

**KNOWLEDGE AND PARTICIPATION OF UIR BIOLOGY AND MATHEMATICS EDUCATION STUDENTS ABOUT THE USE OF FOOD PACKING PLASTIC AS A SOURCE OF ENVIRONMENTAL POLLUTION**

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**ABSTRACT**

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This study aims to determine the knowledge and participation of biology education students and UIR mathematics education students regarding the use of plastic food wrap as a source of environmental pollution. The research was conducted in March-May 2021. The research method is a survey method. Data collection techniques using tests, questionnaires, interviews, and documentation. The instrument used is a test based on Bloom's taxonomy with 15 questions and a questionnaire of 20 statements, instrument testing, and reliability testing. The population in this study amounted to 243 students and used a saturated sample. The results showed that the average knowledge of UIR biology and mathematics education students about the use of plastic food wrap as a source of environmental pollution was 70.36% in the good category. Meanwhile, the participation of UIR biology and mathematics education students regarding the use of plastic food wrap as a source of environmental pollution with a value of 84.57% in the very good category. It can be concluded that the knowledge and participation of UIR biology and mathematics education students regarding the use of plastic food wrap as a source of environmental pollution are in a good category.

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## INTRODUCTION

Plastic is the prima donna for the industrial world because of its convenience and practicality to replace other materials such as wood and metal in helping human life. So that humans are very dependent on the existence of plastic used as food wrappers and for various other purposes. When wasted in nature, plastic waste obtained from food wrappers without being appropriately managed will accumulate and require a long time in the reform process. Thus, it can pollute and interfere with life in nature, especially for biotic and abiotic. Efforts must be made to reduce pollution to the environment by reusing plastic for other functions, recycling, and reducing the use of plastic food packaging (Endah, 2011).

There are seven kinds of international plastic codes, logos or writings or plastic codes usually printed and embossed on plastic parts, especially in food and beverage industry products. Plastic is easy to get because its function is used as a place to eat, whether directly or indirectly, for daily activities. Food packaging in the millennial era in plastic is easy to get because it functions as a container and is relatively cheaper. Some are flexible (thin) for food wrappers and rigid for beverage bottles and meet the standard triangle on the product label (Indrawati, 2017).

Packages of food and drinks purchased have a tangible impact on the environment as a pollutant material that will ultimately impact areas such as; ditches, rivers, beaches, and ending in the oceans. Data from the Ocean Conservancy, which has conducted research, found that 4 out of 6 types of waste are related to plastic food wrapping. In general, people have been in contact with plastic from the 1950s until today. If plastic is still ignored, then the most significant impact will be accumulation in the ocean that comes from the flow that is passed because there are types of plastic that cannot be processed. So it is necessary to take care of actions that are carried out in an integrated manner to reduce waste in the environment (Widyaningrum, 2019).

Food packaging plastic waste is a problem that needs attention. Apart from the community and government, students need to be specifically involved in educating the dangers of using plastic so that the amount disposed of is still within the allowed limit. The population is one of the factors that increase the amount of plastic. Student participation in managing the use of plastic food wrap is needed to remind each other of the great dangers that will occur if they are passive, such as pollution of soil, water, ditches, ditches, and rivers. Sufficient knowledge plays a vital role in preventing existing plastic food wrappers from being disposed

of in the environment. According to Rusuli (2015), knowledge is the material of knowledge and can only answer what is needed by all humans to advance the nation's life. Knowledge is obtained based on experience from observations or experiments and tested for validity, systematic, objective, general, and reliability. Knowledge begins with reason, and experience follows reality. In general, there are four types of knowledge; factual, conceptual, procedural and metacognitive. Based on that, this type of knowledge can be related to the types of cognitive processes used for retention and transfer proportionally by using categories in the cognitive process dimension through; remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5) and creativity (C6) Anderson and Krathwohl (2015).

