DETERMINANTES DO CONSUMO DE PRODUTOS ORGÂNICOS

RESUMO

O aumento da consciência ambiental e o desejo crescente por alimentos mais seguros à saúde fizeram da categoria de produtos orgânicos uma das mais crescentes no setor de alimentos. Assim, esta pesquisa teve por objetivo identificar as variáveis socioeconômicas mais significativas que influenciam a frequência de consumo de produtos orgânicos, e para isso fundamentou-se em um estudo quantitativo-descritivo com amostra probabilística de 400 indivíduos, residentes da área urbana de Campo Grande/MS, Brasil, responsáveis, sozinhos ou não, pela compra de alimentos na família. Como ferramenta para coleta dos dados, utilizou-se questionário estruturado, constituído por variáveis socioeconômicas e de frequência de consumo de produtos orgânicos. Para a análise dos dados realizaram-se testes estatísticos/econométricos com software estatístico STATA 11.0, utilizando modelo Multinomial Logit (MNL), além da verificação do efeito das variáveis explicativas sobre a probabilidade da frequência de consumo de produtos orgânicos através da Razão de Risco Relativo (RRR), e foi analisado o Efeito Marginal (EM) exercido pelas variáveis explicativas em cada nível de frequência de consumo de produtos orgânicos. Os resultados mostraram que as variáveis explicativas sexo, escolaridade e classe econômica foram estatisticamente significativas na probabilidade de um indivíduo pertencer a alguns dos níveis de consumo (raro, esporádico e frequente) em detrimento de nunca ter consumido produtos orgânicos, sendo maior frequência de consumo quando o consumidor for do sexo feminino, possuir maior escolaridade ou for de classe econômica mais elevada.

Palavras-chave: Determinantes de Consumo; Consumidor de Produtos Orgânicos; Perfil Socioeconômico; Modelo Multinomial Logit.

DETERMINANTS OF ORGANIC PRODUCTS CONSUMPTION

ABSTRACT

The increased environmental awareness and the growing desire for safer foods to health made the organic products category one of the most growing in the food sector. Thus, this study aimed to identify the most significant socioeconomic variables that influence the frequency of organic products consumption, and for that, it was based on a quantitative-descriptive study with a probability sample of 400 individuals, residing of the urban area of Campo Grande/MS, Brazil, responsible, alone or not, for food purchasing in family. As a tool for data collection, was used a structured questionnaire developed from socioeconomic variables and frequency of consumption of organic products. For the data analysis was performed statistical/econometric tests with the STATA 11.0 statistical software, using Multinomial Logit model (MNL), addition to verification of the explanatory variables effect on the probability of the consumption frequency levels of organic products through the Relative Risk Ratio (RRR), and was analyzed the Marginal Effect (ME) exercised by the explanatory variables in each frequency level of organic products consumption. The results showed that the explanatory variables gender, education and economic class were statistically significant in the probability of an individual belong to some of the levels of consumption (rare, occasional and frequent) over never having consumed organic products, being higher frequency of consumption when the consumer is female, have higher education or is of higher economic class.

Keywords: Consumption Determinants; Organic Consumer; Socio Economic Profile; Multinomial Logit Model.

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1 INTRODUCTION

The spread and the increased environmental awareness and the growing desire for foods that are safer for health have led society towards questioning the practices and model processes of conventional agriculture (chemical). Despite this fact, many risks are related to effects not known by the long-term health, due to the use of pesticides and their residues in food and environment (Mei-Fang, 2007). Thus, this research examines which variables related to the characteristics and socio-economic profile of an individual may be more (or less) determinant in the frequency of consumption of organic products.

According to the Ministry of Agriculture, Livestock and Food Supply (MAPA, 2011), for a product to be considered organic, it needs to be produced within an environment which is characterized by agro ecological principles, including the responsible use of land, water, air and other natural resources used in the production process, and not make use of this process of substances as soluble synthetic fertilizers, pesticides and transgenic seeds, with the parameters and guidelines of the same regulated by the Law No. 10.831 of December 23rd 2003, which has its definition, marketing, qualification, supervision, among other provisions (Law no. 10.831, 2003).

As stated Dettmann and Dimitri (2009), the category of organic products is, nowadays, the one that had the fastest expansion into the U.S. food industry, with the average growth rating between 1998 and 2006 of 17% a year. Regarding Brazil, the data shows that in the organic market circled around R$ 350 million in 2010, an amount that represents a growth of 40% in relation to the movement of the market in 2009, thus revealing that the country is going through an expansion of the organic market above expectation of the world, which is around 20% (Brazil, 2011). In the country, organic products, which for some time were mainly sold in fairs, have revealed a significant expansion in supermarkets (Pimenta, 2008).

