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# Contents

# TAPIOCA VERMICELLI CONSUMPTION OF THE HOUSEHOLD AROUND TAPIOCA VERMICELLI AGROINDUSTRY AT METRO CITY, LAMPUNG PROVINCE

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**Abstract:** Tapioca vermicelli as local food processed potential for food diversification. This research aimed to study the pattern of tapioca vermicelli consumption of the household around vermicelli agroindustry and to analyse factors which influenced the household vermicelli consumption. This research was conducted by survey method, located at Metro City Lampung Province. The population of this research were household around the tapioca vermicelli agroindustry. The 71 household sample was taken proportionally random and the respondent was housewives. Interview base on the questionnaire was used for collecting data and the vermicelli consumption data were collected by recall method on February-April 2017. Data were analyzed by descriptive statistic and multiple linear regression. The result showed that the household tapioca vermicelli consumption was 124,30 gram/household/week, the frequency was 3 times a week, and consumed as bakso (meatball). The factors that influenced the household tapioca vermicelli consumption were household income, knowledge of diversification, and the psychological readiness to food diversification.

Keywords: Consumption, diversification, pattern, tapioca, vermicelli.
Abbreviations: [Tapioca Vermicelli Consumption of the Household in Metro City Lampung].

## Introduction

The food diversification program has long been proclaimed by the Indonesian government since 1974 with the issuance of Presidential Instruction (Inpres) about Improvement of the People's Food Menu. Although the program of food diversification has long been declared the results have not been as expected. The food diversification program that the achievement is measured by the Food Hope Pattern (Pola Pangan Harapan/PPH) shows that PPH score of 2016 is 86.0 just slightly below the target of 86.2. However, when seen from the consumption per food group has not reached the ideal conditions. Tuber, animal, bean, vegetable, and fruit food groups have increased but are still under ideal conditions (Ministry of Agriculture, 2017).

In the annual report of Food Security Agency 2016, it was stated that the consumption of energy of the tubers of 49.5 kcal/capita/day is still far below the PPH standard of 120 kcal/

capita/day. Therefore, the appropriate strategy is needed to increase the consumption of tubers (Ministry of Agriculture, 2017). To accelerate food diversification, in 2009 the government issued Presidential Decree No 22 of 2009 about Food Diversification Acceleration Policy Based on Local Resource. The presidential regulation becomes a stepping stone in developing local food in realizing food diversification. Local food can be either fresh or processed. There is no legal or universally accepted definition of local food. In part, it is a geographical concept related to the distance between food producers and consumers. In addition to the geographic proximity of producer and consumer, however, local food can also be defined in terms of social and supply chain characteristics (Martinez et al., 2010). Eating locally is correlated with improved nutrition, increased likelihood of making healthier food choices, obesity prevention, and reduced risk of diet-related chronic disease. This

is mainly because the food is more nutritious, fresher, and less processed (Martinez et al., 2010). Local food commodities that have been studied and have been tested on an industrial scale include sweet potato, corn, and cassava (Muchtadi & Sukmawati, 2012; Khaeron, 2016; Glenna et al., 2017; Epeju & Rukundo, 2018).

Among the various processed foods based on cassava, noodles made from cassava is one of the products that have been cultivated in the National Strategic Leading Research (Rusnas) in 2002 (Muchtadi & Sukmawati, 2012). In Lampung Province, the vermicelli made from cassava, known as mi aci (tapioca vermicelli) have been known for a long time in certain areas, but not evenly distributed throughout the region, even in Bandar Lampung (Capital of Lampung Province), tapioca vermicelli is not available in the market. It shows that the socialization of tapioca vermicelli as one of the locally processed food in the diversification of food consumption is not yet widely known, so its consumption is still limited.