Students need to know the types of food packaging materials that meet the requirements, such as the licensing process, selection of raw materials and their impact on the environment. Related to this, in 1988, The Society of Plastic Industry America issued special codes to make it easier to identify packaging that is classified as food-grade, so it is safe when in contact with food ingredients, especially in the presentation and packaging of food, both in the form of raw materials and raw materials. has been cooked and safe for health. This plastic material is also trusted, easier to use and more guaranteed protection during the distribution process (www.kompasiana.com, 2019).

Students must also participate in planning and implementing responsibilities according to their level of obligation and maturity. According to Candra (2012), participation is carried out in the planning, implementation, and evaluation stages. Suppose it is related to the problem of plastic food wrap. In that case, students are required to participate at least in their environment, then participate in activities carried out by specific organizations oriented towards plastic problems, especially plastic food wrappers and how to manage them correctly and adequately under applicable regulations. Added by (Zamroni and Dwiningrum, 2015), participation is mental and emotional and physical involvement as individuals and groups in certain situations. Putting all the efforts they have so that the goal goes as it should.

The knowledge and participation of students in reducing the disposal of plastic food wrap are critical. Based on initial observations in the field of study program students. UIR's biology and mathematics education regarding plastic food wraps found some phenomena. Lack of knowledge of students about food packaging plastics, food packaging plastics are easy to get and affordable to

buy, students do not understand the logo on existing food packaging plastics, throw food packaging waste carelessly, do not understand the dangers of food wrapping plastics for health and cause pollution environment. This study aims to determine the knowledge and participation of UIR biology and mathematics education students regarding the use of plastic food wrap as a source of environmental pollution.

## METHOD

This research was conducted in March-May 2021. The method used was a survey method. Data collection techniques using tests, questionnaires, interviews, and documentation. The instrument in this research is a test in the form of a question that aims to determine the level of knowledge possessed by UIR biology and mathematics education students. The questions given are 15 items. Making questions based on Bloom's Taxonomy with the order of questions from remembering (C1), understanding (C2), applying (C3), analyzing (C4) and evaluating (C5) and (C6) creativity.

Then Non-Test uses a questionnaire with four indicators; decision-making, implementation, benefit-taking, and evaluation, consisting of 20 questionnaires. The scale used is a Likert scale with three categories: Strongly Agree, Agree, and Disagree. Put a checklist (v) in filling out the questionnaire for the answer that is suitable for the choice. Then interviews and documentation. The research instrument has been validated, namely, construct and content validation. The questions were validated by a colleague of Tengku Idris, M.Pd, while the questionnaire to measure participation was conducted by Dr Nurkhairah Hidayati S.Pd, M.Pd. The measuring tools used in both questions and questionnaires follow the material for research, namely about plastic food wrapping. Then test the instrument by conducting empirical validation for questions and questionnaires on other students who the sample with were not 30-40% provisions. The reliability test of this study used the Alpha Cronbach technique data processing with the SPSS 22 program. The data for the questions initially amounted to 18 items. After being tested, the valid questions amounted to 15 items). Then, for the questionnaire, which has initially been 23 statements after being tested that was valid, there were 20 statements. Knowledge (question) obtained Cronbach's Alpha value of 0.66, and participation (questionnaire) obtained Cronbach's Alpha value of 0.79. Sujarweni (2014: 193) says that decision making using the Alpha Cronbach technique has two conditions, namely: if Cronbach's Alpha value > 0.60, then the

questionnaire or questionnaire is declared reliable or consistent and if Cronbach's Alpha value < 0.60, then the questionnaire or questionnaire is declared unreliable or consistent.

The population in this study were students of biology and mathematics education totalling 243 people. There are 128 biology students and 115 mathematics students. The sampling technique used is saturated. The saturated sample technique is that the entire population is sampled. Analysis of the data using descriptive analysis, the data obtained from respondents' answers using the IBM SPSS Statistics 20 program. The interpretation category contains five categories for assessment, namely very good, good, quite good, less good and not good. How to determine the results of the data obtained after the calculation which can be seen in Table 1.