Regarding the motivations, Sangkumchaliang and Huang (2012) emphasize that the most relevant to the choice for organic food are health and environmental benefits, beyond the appreciation of local family farms. In this sense, for Biemans (2011), consumers opt for organic food from the association made with the aspects of health and safety.

However, the absence of information, the level of the consumers' trust in the authenticity of the product and price are barriers to the consumption of these products (Rodrigues, Carlos, Mendonça & Correa, 2009; Sangkumchaliang & Huang, 2012). In this context, Nie and Zepeda (2010) stress that the most obvious limitation of consumption is related to the difficulty of access.

Regarding the profile of this consumer group in question, according to De Moura, Nogueira and Gouvea (2012), there is evidence that consumers of organic products are targeted based on demographic and behavioral variables and profile.

To Rozin, Fischler and Shields-Argelès (2012), several studies still have to be designed around the consumers' preference for natural products , both in developed countries and in less developed or developing countries.

Thus, the problem of the research is know: what are the socioeconomic determinants of frequency of organic products consumption? And the aim is to identify the most significant socioeconomic variables that influence the level of frequency of consumption of organic products in the light Multinomial Logit Model (MNL).

2 THEORETICAL FUNDAMENTATION

As it is reasoned on Law no. 10.831, of December 23rd, 2003, organic product, *in natura* or processed is defined as "[...] that obtained in organic agricultural production system or come from sustainable extractive process and not harmful for the local ecosystem" (Law no. 10.831, 2003).

According to Lima-Filho and Silva (2012) an increasing portion of consumers has tried this type of product to the diet of the family, being this search influenced by specialized and popular media, health professionals, or even friends.

The development of the organic movement, which had its origins in terms of processes occurred during the 1940s and 1950s, had strength during the 1960s and 1970s, when the growth of consumer activism associated with the concept of changes in the natural environment caused by man (Pearson, Henryks & Jones, 2010) .

Regarding the motivations and perceptions of individuals as the consumption of organic products, the literature comes almost in a consensus, which are listed among the main reasons for such factors primarily relating to: personal health, product quality and interest around degradation of the environment (Tregear, Dent & McGregor, 1994). What is supported by subsequent research (Brown, Dury & Holdsworth, 2009; Hoefkens, Verbeke, Mondelaers & Camp, 2009; Hughner, McDonagh, Prothero, Shultz & Stanton, 2007; Lima-Filho & Silva, 2012; Pearson, Henryks & Moffitt, 2007).

Among the factors commonly used to justify the consumption of organic products, health is characterized by being the most important item for consumption at the expense of those of conventional products (Junior, Neto & Moraes, 2014; Lima-Filho

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& Silva, 2012; Rodrigues *et al.*, 2009; Teixeira, 2006; Yin, Wu & Chen, 2010). However, despite the health constitute the main reason the consumption of organic products, this association is not supported by scientific research, ie, it is not scientifically proven the link between the consumption of these products and the highest quality healthcare, which it makes inconclusive the researches that advocate the composition of organic products as a promoter of health benefits (Pearson, Henryks & Jones, 2010). Rather, the rationale around the promotion of environmental benefits, has more support in the scientific matter (Chen, 2009).

The justification of personal health can be seen as a proactive measure or in response to an adverse situation. As a proactive measure, for example , parents of infants and young children in search of a "purer" and "more natural" look for organic food (Pearson, Henryks & Jones, 2010), in this way, it was verified that the consideration of health as a factor of purchase decision assumes significance in relation to the age of individuals (Wandel & Bugge, 1997). On the issue of adverse situation, it can be mentioned the confrontation with a serious illness, in which case, it is sought to explore treatments which individuals turn to organic foods basing on the belief that these will contribute to recovery (Pearson, Henryks & Jones, 2010).

Concerning the justification of product quality, consumers generally relate organic products to parameters of a better quality, such as taste and the ability of the supply chain to offer a "fresher" product (Junior, Neto & Moraes, 2014; Pearson & Henryks, 2008). However, according to Pearson, Henryks and Jones (2010), the quality of a product is subject to variables, which is a problematic as they vary according to the expectations of the individual, which it can refer to a specific product purchased in a certain time and circumstance for a particular use. Therefore, as regards the health variable discussed previously, the connection between any production system, whether organic or other than the quality of the product is brittle (Pearson, Henryks & Jones, 2010).

The third more compared justification is related to the concern for the environment, in which there is scientific evidence that supports the perception the production methods of organic agriculture is less harmful to the environment (Fuller, Norton, Feber, Johnson, Chamberlain, Joys, Mathews, Stuart, Townsend, