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Consumer Acceptance of Vegetable Protein and No Preservatives in Organic MSG (Monosodium Glutamate)

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ABSTRACT

Allergy is a response from the body's defense to reject when exposed to certain antigens. When the antigen (allergen) enters the body's tissue, there are two responses produced by the body, namely the allergen that is successful in destroying it or the allergen that damages the body's tissue. Proteins are polypeptide macromolecules composed of a number of L-amino acids linked by peptide bonds. MSG (Monosodium Glutamate) is a gram of sodium derived from glutamic acid. The aim of this research is to determine consumer acceptance of vegetable protein .This research uses quantitative research methods by distributing questionnaires to the public. As well as helping to provide replacement products to people who are allergic to animal protein. The results of the questionnaire that was given to the public, of the 53 respondents who were given the questionnaire, found that 32 respondents chose to use plant-based products and the remainder chose not to use plant-based products. These plants are allergic to animal protein and the rest do not experience allergies.

1. INTRODUCTION

Protein is the main macromolecular component needed by living creatures. The function of protein is prioritized for the process of synthesizing new proteins according to the body's needs, while carbohydrates and lipids are used to meet the body's energy availability. (Susanti, 2016). Sources of protein found in food can be grouped into animal ingredients and vegetable ingredients. Animal protein is protein sourced from animals. Examples of foods that contain animal protein elements are meat, fish, chicken, eggs, milk, fish, shellfish and others. And there is also a source of protein, namely soybeans, which are a source of vegetable protein that has high quality, namely, bean protein is limited in the amino acid methionine (Umar, 2021). However, some people are intolerant to this protein. Many factors influence the occurrence of allergies to protein.

Protein has become part of all living cells and is the largest part of the human body after water (Rismayanthi, 2006). Proteins are macromolecules that make up most of the cells in the human body, containing carbon, hydrogen, nitrogen and sometimes sulfur and phosphorus. In contrast to other macronutrients such as carbohydrates and fat, protein plays a more important role in the formation of biomolecules than an energy source. Proteins also play a role in determining the size and structure of cells, the main components of the communication system between cells, and as catalysts for various biochemical reactions that occur in cells (Fatchiyah et al., 2011). Conventional protein sources can be obtained by consuming foods that contain vegetable protein (from plants) and animal protein (from animals). Meanwhile, conventional protein sources are usually obtained in the form of protein sources that have been developed to cover the need for

protein, which usually comes from microbes (bacteria, yeast or mold) known as single cell protein, but the product in food has not yet been developed until now (Khotimah, 2021)

The function of protein is as the main substance for body formation and growth. Protein as the main substance that forms the body's cells is the main substance that forms body cells and is used as an energy source when carbohydrates and fat in the body are reduced (Azhar, 2016). Protein can be used as an energy source if an organism lacks energy. The special feature of protein is that its structure apart from containing the function of protein in the human body is the growth and maintenance of tissue, so that the body can support and maintain tissue. There are several other functions of protein, namely as the main source of energy besides carbohydrates and fat, as a building agent, and a regulatory agent. Protein can also regulate metabolic processes in the form of enzymes and hormones to protect the body from toxic or dangerous substances and maintain cells and body tissues (Rismayanthi, 2015). In the form of chromosomes, proteins also play a role in storing and transmitting inherited or hereditary traits in the form of genes. In the form of this gene, code is stored for the synthesis of certain enzyme proteins, so that the metabolic process is inherited or inherited from parents to children and continued to the next generation, continuously (Rismayanthi, 2015). Sources of protein found in food are grouped into animal foods and plant foods. Animal protein is protein that comes from animals. Examples of foods that contain protein elements include meat, fish, chicken, eggs, milk, fish, shellfish and others. Meanwhile, vegetable protein sources are proteins that come from plants (Azhar, 2016). Food ingredients that contain vegetable protein can be found in vegetables, fruit, nuts. There is one source of protein, namely soybeans, which are a source of vegetable protein that has the highest quality or value, bean protein is limited in the amino acid methionine. (Annisa, 2021)