**Table 1.** Score interpretation category for knowledge and perception

No	Range	Category
1	81%-100%	Sangat Baik
2	61%-80%	Baik
3	41%-60%	Cukup
4	21%-40%	Kurang Baik
5	0%-21%	Tidak Baik

Source: [Riduwan \(2013\)](#)

## RESULTS AND DISCUSSION

This research has been carried out on biology and mathematics education students by distributing 15 questions to measure knowledge and a 20-statement questionnaire to measure participation through Google Forms. The respondents used as samples from the two study programs were 243 students. Then the data obtained from the analysis results will be described.

### Data Analysis of Student Knowledge

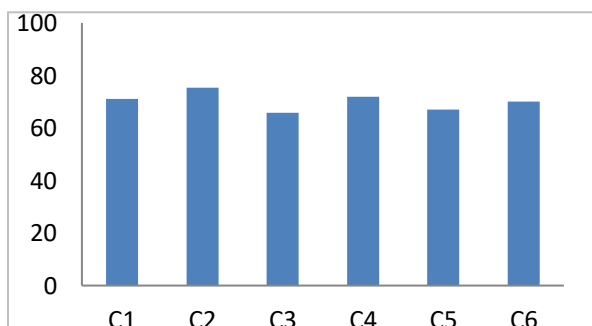
The data obtained from the results of the analysis of the biology and mathematics students' knowledge about using plastic food wrap as a source of environmental pollution through questions made from C1-C6. The following percentages presented in the form of Table 2.

From Table 2, the level of questions C1 has an average of 71.15% with the good category. Level C2 with item number 3 and 14 with an average of 72.54% in the good category. C3 with item numbers 2 and 6 with an average of 65.80% good category. C4 with item numbers 4,5,8, 9,11,12 with an average of 70.85% with good category. C5 with item number 1.7.13 with an average of 71.84% with good category. As for C6, with item number 15 with an average of 69.98% in the good category. Average

knowledge of Biology and mathematics have an average of 70.36% good category. Explained by Figure 1.

**Table 2.** Knowledge of biology and mathematics education students

Cognitive Level	Item no.	Biology students	Math students	Average					
C1	10	71,87%	70,43%	71,15% (good)					
					C2	3	70,31%	71,30%	72,54% (good)
					C3	2	67,17%	66,08%	65,80% (good)
C4	4	74,21%	72,17%	70,85% (good)					
					5	66,40%	66,95%	66,95%	
									8
					9	66,40%	65,21%	65,21%	
									11
12	82,03%	80,86%	80,86%						
				C5	1	67,18%	66,95%	71,84% (good)	
7	69,53%	66,08%	66,08%						
									13
C6	15	69,53%	70,43%	69,98% (good)					
					<b>Average</b>			<b>70,36%</b>	
<b>Category</b>				<b>Good</b>					



**Figure 1.** Knowledge graph of biology and mathematics education students

#### Data Analysis of Student Participation

The data obtained from the analysis of the study program student participation. Biology and mathematics education regarding the use of plastic food wrap as a source of environmental pollution can be seen in Table 3. Analysis on decision-making obtained an average of 88.85% in a very good category, on the implementation have an average of 81.46 % with a very good category. Then about taking benefits an average of 80.02 with a good category, then about the evaluation of an average of 87.95 % with a very good category, and for the average, all indicators obtained an average 84.57%

with a very good category for more apparent data can be seen in Figure 2.

**Table 3.** Recapitulation of students' participation

Sub Indicator	Item	Biology education	Math education	Average
Decision-making	1	88,02%	89,86%	88,85% (very good)
	2	86,20%	89,57%	
	3	94,53%	93,62%	
	4	88,02%	88,10%	
	5	90,63%	90,14%	
Implement-tation	6	83,85%	83,77%	81,46% (very good)
	7	76,04%	74,78%	
	8	77,60%	77,01%	
	9	90,63%	88,98%	
	10	84,90%	81,74%	
Taking benefit	7	76,04%	74,78%	80,02% (good)
	8	77,60%	77,01%	
	11	85,94%	87,24%	
	12	84,90%	84,35%	
	13	76,56%	75,07%	
Evaluation	14	77,34%	77,68%	87,95% (very good)
	15	75,78%	75,36%	
	16	84,64%	84,63%	
	17	91,40%	89,57%	
	18	86,72%	86,09%	
	19	91,93%	91,59%	
	20	85,16%	87,83%	
<b>Average</b>			<b>84,57%</b>	
<b>Category</b>			<b>very good</b>	