Economically and nutrition, cassava is feasible to be developed as a staple food (Arief, Novitasari, & Asnawi, 2018). Tapioca vermicelli agroindustry in Lampung Province gives positive added value (Lestari, 2007; Fitriani, Unteawati, Mutaqin, & Sutarni, 2018; Milner & Rosenstreich, 2013). If economically profitable and feasible to be developed, tapioca vermicelli has potential as local food processed that can accelerate the diversification of food consumption. Therefore, it is necessary to examine the consumption pattern of tapioca vermicelli in the community.

Food consumption is related to food selection. Various factors affect the selection of food. The selection of food is determined by economic factors and access to food and behavioural factors (Drewnowski, 2012; Vabo & Hansen, 2014; Dimitri & Rogus, 2014). Access to food is related to food availability and affects food consumption of carbohydrate sources (Kearney, 2010; Apriani & Baliwati, 2011; Muchtadi & Sukmawati, 2012). Behavioural factors, in this case, are individual behaviour

or consumer behaviour (Drewnowski, 2012). Proposed a consumer decision-making model that has three components: input, process, and output (Schiffman & Kanuk, 2007; Milner & Rosenstreich, 2013). The input types are grouped into marketing inputs and socio-cultural input. Associated with the socio-cultural aspects, this study adopted the concept of psychological readiness on food diversification (Hidayah, 2011). Psychological readiness to diversify food will determine the success of socialization of food diversification (Hidayah, 2011). Psychological readiness on food diversification includes knowledge, attitudes toward food diversification, and a tendency to consume food sources of non-rice carbohydrates. The concept of psychological readiness delivered by Hidayah (2011) was applied in this study to determine its effect on one of the specific processed cassava consumption as potential diversification food, namely tapioca vermicelli. Hidayah's research (2011) does not connect psychological readiness and other variables with specific commodities, such as this research. From this research, it is expected to obtain information on factors that determine the potential specific food for consumption food diversification. Tapioca vermicelli is a potential food to support food diversification because vermicelli is a type of noodle food, meanwhile, noodles are a type of food whose consumption is significantly increased in the food consumption patterns of Indonesian. This study aims to study the consumption pattern of tapioca vermicelli by households around tapioca vermicelli agroindustry and analyze the factors that affect the consumption of tapioca vermicelli.

## Materials and Methods

### *Location, Time of Study, and Sampling Technique*

The study was conducted in the Metro City of Lampung Province, using the survey method. Site selection is done purposively with the consideration of Metro City is the production centre of tapioca vermicelli. Data collection was conducted from February to March 2017.

Households around the tapioca vermicelli agroindustry of Cap Bulan, Cap Dua Jangkar, Cap Motor, and Cap Monas Lancar in Metro City covered in three urban villages are the population of this study, while households are the unit of analysis. Several households in that area are 1,022 families. Based on the formula of Isaac and Michael, from the study population determined a sample of 71 families (Isaac & Michael, 1995). The number of samples from each urban villages was determined proportionally, so that the samples obtained in the villages of Banjarsari, Karangrejo, and Iringmulyo were 40, 24, and 7 families, respectively. The selection of household samples was carried out in a simple random sampling

### Data Collection and Analysis

The type of data used is primary and secondary data. Primary data included income data, education, nutrition knowledge, knowledge about food diversification and attitude toward food diversification, and the tendency to consume non-rice staple food, introduction to tapioca vermicelli and also the consumption of tapioca vermicelli. Primary data were obtained by interview using a questionnaire. Questionnaires to measure psychological readiness to food diversification and nutrition knowledge had been tested its validity and reliability. The validity is tested using Product Moment correlation analysis and the reliability is tested using Alpha Cronbach. Household tapioca vermicelli consumption is obtained by recall method for the last one week period. To calculate the energy content of food consumed is used Daftar Komposisi Bahan Makanan (DKBM) (Ministry of Health of Indonesia, 2005). Secondary data is obtained from relevant agencies and from the literature which includes the data of food consumption of the community.

Data were analyzed with descriptive statistics and multiple linear regression. Psychological readiness to food diversification and nutrition knowledge had been transformed to interval scale by Method of Successive Interval (MSI).