Animal foods are good sources of protein, in quantity and quality, such as eggs, milk, meat, poultry, fish and shellfish. Sources of vegetable protein are soybeans and processed products such as tempeh and tofu, as well as other nuts. Animal protein generally has higher quality (nutritional value) than vegetable protein. However, a mixture of several food sources of vegetable protein can produce an overall amino acid composition that is quite high quality (Diana, 2009). In terms of nutritional quality, because the essential amino acid content is incomplete in vegetable protein, it is very dependent on vegetable protein. Plant foods usually have deficiencies in several amino acids, namely lysine, threonine, tryptophan, cystine and methionine. This is a problem because incompleteness of essential amino acids in food can cause digestibility and low utilization of the protein consumed (Muhilal et al., 1993; Norra, 2021)

Indonesian people's consumption of vegetable protein is very high when compared to consumption of animal protein. 12 The results of the 2014 Central Java Province Individual Food Consumption Survey (SKMI) analysis show that protein consumption figures in the community are still dominated by vegetable protein. The largest contribution of vegetable protein comes from nuts and their processed products. The relatively high price of animal protein means that not all Indonesian people can consume animal protein and tend to only consume vegetable protein products. (Swarinastiti, 2018)

Food is one of the causes of dangerous allergies. Approximately 15% of the public suspect that they are allergic to a food, even though the incidence of food allergies in children ranges from 6-8% while in adults it is 1-2%. This condition occurs due to the use of the term food allergy which is used in a wrong and inaccurate sense. So The American of Allergy and Immunology and the National Institute of Allergy and Infectious Disease have defined several terms for an undesirable reaction to a food, also called an adverse food reaction, which is a term used to describe a reaction that occurs after eating it. a food. It is necessary to differentiate between food allergic reactions and food intolerance. Where a food allergy reaction is an adverse reaction to food due to an abnormal immunological response, while food intolerance is a result of non-immunological mechanisms (Rahmi 2020; Siregar 2016; Zubir et al. 2015 ; Purnawamawati, 2023).

Objects that can cause an allergic response are known as allergens. In many people, allergens do not cause a reaction in the body, however, in someone who is allergic to the allergen, the

immune system will react because it is considered dangerous for the body. Allergic reactions that appear in each person are different, from mild reactions such as sneezing to severe reactions, namely anaphylaxis. The allergic reaction that occurs also depends on the type of allergen. (Abriyani, 2022).

Food allergies are immune system reactions that occur after exposure to certain foods. Food is defined as substances consumed by humans whether processed, semi-processed or raw. Food allergens are described as specific components of a food or food ingredient (typically a protein, but can also be in the form of a hapten) which are recognized by immune cells which then cause an immunological reaction mediated by mast cells and IgE. (Hendra, 2020)

Allergic reactions to food can occur within minutes to 24 hours after exposure to food ingredients that trigger allergies. Slow reactions cause difficulties in identifying foods that cause allergies. Reactions occur. Allergies to food are caused by several factors, namely, heredity, exposure to allergens, gastrointestinal permeability and environmental factors such as exposure to microorganisms (Karjadidjaja, 2007). Allergies to food ingredients can also occur, incompatibility with the origin of the ingredients used, causing allergy symptoms. Of course, the addition of an ingredient that causes an allergic response to occur needs to be considered

Parvalbumin is a protein that is resistant to heat and is not easily digested by protease enzymes so that fish processing using heat or enzymes is not able to remove this allergy-causing protein (Ruethers et al. 2018). Therefore, alternative fish processing that is able to eliminate the protein content that causes allergies needs to be researched. Surimi is a processed fish product made from fish flesh that has been washed several times to remove water-soluble proteins, blood (pigment), and odor-causing fat. The washing process is also known to reduce levels of allergenic proteins, especially parvalbumin (Kurata et al. 2017; Nugraha, 2020)

The addition of an ingredient to food is something that is deemed necessary to improve the quality of a product so that it can compete in the market. One type of preservative that is quite often used in food is benzoic acid. This preservative is suitable for use in food ingredients. This ingredient works effectively at a pH of 2.5-4.0 to prevent bacterial growth. Because it contains a large salt content, it is usually used in the form of Nabenzoate salt. The standard for consuming benzoate preservatives according to BPOM No.36 of 2013 is 0-5 mg/kg body weight, if it exceeds the stipulated provisions it will cause negative effects on the body's organs, one of which is the kidneys, the use of this benzoate preservative within a specified period of time long term can damage blood cells, if blood pressure decreases then filtering in the body decreases so that the process of excreting urine becomes less, if left to continue then toxins that cannot be excreted through urine can build up and cause kidney problems (Hilda, 2015). One of the things that Often found in foods that can cause allergic reactions is the use of MSG.

