Determination of Monosodium Glutamate Content of some Selected Noodle Seasonings Sold within Anambra state

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Abstract

Monosodium glutamate is the sodium salt of glutamic acid found in many food products like cheese, tomatoes and noodles. It has been used to replace common salt in many processed foods. The study investigates the monosodium glutamate contents of some selected noodle seasonings sold within Anambra state. The monosodium glutamate (MSG) content of the samples was determined by spectrophotometric method at the absorbance of 502nm. The result showed the concentration of MSG (in Mean±SEM) for Jolly Jolly, 0.56±0.02mg/g, Mimee, 0.91±0.10mg/g, Indomie, 1.21±0.02mg/g and Tummy-tummy, 1.44±0.01mg/g. The results showed that the MSG content for the sampled seasonings were in the permissible limit established by the European Directive. Furthermore, MSG levels in the examined Nigerian noodle seasoning samples are also less than the largest palatable dose of MSG for humans, hence recommended for consumption.

Keywords: Monosodium Glutamate, Seasoning, Noodles and Spectrophotometry

Introduction

Monosodium glutamate (MSG) is a sodium salt of glutamic acid. It is usually a white powder which ionizes into free sodium ions and glutamic acid (David, 2008). Glutamate is one of the most natural occurring non-essential amino acid. Monosodium glutamate is the Sodium salt of glutamic acid found in many food products (Chiaki, 2009). It is produced by the fermentation of bacteria recent days. Monosodium Glutamate (MSG) is a very important food additive and it plays vital role in food industries, it is used as a flavor enhancer or amplifier to increase the palatability of foods (Kirkurae, 2002).

Monosodium glutamate as a flavor enhancer has been beneficial to help reduce the excessive intake of sodium salt by providing food with the desired umami taste (Caldwell *et al.*, 2000). Even though food safety regulatory agencies assume MSG consumption to be safe, some preclinical and clinical investigations have challenged its safety, especially in event of chronic exposure (Anca *et al.*, 2019). The controversy is likely fueled from the

knowledge that endogenous glutamate plays a role in physiological as well as pathological processes. Glutamate has various physiological functions: it is a major substrate for energy production in enterocytes, an intermediary substance in protein metabolism, precursor of significant metabolites such as glutathione (GSH, oxidative stress modulator) or *N*-acetylglutamate (metabolic regulator), and also a central nervous system (CNS) excitatory neurotransmitter (Meldrum, 2000;Newsholme, 2001) An increase in CNS glutamate concentration is associated with brain damage, similar to status epilepticus, cerebral ischemia, or traumatic injuries, as well as with chronic neurodegeneration analogous to Huntington's chorea (Meldrum, 2000).

Monosodium glutamate in recent times has been claimed to induce some levels of health risk. High intake of refined Monosodium Glutamate accumulates in the body until it reaches threshold of sensitivity. In his findings, Gershium, (2012) reported that "MSG" is a flavor enhancer and can result to health issues like damages to the liver, skin irritation and stomach upset after excessive intake. In the same vein, it have been reported that "MSG" is harmful to the developing brain of the foetus in their womb. Food in wide range have different functions that it performs in human body which include provision of received nutrient for body growth, repair and maintenance of cells and provision of energy for metabolism and other metabolic processes in the body (Christine, 2013).The present study investigates the monosodium glutamate contents of some selected noodle seasonings sold within Anambra state.

Materials and Methods

Samples Collection and Preparations

The seasonings were collected from Indomie, Mimee, Jolly-jolly and Tummy-tummy noodles purchased from Eke Oko market. The samples were prepared by dissolving 50mg each of the seasoning powder in warm water and incubated at 70°C for 10 minutes. The solutions when cooled to room temperature were shaken and centrifuged at 2000r/min for 15 minutes(Afraa *et al*., 2013). The supernatants were used for MSG quantitative analysis.

Determination of the Monosodium Glutamate

The monosodium glutamate of the seasonings was determined using the method of Afraa*et al*. (2013). A reaction mixture was formed, containing 0.5ml of L-glutamate oxidase(0.2 U/ml), 0.2ml of Horse Radish Peroxidase from

horseradish(0.1 U/ml, 0.1 ml of chromogenic reagent (consisting of 0.11g of 4-aminoantipyrene and 0.043g phenol in 100ml of phosphate buffer) and 0.3 ml of phosphate buffer (pH, 7.5). After pre-incubation for 2mins at 37·C, 0.1ml of the sample was added and again incubated for 20mins at 37·C with gentle shaking. The absorbance was measured at 502nm using spectrophotometer(AXIOM-752 UV-VIS). A standard curve was prepared using standard monosodium glutamate and the concentrations of the salt in the seasonings extrapolated from the graph. Each sample was tested in duplicate and the results were reported as mean ±Standard Deviation

Results

Table 1. The Monosodium Glutamate Composition of the Selected Commercial Noodle Seasonings

Noodle Seasoning	**Monosodium glutamate (mg/g)**
Indomie (IMG)	1.21±0.02
Mimee(MMG)	0.91±0.10
Jolly jolly(JMG)	0.56±0.02
Tummy tummy(TMG)	1.44±0.01

The value of the monosodium glutamate are presented in Mean±SEM

Discussion and Conclusion

Monosodium glutamate or MSG has been used mainly in the food industry to enhance the food flavor, due to its special taste (umami). It has been used to reduce sodium intake to level considered safe and replace sodium chloride in processed foods. The results obtained from this study which is in the range of 0.5 to 1.5 mg/g, are lower than the range (2.551 to 3.120 mg/g) reported by Shivakumar and Samir, (2015) for indian commercial seasonings. Another comprehensive study by Mehreen*et al*. (2014) observed an MSG composition range value of 2.7 to 8.8 mg/g in Pakistan commercial seasoning. The higher range of values for MSG in these previous investigations, maybe due to the use of High Performance Liquid Chromatography in the analysis on different noodle samples. The US food and drug administration (USFDA) classifies MSG as generally recognized as safe (GRAS). Still, it is believed that large doses of MSG can cause headaches, nausea and general discomfort, which is known as Chinese restaurant syndrome. However, controlled scientific studies have refuted such claims. The optimal palatability concentration for MSG is between 2mg/g to 8mg/g (w/w) which is self-limiting as over-use decreases its

palatability (Loliger, 2000). The largest palatable dose for humans is about 0.06mg/kg body weight (Reitz and Guibault, 2005).

The present research values, shows that the investigated samples MSG levels per seasoning are within the palatable range for human (0.06mg/g body weight) and as established by the European Directive of 95/2/CE on food addictives and sweeteners. EFSA (2017), re-assessed the safety of glutamates used as food additives and derived a group acceptable daily intake (*ADI*) of 30 mg/kg body weight per day. It can be concluded that within these ranges, there may be no health problems which are the representative symptoms of MSG intolerance and chinese restaurant syndrome

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