### Results and Discussion

#### Social Economic Condition of Household

The number of respondents who are all housewives is 71 people. Age of housewives mostly ranged from 23-43 years as many as 48 people (63.38%). The level of education of housewives is mostly between 6-12 years old (SD-SLTA) that is as many as 33 people (46.48%). Households in the study area were included in the criteria of small households with the number of members ≤ 4 persons as many as 57 households (80.28%). Most housewives do not work for a living, this group includes 43 people (60.56%). Household income in Metro City ranges from Rp750,000.00 to Rp5,000,000.00 with an average of Rp2,149,295.00 per month.

#### Level of Introduction of Tapioca Vermicelli

Vermicelli is one type of noodle that well known by the community, but the most widely known are rice-based vermicelli. Vermicelli based non-rice (eg tapioca) has not been widely known. The level of recognition of a type of food will affect the selection of food. For that, we need to know the level of introduction of housewives to tapioca vermicelli. In this study, the introduction rate of tapioca vermicelli was assessed by scoring the two questions asked, of the two questions the total maximum score that can be achieved is seven.

The result of the research shows that housewife around agroindustry of tapioca vermicelli in Metro City is very familiar with tapioca vermicelli. Almost all housewives scored seven, only two (2.81%) who did not get the maximum score. This is understandable because the research location is the area around agroindustry of tapioca vermicelli, where tapioca vermicelli agroindustry has been very long-standing in Metro City.

#### Nutrition Knowledge

Nutrition knowledge is one of the personal factors that affect the selection of food. The ability of housewives in answering various questions about food and nutrition shows the

knowledge of the housewife's nutrition. In this study, nutrition knowledge was assessed from 25 questions about food and nutrition consisting of 7 questions about healthy food, 5 questions about food use for the body, how to choose and process food (4 questions), local food (1 question), type and source nutrients (4 questions) and questions about the consequences of malnutrition (4 questions). The value is 0 (zero) if the answer is wrong and 1 (one) if the answer is correct.

It was found that the knowledge of housewife nutrition ranged between 7 and 23 with a mean (X) 13,11 with standard deviation (SB) 3,54. The nutritional knowledge value of housewives is further classified into three categories. Distribution of housewives by category of nutritional knowledge can be seen in Table 1.

Table 1 shows that the distribution of the lowest housewives is in the category of high nutritional knowledge that is 28.17 per cent. There appears to be a balance between groups of housewives with low and middle nutritional knowledge. This is in line with the education of housewives who cluster in lower and middle education.

### Psychological Readiness for Food Diversification

In this research, the measurement of psychological readiness of the society towards food diversification (Hidayah, 2011), where the people's readiness to diversify food includes three dimensions, namely knowledge, attitude toward food diversification, and the tendency to consume food of non-rice carbohydrate source. Knowledge of housewives about food diversification was obtained by asking the question of how far the housewife's knowledge of food diversification (1 question). Attitudes towards food diversification seen to measure psychological readiness are the role and opinions of respondents about local food and the importance of counselling and dissemination of food diversification (three questions). The consumer's tendency towards food diversification is judged from the actions taken by the respondents in consuming local food (2 questions). From each question, the given score is between 1 and 5.

Of the three aspects assessed in psychological readiness on food diversification, it is known that the range of values ranges from 13 to 29. Furthermore, it is classified to obtain the distribution of housewives according to psychological readiness to food diversification as shown in Table 2.

From Table 2 it can be seen that among the three dimensions of the psychological readiness on food diversification, the dimension of knowledge is the dimension that has the lowest value. This indicates that the food diversification program that has been running has not been understood by the research community. Although in the knowledge dimension of psychological readiness is in a low category, but for the dimension of attitude is in the medium category. In the dimension of the tendency to consume non-rice food, housewives in the research area are in the high category. This happens because in general the community has been accustomed to consuming local food, following the availability of food.