Msg (Monosodium Glutamate) is a mixture used in food to add a delicious taste to food. This habit is carried out quite often by people so that it has become one of the cooking spices that must be used. Msg itself has a quite strong umami taste, referring to a rich and rich taste. the resulting savory taste. MSG itself is a sodium salt of glutamic acid, which is one of the non-essential amino acids naturally contained in food. According to Yonata (2016) the compound composition of MSG is 78% glutamate, 12% sodium, and 10% water, when it dissolves in water it will dissociate into free salt and form an anion from glutamate. In 1995, MSG was classified as a safe food ingredient such as salt, vinegar or baking powder, but its use was limited to 120 mg/kg body weight per day by FDA and WHO. Initially, Japanese, Korean, Chinese and Thai people only used 30-60 mg of MSG. China itself is a consuming country and produces 52% - 57% more MSG than the world's consumption. MSG itself is generally a nutritional aspect. It is used as an ingredient in processed foods, such as broths, sauces, chips, snacks, frozen foods and fast food. MSG itself is also contained in various spices and packaged food products. Consuming packaged snack foods containing MSG can cause health problems for the body. MSG itself has been reported to be associated with side effects, one of which is obesity. People are often offered organic MSG alternatives which are of course claimed to be healthier than conventional products.

Even though it is permitted as a food flavoring, excessive use of MSG can cause dizziness and nausea. This symptom is called Chinese Restaurant Syndrome. The use of MSG in the food consumed often harms health because MSG will break down into sodium and glutamate. The salt produced into MSG is able to meet salt needs by 20-30%, so that excessive consumption of MSG causes an increase in salt levels in the blood (Lisdiana, 2004; Badriyah, 2019.

According to Wicaksono (2022), pineapple extract is rich in the enzyme bromelain which can break down the structure of protein molecules into acid. The high protein content in tempeh is then broken down into peptides by protease enzymes, so that the results produce a savory taste in food which can be used as organic MSG. Therefore, it can be used as an alternative flavoring which is certainly not harmful to the body if consumed over a long period of time. Long. This can be an alternative for people who have allergies to MSG content, especially animal protein.

Bromelain is a sulfhydryl protease enzyme found in plants of the bromeliaceae family. Pineapples are plants in the bromeliaceae family that produce the most bromelain enzymes. Pineapples grow in tropical and subtropical areas including Indonesia, Malaysia, Thailand, the Philippines, China, Kenya and India (Pavan et al., 2012). Pineapples are usually consumed directly or processed into canned fruit. Apart from being used as food, pineapple can also be used in the food industry, cosmetics, food supplements and medicine. Apart from that, pineapple waste can also be used as a substrate for the production of methane, ethanol, citric acid and antioxidant compounds (Ketnawa et al., 2012). Enzymes have the property of being denatured due to several factors such as temperature, pH and storage time (Sarkar et al., 2017). The optimum pH for the bromelain enzyme is usually in the range of 5.5 – 8.0 and can break down glycyl, analyl and leucyl peptide bonds. The bromelain enzyme can be inactivated at pasteurization temperatures and if thermal denaturation occurs it cannot become active again (irreversible) (Novaes et al., 2015). Pineapple storage and processing conditions can usually reduce the activity of bromelain so it is necessary to know the stable conditions for the bromelain enzyme. (Nathania, 2018)