The data discussed in this study were obtained from the distribution of level questions C1-C6, a questionnaire with four indicators consisting of 20 statements. The following are the results of research on the knowledge of biology and mathematics education students about the use of plastic wrap as a source of environmental pollution.

#### Data analysis at the level of questions C1

The question with level C1 lies in question number 10, with an average of 71.15% in the (good) category, containing material on the definition of environmental pollution caused by plastic food wrap, one of the problems related to environmental pollution. The use of plastic as a food wrapper from year to year continues to increase and cannot be avoided, so that the amount of contamination will continue to increase due to the nature of plastic in general; it cannot decompose, cannot decompose naturally, cannot absorb water, nor does it rust, and in the end, it becomes a problem for the environment. According to [Karuniastuti \(2016\)](#), plastic food wrap is dangerous for human life and the environment because it can pollute it. If the use of plastic food wrap has increased, then the waste generated is also significant because plastic is difficult to decompose, takes a long time, even hundreds of

years, until it completely decomposes with the soil. Supported by the Law of the Republic of Indonesia Number 4 of 1982, Article 1 paragraph 7 reads; the entry or inclusion of living things, substances, energy and or other components into the environment and or changes in the environmental order by human activities or by natural processes, so that the quality of the environment becomes less or no longer functions.

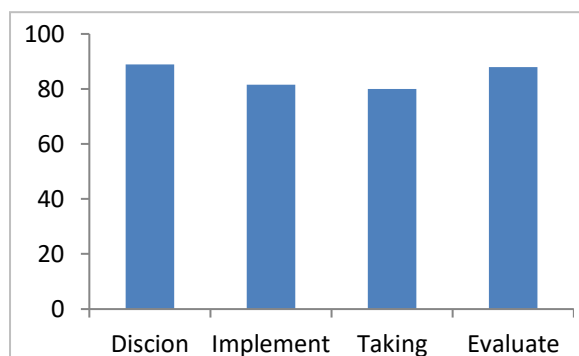


Figure 2. Student participation graph

Data analysis at the level of questions C2

Questions with level C2 are in questions number 3 and 14, with an average of 72.54% belonging to the (good) category. Item number 3 contains all existing plastic users such as buildings and construction, textiles, transportation, electricity, and chemical industries. Plastic as food wrap is PS (Polystyrene). The use of plastic as food wrap is increasing along with the development of the plastics industry. However, plastic packaging can be recognized from the logo or writing listed as safe for food or food-safe / for food use.

Nevertheless, in principle, there is no single type of plastic safe for food packaging. The choice of plastic must be more selective because the impact generated is cumulative. Reinforced by the results of research by [Putra and Yuriandala \(2010\)](#), when not in use, plastic food wrappers will become waste and pollute the environment. Therefore, various parties need serious efforts to manage it properly so as not to pollute the environment. The solution that must be done is to make appropriate disposal so that it does not impact the environment and organisms. According to [Santhi \(2016\)](#), plastic wrap packaging dominates the food industry in Indonesia, and flexible (flexible) packaging reaches 80%, the amount of plastic used to package, store and wrap food reaches 53%. From the results of interviews with several students, it was found that plastic is the most suitable food wrapper because it can be thrown away after being used anywhere and anytime and pays little attention to the effects caused by the wrapper.