Table 1: Distribution of housewives by category of nutritional knowledge

| Nutrition knowledge category | Number of housewives (persons) | Percentage (%) |
|---|---|---|
| Low ( < 11,34*) | 26 | 36,62 |
| Medium ( 11,34 -14,88) | 25 | 35,21 |
| High ( > 14,88) | 20 | 28,17 |
| Total | 71 | 100,00 |

Table 2: Classification of housewife's psychological readiness toward food diversification by dimension *)

| Dimension and classification | Range | Frequency | Percentage (%) |
|---|---|---|---|
| Knowledge of diversification | | 71 | 100.0 |
| ☐     Low | 2 - 4 | **42** | **59.2** |
| ☐     Medium | 5 - 7 | 21 | 29.6 |
| ☐     High | 8 - 10 | 8 | 11.3 |
| Attitude toward diversification | | 71 | 100.0 |
| ☐     Low | 6 - 9 | 27 | 38.0 |
| ☐     Medium | 10 - 12 | **42** | **59.2** |
| ☐     High | 13 - 15 | 2 | 2.8 |
| The tendency to consume non-rice food | | 71 | 100.0 |
| ☐     Low | 2 - 4 | 0 | 0.0 |
| ☐     Medium | 5 - 7 | 24 | 33.8 |
| ☐     High | 8 - 10 | **47** | **66.2** |
| Psychological readiness to food diversification | | 71 | 100.0 |
| ☐     Low | 15 - 24 | **54** | **76.1** |
| ☐     Medium | 25 - 29 | 13 | 18.3 |
| ☐     High | 30 - 34 | 4 | 5.6 |

.*) Sayekti, Lestari, & Ismono, (2017)

### Tapioca Vermicelli Consumption Pattern

The pattern of consumption of tapioca vermicelli shows the household habits in consuming tapioca vermicelli which is seen from the amount, frequency, type of preparation, and how to obtain. The consumption patterns of tapioca vermicelli as processed local food shows society's demand as a reflection preference, availability, and actual purchasing power of society. From the results of the study, it is known that most households (67.60%) consume tapioca vermicelli. Tapioca vermicelli is one of many types of local food preparations made from raw cassava consumed by households in Metro City.

Three local food commodities found consumed by households in Metro City are corn, cassava, and sweet potato. Among the three commodities, cassava is the most consumed commodity. The type of processed from cassava is also the most that are 15 types, compared to four types of corn processing and three types of sweet potato. The contribution of cassava energy to local food energy consumption can be seen in Figure 1.

From Figure 1, it can be seen that the consumption of energy from household processed food is dominated by energy from processed cassava. Total energy consumption of tuber group is 5,117 kcal/household/ week or 731 kcal/capita/day. If the average number of household members is 4 people, then the average consumption of energy group of tubers is 182.75 kcal/capita/day. This is much higher than the consumption of national tubers reported by Badan Ketahanan Pangan 2016 which amount 49.5 kcal/capita/day (Ministry of Agriculture, 2017).

National Recommended Dietary Allowance (RDA) is 2,150 kcal/capita/day, meaning that the contribution of energy consumption from tubers in Metro City reaches 8.50 per cent. The contribution has exceeded the PPH standard of 6 per cent. The contribution of tapioca vermicelli is 10 per cent of cassava energy consumption.
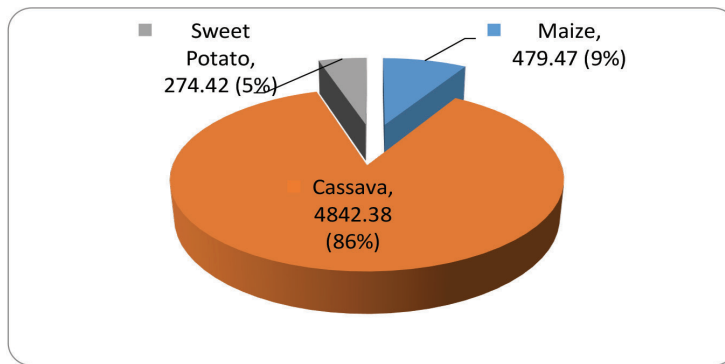
Figure 1: Contribution of energy consumption of processed food of cassava