Tempeh is one of several fermented foods native to Indonesia that has been recognized by the world, as explained by Babu & Vidyalaksmi (2009), various fermented food products exist throughout the world. Tempeh has become one of the most widely accepted food products. Tempe is a popular fermented food in Indonesia that is rich in nutrients and active substances. The nutritional composition of tempeh, including protein, fat and carbohydrate levels, does not change much compared to soybeans. Because there are digestive enzymes produced during the fermentation process, the food content becomes easier to digest. Therefore, tempeh is good to give to all ages (Astawan, 2008). The research results of Subagio (2002) explain that the hydrolysis of tempeh by the protease enzyme produces short peptides that have a savory taste. This research leads to the idea that the hydrolyzation of tempeh by protease enzymes has the potential to be used as a flavoring ingredient to replace MSG. According to Sun (2011) there are two methods for hydrolyzing proteins, namely acid hydrolysis and enzymatic hydrolysis. Acid hydrolysis is starting to be avoided by most food industries, because the resulting product is not safe for health. Enzymatic hydrolysis is a safe method of choice, the enzymes often used are bromelain, papain and fisin. According to Kunts (2000), protein hydrolysis products have a wide range of applications related to their functional or nutritional properties. Considering that most protease enzymes for the food industry are still imported and the price is relatively expensive, it is necessary to develop the use of protease enzymes sourced from local Indonesian natural ingredients, one of which is the bromelain enzyme which comes from pineapple (Ananas comosus). (Machin, 2012)

Based on the background above, there is a discussion about the use of MSG in people's lives, which causes health impacts such as allergies, so researchers want to conduct research with the title "Acceptability Consumers Against Vegetable Protein and No Preservatives in Organic MSG".

2. MATERIALS AND METHODS

2.1. Type of Research

This research uses descriptive qualitative research by distributing questionnaires to students at Muhammadiyah University of Surakarta and the general public. The population of this study were students and the general public aged 19-22 years who had tried using organic and conventional MSG products, and had certain symptoms.

3. RESULTS AND DISCUSSION

3.1.Preparation of raw materials

In making organic MSG made from pineapple bromelain extract and tempeh protein hydrolyzate, the raw materials used are pineapple, tempeh, salt and dextrin. With a ratio of 2: 1: 0.05: 0.05, with this amount of raw materials it can be produced 280 ml Organic.

Table 1. Ingredients for Making Organic MSG

MANUFACTURING ORGANIC MSG		
NO.	**RAW MATERIAL**	**AMOUNT(grams)**
1.	Pineapple	200 grams
2.	Tempeh	100 grams
3	Salt	5 grams
4	Dextrin	5 grams