Furthermore, item number 14 contains

material for companies whose products are packaged in plastic, which always emphasizes that the plastic packaging for their product packaging is environmentally friendly plastic. Environmentally friendly plastics are plastics made from organic materials to decompose/degrade quickly and are suitable for use. In 2000 it was researched and developed by several institutions and industries, such as LIPI, UI, BPPT and other institutions concerned with environmental issues related to plastic in general and plastic food packaging. The research found that environmentally friendly plastics come from natural polymers, one of which is made from cassava. Cassava is a widely available plant in Indonesia, easily obtained at low prices and an additional ingredient in the food industry as tapioca flour. The dregs called onggok can be one of the primary alternative materials for environmentally friendly biodegradable plastic that microorganisms can decompose, can be recycled, and can decompose naturally, thereby reducing environmental pollution. [Nisah \(2018\)](#) stated that starch is a very abundant edible polysaccharide from various kinds of tubers and cereal seeds. Most of its manifestations, consisting of two macromolecules having the same structural unit 1,4-D-glucopyranose, in a linear architecture, are present in different proportions according to the species producing them. Utilization of starch or its derivatives to produce plastics, including plasticized starch, mixtures, and composites. Strengthened by [Pranamuda \(2006\)](#), the need for biodegradable plastic materials has increased. In the future, this plastic will develop into a large industry.

C3 question level analysis

Questions with level C3 consist of questions number 2 and 6, with an average of 65.80% belonging to the (good) category. Question number 2 explains about a homemaker who wants to help her husband's economy as a collector of used goods so that in his house, there is much garbage such as plastic bottles, cardboard, motorcycle tires, and others. Food packaging waste that is found around us every day can be used if it is appropriately managed as a craft and has economic value, by recycling the plastic to have value in the form of various handicrafts it produces even though it still uses plastic food wrap as its primary raw material and can be done independently. So that indirectly can increase the welfare of the family. Reinforced by the research results of [Hardianti et al. \(2017\)](#), processing used goods helps fill spare time, get additional results, and gain experience in processing plastic waste, product manufacturing, and application of weaving techniques and marketing of plastic waste crafts. [Putra and](#)

[Yuriandala \(2010\)](#) plastic food wrap has promising potential to develop innovative products and services. This creative activity can also be a movement for community empowerment and expand employment opportunities and open up the possibility of increasing community welfare.

Problem 6 explains that a microwave is a household appliance that does not waste time as a food heater. However, in its use, it must be carefully selected where the food is so that the food is safe without being contaminated with chemical compounds. It is better to use plastic with code numbers 4 and 5. This is because containers with code 4 are made of Low-Density Polyethylene (LDPE), a plastic considered safe to use. After all, it is resistant to chemical exposure, being one of the types of plastic that can be used as wrappers for food and Drink.

Meanwhile, plastic with code 5 made of polypropylene (PP) is stiffer than other plastics. Besides, it has a high boiling point, so it is suitable for use as food containers to be warmed in the microwave. It is also resistant to hot food temperatures and does not melt up to 140 degrees Celsius if it is wrapped in plastic. This is safer. Furthermore, it can be used repeatedly. This is why plastic with triangles labelled 4 and 5 are better used as a food wrapper. From the results of [Yulia Astuti's research \(2013\)](#) in using plastics, especially plastics with codes 2, 4, 5 and 7, it will be safer without chemical hazards, so it is recommended for use in everyday life even though there are advantages and disadvantages. So the consumers have to be smart in choosing the food wrappers to be purchased and pay attention to the triangular label on each package. Strengthened by [Santhi \(2016\)](#), plastic packaging has several advantages, its flexible shape so that it quickly follows the shape of the packaged food; lightweight; not easy to break; are transparent/ translucent, easy to label and made in various colours, can be mass-produced, the price is relatively low, and there are various types of choices of plastic base materials. Although plastic has many advantages, there are also disadvantages when used as food packaging, namely certain types, to pollute the environment.