The range of consumption of tapioca vermicelli by households in Metro City is between 53 to 1,000 grams/household/week with an average of 124.30 grams/household/week or 497.2 gram/household/month. The amount of consumption is lower than the results of research by Vidyaningrum, Sayekti, and Adawiyah (2016) in Purbolinggo East Lampung of 1360 grams/household/month. This difference occurs due to different sampling techniques (Vidyaningrum, Sayekti, & Adawyah, 2016). Although consumption of tapioca vermicelli is not the most among the 15 types of processed foods made from cassava consumed by households in Metro City, tapioca vermicelli is quite meaningful in the pattern of local food consumption processed. Figure 2 illustrates the position.

It can be seen in Figure 2 that among the 10 foodstuffs of cassava processing, the number of household tapioca vermicelli consumption per week is ranked seventh, while when seen in the consumption of energy tapioca vermicelli is ranked fourth. The difference in ranking position occurs because tapioca vermicelli is dry food (low water content) so it is quite solid energy. The frequency of consumption of tapioca vermicelli in this study was measured by giving a score on household food consumption (Suhardjo, 1989). The basic categorization of Suhardjo is: (a) very often if> 1 x / day (every meal), (b) often if> 1 x / day, 1 x daily, 4-6 x / week, (c) enough often 3 x per week, (d)

enough if, 3 x / week or 2 x / week, (e) rarely (1 x / week), and (f) not consumed. The scores for each of the consecutive categories from a to f are 50, 25, 15, 10, 1, and 0. The scores of all households are summed and the values are averaged to indicate population frequency. From the result of research, the frequency score of tapioca vermicelli consumption in Metro City is 3.46. This is highest compared to other processed cassava food.

The comparison of the consumption frequency of some of the cassava processed foods can be seen in Figure 3. It can be seen that although in terms of quantities, consumption of tapioca vermicelli is ranked seventh but in terms of frequency is ranked first. The high frequency of consumption is a good thing to increase consumption of tapioca vermicelli because although the amount in one-time consumption is not large if multiplied by a high frequency then the total amount of consumption will large.