3.1.1. Product Manufacturing Step

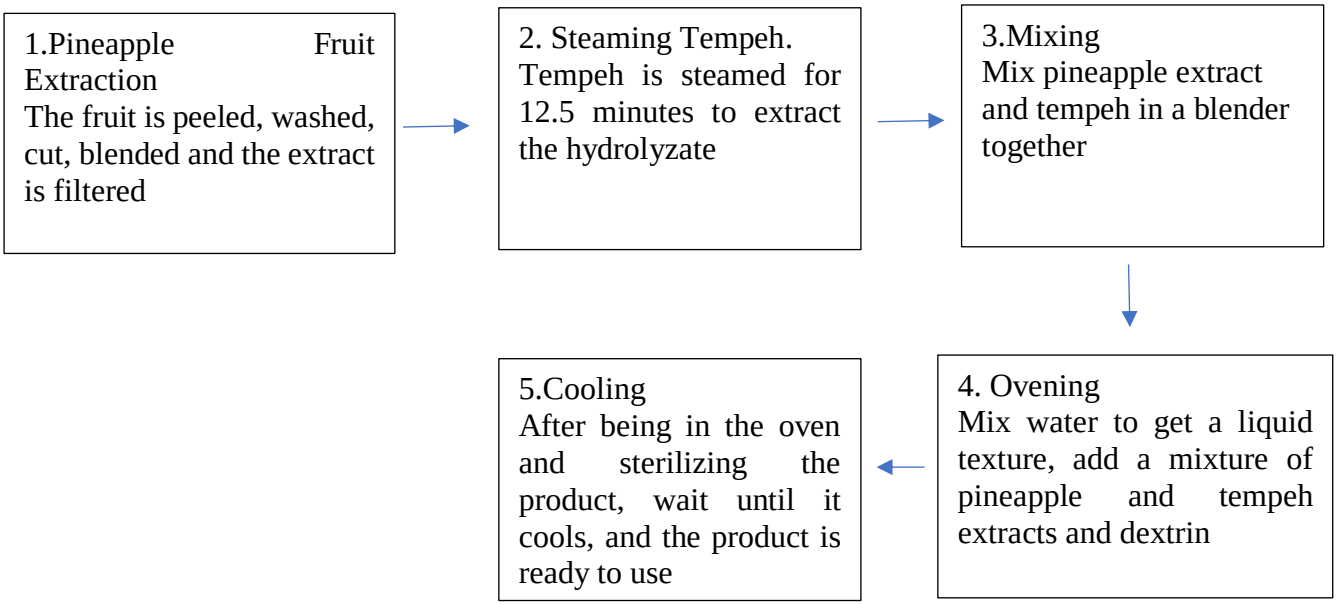

Figure.1 Steps in Making a Product

In making the product, these ingredients are needed in a ratio of 2 : 1 : 0.05 : 0.005. Making this large quantity produces 280ml of Organic MSG which can help people who have symptoms, especially allergies to animal products or animal protein. So this is able to increase protein needs

3.1.2. Results Data

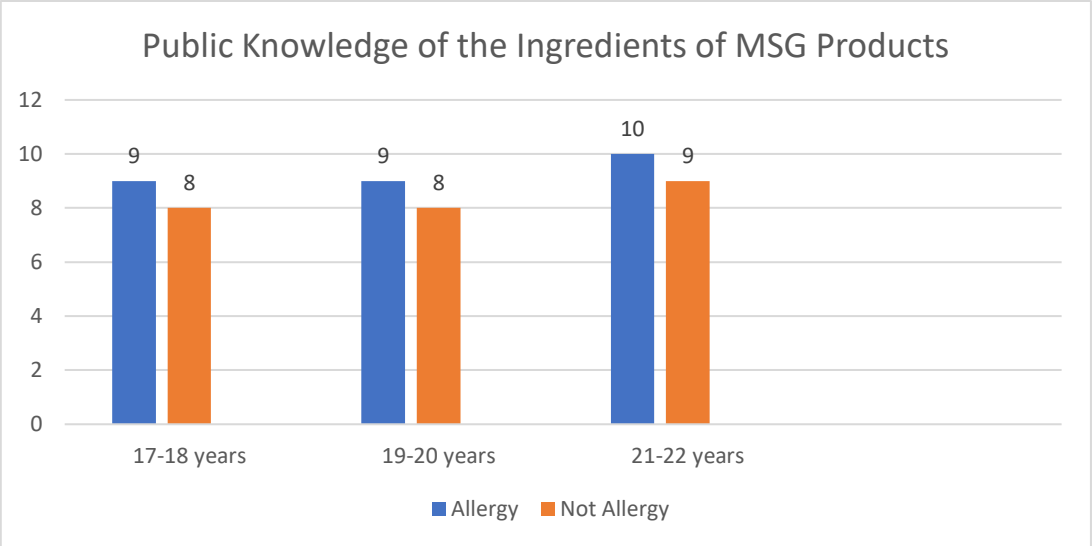

Figure 1.2. Knowledge of MSG Content

From filling out the questionnaire that was distributed, 25 out of 53 people knew about the ingredients in the MSG products they used, so they could avoid ingredients that could cause allergy symptoms. Meanwhile, 28 out of 53 people didn't know about the ingredients in the MSG they used so that The lack of available information will have a negative impact on users. According to research by Arapa (2023), based on a survey conducted by the Indonesian Monosodium Glutamate and Glutamic Acid Factory Association (P2MI), MSG consumption in Indonesia itself has increased from 100,568 tonnes to 122,966 tonnes, estimated at 1.53 grams/capita/per day. MSG consumption in Indonesia is at the household level, restaurants/catering, food processing and packaging industries. The largest consumption of MSG is used by households. From this it can be seen that the Indonesian people currently still do not understand the content in MSG, with the increase in MSG production itself, this means that many people are still dependent on the use of MSG in everyday cooking. By because it is a serious matter that needs to be addressed.