#### C4 question level analysis

Questions with level C4 consist of questions number 5 and 9, with an average of 70.85% belonging to the (good) category. Question number 5 explains that Indonesia is the country with the 4th most populous population globally, making Indonesia the number 2 waste-producing country with 3.2 million tons of plastic waste in the oceans every year and being number 1 in Southeast Asia. Not infrequently, we see people throwing garbage,

especially plastic waste, in any place and where there is a chance it can be on the side of the road, on the ground, behind the house, in ditches and household waste and finally going to ditches if there is rain it will flow into rivers and streams. The last is to the sea, which gradually breaks down into small and floating particles, floats on the water's surface, and is eaten by these small or large animals. If this is not realized or appropriately understood, it will threaten and cause death and contamination of the environment.

For this reason, it is necessary to dispose of food plastic packaging waste in its place or collect it for recycling. Supported by research from [Anggraini et al. \(2020\)](#), plastic is a chemical material, meaning that plastic is not a natural material but artificial or synthetic. Plastic waste, especially food wrappers, will harm the environment. It requires special awareness and knowledge of students and the community regarding disposing of plastic waste and its series. It is necessary to have activities to socialize the problem of plastic food wrap so that it is not disposed of carelessly. Based on [Jambeck \(2015\)](#) data, Indonesia is ranked second in the world for producing plastic waste to the sea, which reached 187.2 million tons, after China, which reached 262.9 million tons. This data proves that there is no proper management of plastic waste or plastic food wrap so that it is also affected by the sea or the environment.

Question no 9 contains all plastic users such as buildings and construction, textiles, transportation, electricity, chemical industries using plastic, so that the biggest producer of plastic is food wrappers. Food wrapper with its primary plastic material, usually used as food wrapper is PS (Polystyrene). The use of plastic as food wrap is increasing along with the development of the plastics industry. However, plastic packaging can be recognized from the logo or writing listed as safe for food or food-safe / for food use/food grade. However, in principle, there is no single type of plastic safe for food packaging.

The choice of plastic must be more selective because the impact produced is cumulative and will pollute the environment. Reinforced from the research results of [Putra and Yuriandala \(2010\)](#), Plastic food wrapping when it is not used will become waste and can cause danger. Various parties need serious efforts to manage it properly so as not to pollute the environment by providing disposal and management so that it does not impact the environment and organisms. According to [Santhi \(2016\)](#), plastic wrap packaging dominates the food industry in Indonesia, and flexible (flexible) packaging reaches a percentage of 80%, the amount of plastic used to package, store and wrap

food reaches 53%. The interviewed students found that plastic is the most suitable food wrapper that can be disposed of anywhere and anytime, and there is a lack of attention to the effects caused by the package.

Level Analysis of C5 questions with level C5 consists of 3 questions, namely questions number 1.7 and 13, with an average of 71.84% belonging to the good category. From the data obtained, only items 1 and 7 will be discussed because the average per question has the lowest score in the good category as well. Next is item number 1 with the material; Dini is pregnant with her first child at the age of 6 months, but she buys fried food on the roadside with plastic or Styrofoam wrappers every day. The diagnosis of the fetus on the above early habits is stunted growth, suboptimal weight, and diabetes mellitus. The use of plastic wrap in the long term has an effect because it contains chemicals, so pregnant women should not use it because it is feared that it will interfere with fetal growth. More importantly, the chemicals in plastic wrap can disrupt the endocrine system by mimicking estrogen, one of the main hormones in pregnant women. Because the work of this hormone is to increase blood flow to ensure nutrition to the fetus, thicken the uterine wall for implantation, increase uterine size, increase white blood cells and is also crucial in the process of pregnancy. [Jumadewi \(2019\)](#) said plastic is quite popular among the public. Plastic is often used as food and beverage packaging. The use of plastic is harmful to health, especially for pregnant women, which affects the fetus and child. Because plastic contains additives in plasticizers, these additives can migrate into packaged foods and beverages, especially in hot and oily conditions. This problem can be avoided by knowing the correct use of plastic according to the code and type. For this reason, it is necessary to increase the knowledge of pregnant women about plastic and be correct in using and utilizing plastic as a food wrap.