The high frequency of consumption is related to the preparation type of processed tapioca vermicelli selected. The results of the study found that the type of preparation selected by most housewives is meatballs (vermicelli in meatballs). Meatball is a snack suitable for consumption in any situation and favoured by various consumers. Concerning the fact, the socialization of tapioca vermicelli in processed meatballs appropriate to do.
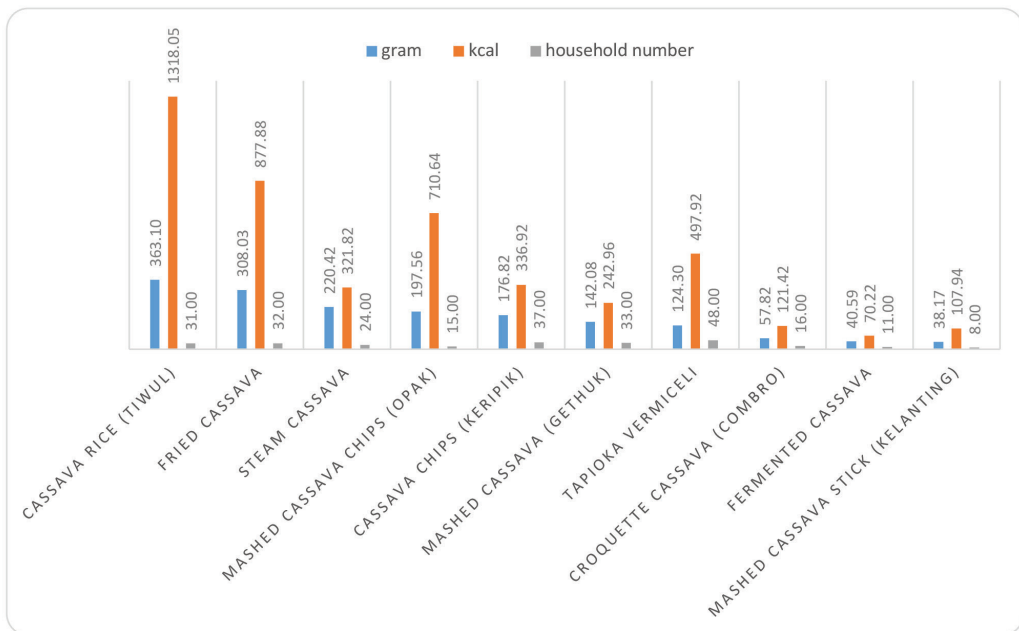
Figure 2: Comparison of consumption of tapioca vermicelli with some other processed cassava food
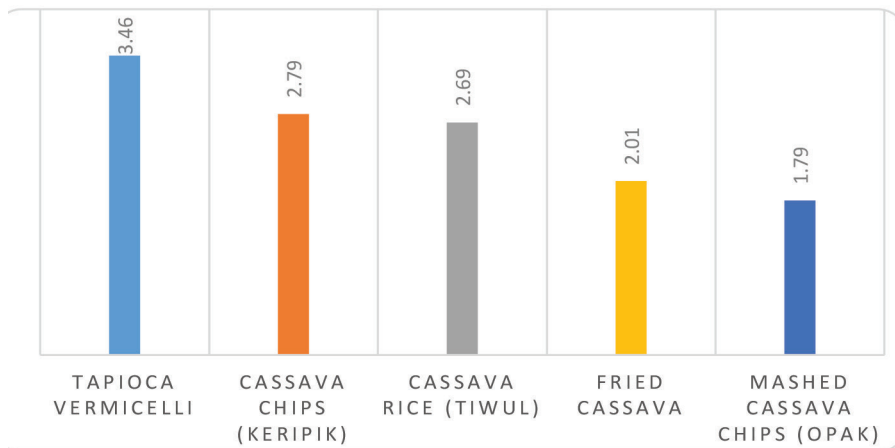


Figure 3: Frequency of consumption of some processed food of cassava

Following the findings that the type of processed tapioca vermicelli consumed is processed meatballs, then the food is obtained by buying. Concerning these findings, efforts to increase the consumption of tapioca vermicelli can be done by increasing the availability of food made from tapioca vermicelli that is ready to eat.

## Factors Influencing Tapioca Vermicelli Consumption

Some of the variables that are suspected to affect tapioca vermicelli consumption are education level, income, nutrition knowledge, recognition rate, diversification knowledge, and psychological readiness on food diversification.

The results of the analysis of these factors can be seen in Table 3.

The adjusted coefficient of determination is 0,1475. This means that only 14.75 per cent of variation in tapioca vermicelli consumption can be explained by the variables in the model (level of education, income, nutritional knowledge, recognition rate, diversification knowledge, and psychological readiness on food diversification), while the remaining (85.25 per cent) is explained by other variables that are not included in the model. Large residual values in the model indicate that tapioca vermicelli consumption is a complex problem so that many variables are involved.

F-stat is 3,0187 with probability value equal to 0,0120 which mean that variable of education, income, knowledge of nutrition, level of recognition, knowledge of diversification, and psychological readiness to food diversification together have the influence to the consumption of tapioca vermicelli in significantly of 95 per cent. All of these variables are a manifestation of economic factors, access to food, and behavioural factors (Dimitri & Rogus, 2014).

