrome- a group of issues such as high cholesterol, high blood pressure, high blood sugar and excessive body fat. It can cause cardiac arrythmias. It’ side effects may be more harmful than alcohol, nicotine and drugs.

Present study on the albino rats shows the different doses of MSG on the morphometric and histological changes of the thyroid gland. Present findings revealed some deleterious effect of MSG on different body organs and tissues. Investigation on the effect of MSG on the gross weight of the heart of albino rats revealed that continuous and increased use of MSG can significantly increase the gross weight and size of the heart and may be as a result of hypertrophy.\textsuperscript{[5]} Increased heart size and mass can predict excess cardiac mortality and morbidity. Overdose of MSG is also harmful to the important body organs like Liver, kidney etc. It was also investigated that higher amount and prolonged application of MSG to wistar rats can cause disruptions and distortion of cytoarchitecture of the kidney.\textsuperscript{[7]} It is also reported that dilation of the central vein of the liver may occur with increasing consumption of MSG by adult wistar rats. From the investigation on male wistar rat testies, it is also reported that MSG may be connected in case of male infertility as it can cause testicular hemorrhage, degeneration and alteration of sperm cell population and morphology.\textsuperscript{[6,7]}
CONCLUSION

All the side effects of MSG indicate that we should avoid and reduce the consumption of food products that include MSG. So it is better to avoid food and dishes containing MSG. Since the introduction in the past 30 years, the incidence diabetes has increased very much. Obesity in children has increased rapidly. MSG is injected into lab animals to induce obesity so that pharmaceutical companies test their drugs. MSG is a toxic substance, can cause diabetes, adrenal gland malfunction, seizures, high blood pressure, excessive weight gain, stroke and other health problems. If anybody experiences any one of these symptoms, immediately MSG from diet should be eliminated. For the duration of pregnancy, pregnant woman should be cautious about what they consume, especially when the foods include additives like MSG. During this period the unborn child are more sensitive to food items. Excessive ingestion of MSG enhances cancer development.

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REFERENCES