Question no 7 discusses Andi being a student and a street food vendor. Andi is an active student who understands more or less the dangers of using plastic from the seminars he attends. Thus Andi tries not to wrap his food in plastic but uses newspaper. Andi's wrapping of fried foods with newspapers is not justified because newspapers have dangerous chemical compounds. Fried foods and various other types are generally packaged hot using newsprint. It should be noted that they contain lead (Pb) which comes from the ink used to print the writing on newspapers. Hot and fatty ingredients will facilitate the transfer of lead into food.

Pb or lead compounds in the human body

enter through the respiratory or digestive tract to the circulatory system and spread to various other tissues such as the kidneys, liver, brain, nerves, bones and have different effects in the human body. So it would be best if we did not use newspapers as food packaging materials. [Suwaidah et al. \(2014\)](#), The function of packaging in food, among others, is to protect food from contamination that can interfere, harm and endanger human health.

Food or beverage packaging materials can contain hazardous compounds such as heavy metals, lead which can contaminate food and are consumed by humans. This indicates that a certain amount of lead metal is released or transferred from the simulated paper packaging into the simulated fried food. The released lead content increased with increasing temperature and storage time and showed a linear relationship between storage time and release. This requires an understanding that the use of newsprint packaging as food wrappers should be avoided, especially fried foods that contain an element of oil. Consumers must proactively increase knowledge of the safety aspects of using packaging for food. Cooperation between relevant agencies is needed through various media to increase public awareness about the importance of food safety and change the behaviour of producers and consumers. Newspaper food wrappers are still often found as fried food wrappers for reasons of utilization and lower prices when compared to paper that is still clean/new.

#### C6 question level analysis

Questions with level C6 are in question no. 15, with an average of 69.98% belonging to the good category. Plastic will continue to be used by humans even though it has a negative side. Efforts to overcome environmental pollution have been made by introducing environmentally friendly plastics that can be decomposed in nature, recycling plastics, or burning. Then innovative plastics were introduced, namely plastics that can regulate themselves. It is mainly related to electronic or robotic materials, drug carriers, and various types of medical equipment. Plastic, however, has filled human life from almost all sides: clothes, electrical appliances, home appliances, building materials, cellphones, computers, motorcycles, cars, planes, and many others. The narrative hypothesis above is that plastic has a negative side but has an essential role in life from all sides. So, when viewed from the negative side, plastic food wrappers can enter the body from the packaging, so in the future, food wrappers can affect food more than the expiration date. Product

quality will change due to chemical, physical, enzymatic, or microbiological conditions, which occurs due to mass transfer between food and the environment. Storage conditions also affect the appearance, texture, and taste of food. Besides, it is also harmful to health and environmental pollution in the long term. However, plastic wrap has a vital role in life when seen. Food packaging using plastic as a wrapper has become an essential element in food purchases in the last few decades. Because the goal is to be accessible to transport and store, it can protect what it sells and sell what it protects.

Furthermore, plastic food wrap makes it easier to identify products in the distribution chain and distinguish them when they arrive at consumers. It is easy to shape, is lightweight, protects against contamination and offers adequate mechanical strength and low cost. Reinforced by [Diningsih and Rangkuti \(2020\)](#) Exposure to additives in plastics (plasticizers) has a broad impact on health, especially for children and the environment. Plastics are widely used as food packaging. Knowledge is needed to know how to choose and use the correct type of plastic to avoid the risk of exposure to harmful chemicals in plastic that can affect health and the environment. However, plastic food wrap also has a role in this life.