Furthermore, it can be seen that partially, some variables have a significant effect on the consumption of tapioca vermicelli. They are income, diversification knowledge, and psychological readiness on food diversification. Income has a significant positive effect on consumption of tapioca vermicelli. Income is one of the factors that affect food demand (Devi & Hartono, 2015) (Vidyaningrum et al., 2016). The higher the income the higher the consumption of tapioca vermicelli. This shows that tapioca vermicelli is a normal item, with a note, occurring in areas that have good accessibility to tapioca vermicelli because this research is conducted in the region around the tapioca vermicelli agroindustry so that its availability is high. About this matter, tapioca vermicelli can be introduced to a good economy class society as long as it is accompanied by the provision of good tapioca vermicelli.

Knowledge of food diversification has a significant effect on food consumption. Regression coefficient marked positive which

Table 3. Result of regression analysis about factors that influenced the consumption of tapioca vermicelli

| Variable | Consumption of tapioca vermicelli | | | |
| --- | --- | --- | --- | --- |
| | Coefficient (B) | | Probability | VIF |
| (Constant) | 996,3875 | | 0,2454 | |
| Education level | -10,7439 | | 0,7328 | 2,448 |
| Income | 0,0003 | *** | 0,0065 | 1,474 |
| Nutrition knowledge | -47,5214 | | 0,7328 | 2,310 |
| Recognition rate | -208,9636 | | 0,3467 | 1,126 |
| Diversification knowledge | 299,1264 | ** | 0,0497 | 2,582 |
| Psychological readiness | -235,8619 | * | 0,0705 | 2,439 |
| F-stat | 3,0187 | | 0,0120 | |
| R Square | 0,2206 | | | |
| Adjusted R-Square | 0,1475 | | | |

Note:

| | |
| --- | --- |
| *** | : level of confidence 99% |
| ** | : level of confidence 95% |
| * | : level of confidence 90% |

means the higher knowledge of housewife to food diversification hence consumption of tapioca vermicelli is higher. Good knowledge will underlie attitudes, which ultimately dictate good action in terms of diverse consumption. Consumption of tapioca vermicelli is one form of food diversification behaviour.

As has been described that the psychological readiness to diversify the food includes three dimensions, in addition to the dimension of diversification knowledge as well as attitudes and trends toward diversification. The results showed that psychological readiness on food diversification affected consumption of tapioca vermicelli at 90 per cent confidence level. Regression coefficient marked negative which means the higher of psychological readiness to food diversification hence consumption of tapioca vermicelli is lower. This is allegedly due to the correlation with the results of psychological readiness assessment on food diversification, where one of the dimensions is the trend of local food consumption in high category (Table 2). The dimension of local food consumption tendency, in this case, is the tendency towards local food in general (not just tapioca vermicelli). There is a possibility the higher the value of the local food consumption trend, the diversity of local food consumed more diverse, so the portion of tapioca vermicelli even smaller.

From the findings of this research, there is a positive influence between income and consumption of tapioca vermicelli. It indicates that tapioca vermicelli is the potential food to be developed for food diversification in the high-income group. With the right marketing strategy, the contribution of tapioca vermicelli in food consumption patterns can be increased, which means diversification of food consumption can be achieved.

Besides the economic aspects, this study found that the socio-cultural aspects of psychological readiness towards food diversification, especially the dimensions of knowledge on food diversification has a positive effect on consumption of tapioca vermicelli. In

connection with these findings, by increasing public knowledge on food diversification, it is expected that diversification food consumption can be improved by increasing the contribution of tapioca vermicelli in food consumption patterns.

## Conclusion

Tapioca vermicelli has an important position in household food consumption in Metro City. The total consumption of tapioca vermicelli is 124.30 grams/household with the highest frequency score compared to other processed cassava food. Type of processed tapioca vermicelli which is widely consumed is tapioca vermicelli in processed meatballs obtained by buying in the form of ready to eat. Income affects the consumption of tapioca vermicelli. To increase consumption of tapioca vermicelli, it is necessary to socialize tapioca vermicelli in a high-income market segment. Knowledge of diversification and psychological readiness on food diversification affect the consumption of tapioca vermicelli. Given the psychological knowledge and readiness of food diversification is still low, it is necessary to increase the effort of socialization of food diversification program massively to the community.

## Acknowledgements

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