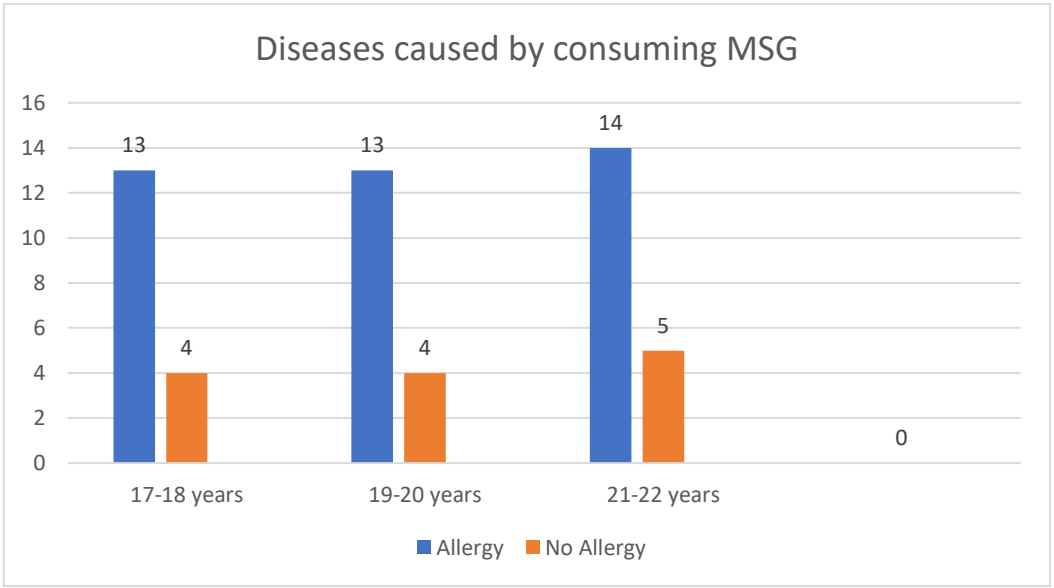

Figure 1.3. Diseases caused by consuming MSG

From filling in the questionnaire that was distributed, 13 out of 53 respondents had symptoms of allergy to conventional MSG in the public cirulation. Then 40 out of 53 respondents stated that they had no allergies to animal products when using MSG products. This will of course have an impact because in daily life consuming food that uses MSG, especially containing animal products, will cause allergic symptoms. According to research from Munasiah (2020), monosodium glutamate if consumed beyond the maximum limit and continuously consumed for a long period of time will certainly cause various various side effects (Alatas, 2011). If MSG is consumed by someone who cannot tolerate amounts of more than 3g/day, it can have detrimental effects on health. Symptoms that arise due to consuming MSG are called MSG complex syndrome. Symptoms of complex syndrome include: burning sensation in the back of the neck area spreading to the arms and chest, numbness in the back of the neck area, stiffness in the face, chest pain, nausea, and drowsiness (Kazmi et al., 2017). triggers side effects from using MSG, but also worsens the health condition of someone who consumes food containing MSG at levels exceeding the maximum.