The average knowledge of students, 70.36%, belongs to the good category. Through experience in the field and around daily life provides an understanding of the dangers and advantages of plastic food wrap, making students the spearhead in reducing plastic use or using other alternatives that can reduce pollution to the environment. It is reinforced by the results of student interviews that students understand the dangers of plastic, which is considered cheap and practical and can be obtained anywhere as food wrappers. However, essential awareness is needed so that the problem of plastic food wrap does not harm the environment and changes the mindset of using environmentally friendly plastic. Decision Making Participation

Analysis of the data about decision-making on average is 88.85%, with a very good category. According to students, it is necessary to involve the community to get information, data quickly and discuss and socialize about the dangers of plastic. Community need regulations for recycling, and there must be an idea of realizing waste management for plastic food wrap that is around us every day because the excessive use of plastic threatens environmental sustainability and can cause problems not only in the environment but also in humans. So, in decision-makers on the

problem of plastic food wrap, it must be a priority to reduce contamination. Through caring about plastic food wrap, decisions will be obtained, not the result of an individual but from the results of the agreement of many people. Supported by the results of [Ventje's research \(2015\)](#) decision making should not only be carried out by some of the elite of the agency apparatus, but students need to discuss this issue to accommodate their interests. From the results of this study, any activities that will be carried out either on a small or large scale need to be discussed so that the results obtained can be applied optimally in field applications. The role of students is also related to involvement in the decision-making process. Reinforced by Abe's opinion (2002), student participation by involving the community in decision-making is a right, not an obligation. However, according to [Soeparman and Soerjono \(1980\)](#) opinion, community participation will coincide with the process itself. In subsequent cycles, the community continues to participate in decision-making, such as agreeing on the current problems of using plastic food wrap. From the results of interviews with students about decision-makers, preferably in the issue of plastic food wrap, it should involve students and the community and in general to reduce pollution to the environment. Implementation Participation

Data from participation on implementation obtained an average of 81.46%, with a very good category. In plastic food packaging, use plastic for hot food or drink containers and throw plastic in any place. It means that the implementation of participation in the use of plastic food wrap has been going well as a source of environmental pollution. It can provide benefits and convenience for students and the community to carry out regular activities. The results of [Tata's \(2015\)](#) research are strengthened. The level of education possessed by students and the community dramatically affects what can be done because of the involvement of this implementation participation because, without support, any work or activity will not run well. According to [Tjokromidjojo \(2007\)](#), participation in the implementation is an integral activity that must be grown and developed, ultimately fostering a sense of belonging, a sense of responsibility, and conscious passion about being responsible.

Taking-benefit participation

Data obtained from participation on taking benefit obtained an average of 80.02% with a good category. In terms of heating food with a microwave oven, use a glass container that is quite heat resistant, the type of plastic can be seen from a specific code, the type of plastic that is safe to use



using codes 1, 2, 3, 4 and 5, plastics that must be avoided using codes 3, 6 and 7, the habit of re-washing can make the plastic layer decompose. From this, students can take advantage of the things above that have been determined as provisions. Therefore, everything about plastic food packaging waste must respond to reduce pollution to the environment. Taking benefits in the problem of plastic wrap waste must be socialized so that they can participate and cooperate in it, following Ericson's opinion in [Slamet \(1994\)](#) involving someone in the utilization stage of a directive implemented to maintain and maintain things that have been in effect so far related to plastic food wrap.

#### Evaluation Participation

The data obtained from participation in the evaluation shows an average of 87.95% with the category (Very Good). In the case of plastic food packaging that is difficult to decompose and produces dioxin substances that are harmful to the environment, it is necessary to process plastic waste properly and pay attention to plastic waste in the environment not to harm other organisms. From the above, at this stage, students and the community must involve students and the community to evaluate how dangerous it is if this is not appropriately considered about plastic food packaging waste, for that involvement must have a spirit of love for the environment so that pollution does not occur in the long term. Following [Hakim's opinion \(2017\)](#), student participation in the evaluation must be fully involved so that plastic food wrappers can minimize the risk to both individuals and the surrounding environment.

#### CONCLUSION

The data obtained from the results of research that has been carried out can be concluded that the knowledge of UIR Biology and Mathematics Education students about the use of plastic food wrap as a source of environmental pollution with a value of 70.36% belongs to the good category. Meanwhile, the participation of UIR biology and mathematics education students regarding the use of plastic food wrap as a source of environmental pollution with a value of 84.57% is in the very good category.

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