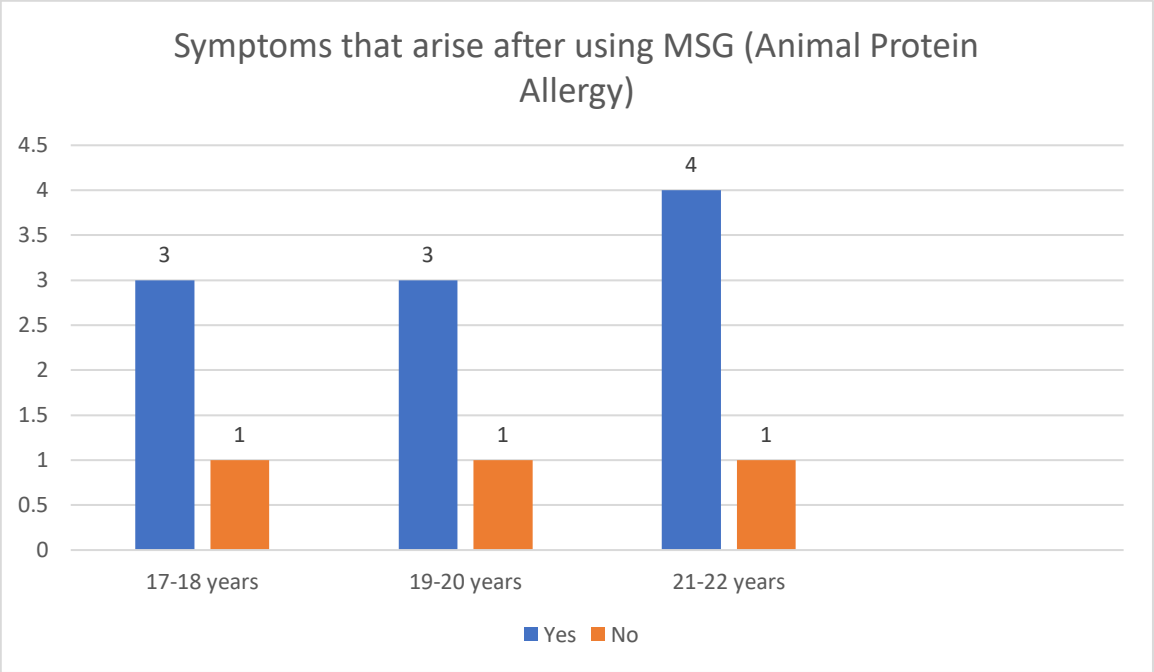

Figure 1.4. Symptoms due to the use of MSG

From filling out the questionnaire that was distributed, only 3 out of 13 respondents who experienced animal protein allergies still felt the symptoms caused by conventional MSG which contains animal protein. And the other 10 respondents did not experience allergy symptoms again after using this Organic MSG product. According to Rochmah (2022), so far, most of the side effects that occur after consuming foods containing MSG occur in the brain's nervous system. Because of this, MSG can indirectly cause a person to experience a decrease in cognitive brain function. The cognitive functions of the brain include thinking logically, making decisions, recording information in memory, solving problems and maintaining concentration. This is of course an impact that occurs when the use of MSG itself is not limited. The content of MSG itself is not completely safe for long-term consumption so it is necessary supervision carried out either by parents or themselves.

4. CONCLUSIONS

From the data obtained, it is clear that some people still don't know what MSG is contained in their food. This will certainly be dangerous because they cannot avoid things that can cause allergies. 13 people out of 53 respondents have allergies to animal protein (24,5%), 3 out of 13 people (23,07%) don't know what animal protein is in the product so it will cause allergy symptoms if they don't understand the ingredients in the product, then 10 out of 13 (76,9%) people who have protein allergies don't feel any symptoms try using this organic MSG product, because the ingredients used mostly contain vegetable protein so it is safe for people who experience symptoms of protein allergies. The use of conventional MSG products cannot be separated from society so many people are still dependent on using this product, but of course the organic MSG product is introduced will be an alternative to get a delicious taste in food but without forgetting the health aspect.

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6. REFERENCES

R. Susanti, E Hidayat. 2016 "Profil Protein Susu Dan Produk Olahannya'' . Jurnal Mipa 39 (2) Hal 98-106

Cut Bidara Panita Umar. 2021 " Penyuluhan Tentang Pentingnya Peranan Protein Dan Asam Amino Bagi Tubuh Di Desa Negeri Lima" . Jurnal Jpikes Vol 1 No. 3 Hal 52-56

Cerika Rismayanthi.2006 " Konsumsi Protein Untuk Peningkatan Prestasi''. Medikora Volume 2 No 2

Dwi Fitri Khotimah, Ulin Nuha Nur Faizah, Titah Sayekti . 2021. "Protein Sebagai Zat Penyusun Dalam Tubuh Manusia: Tinjauan Sumber Protein Menuju Sel" Volume 1, Hal 127-133

Desi Dwi Anissa , Ratna Kumala Dewi. 2021. "Peran Protein: Asi Dalam Meningkatkan Kecerdasan Anak Untuk Menyongsong Generasi Indonesia Emas 2045 Dan Relevansi Dengan Al-Qur'an''. Jurnal Tadris Ipa Indonesia Volume 1 Nomor 3

Bunga Ihda Norra , Tasya Putri Hendrika , Ati Auliyaur Rohmah , Ila Nabinya . 2021. '' Identifikasi Pemahaman Umum Ayam (Gallus Gallus) Dan Ikan Mujair (Oreochromis Mossambicus) Pada Mahasiswa Uin Walisongo Semarang''. Jurnal Pendidikan Biologi, Vol 8, No 1

Dedes Swarinastiti , Galuh Hardaningsih , Rina Pratiwi . 2018. '' Dominasi Asupan Protein Nabati Sebagai Faktor Risiko Stunting Anak Usia 2-4 Tahun''. Jurnal Kedokteran Diponegoro Volume 7, Nomor 2

Roni Nugraha , Irama Dramawanti Pamingkas, Rizsa Mustika Pertiwi, Tati Nurhayati. 2020. "Penurunan Kandungan Protein Penyebab Alergi Pada Proses Pembuatan Surimi Ikan Nila (Oreochromis Niloticus). Jphpi. Volume 23 Nomor 3

Idawati Karjadidjaja. 2007. " Monosodium Glutamat Dan Kesehatan" . Ebers Papyrus Volume 15 No.1

Ida Ayu Putu Purnamawati , I Gusti Ngurah Kurnia Ary Wiartika . 2023. " Alergi Susu Sapi ". Ganesha Medicina Journal, Vol 3 No 1

Ermi Abriyani, Dadan Ridwanuloh, Umar Bahrudin. 2022. "Penyebab Dan Pencegahan Alergi". Volume 2 No.1

Nuwairy Hilda. 2015. "Pengaruh Pengawet Benzoat Terhadap Kerusakan Ginjal". Jurnal Keluarga Sehat Sejahtera Vol. 13 (26)

Ade Yonata , Indah Iswara. 2016. "Efek Toksik Konsumsi Monosodium Glutamate". Volume 5 No.3

Eriza Putri Ayu Ning Tias, M. Galih Wicaksono, Lu'lu'ul Rosyiqul Hayati, Aulia Firda Salsabila, Endang Setyaningsih. 2022. "Potential Bromelain Pinneapple Extract To Breaker Tempe Protein As Organic Msg". Asian Journal Of Health And Applied Sciences 2022, Vol. 1, No. 3, 11–21

Lailatul Badriyah. 2019. '' Edukasi Penggunaan Monosodium Glutamat (Msg) Dalam Makanan Serta Efeknya Bagi Kesehatan'' . Jcee. Vol: 01. No: 02. Hal: 84-87

Destyalitha Sethya Nathania, Marline Abdassah Bratadiredja . 2018. '' Review : Isolasi Dan Uji Stabilitas Enzim Bromelin Dari Nanas (Ananas Comosus L.) '' Farmaka Suplemen Volume 16 Nomor 1

Achmad Machin. 2012. '' Potensi Hidrolisat Tempe Sebagai Penyedap Rasa Melalui Pemanfaatan Ekstrak Buah Nanas'' Volume 4 No 2

Zulyana Fatricia Arapa , Sunarto Kadir , Ekawaty Prasetya. 2023. ‘’ The Relationship Between The Consumption Of Foods Containing Monosodium Glutamate (Msg) With The Incidence Of Obesity In Students Of Sdn 4 Suwawa Tengah’’ . Gojhes Vol 7 No 1

Melia Munasiah. 2020. “ Dampak Pemberian Monosodium Glutamat Terhadap Kesehatan’’. Jurnal Penelitian Perawat Profesional Volume 2 Nomor 4

Diva Latifah Rochmah , Elisa Tri Utami . 2022. ‘’ Dampak Mengkonsumsi Monosodium Glutamat (Msg) Dalam Perkembangan Otak Anak’’ . Jurnal Kesehatan Masyarakat (E-Journal) Volume 10, Nomor 2, Maret 2022

Hendra. 2020. “Peran Imunoterapi Pada Tatalaksana Alergi Makanan”. Jkr (Jurnal Kedokteran Raflesia) Vol. 6, No. 2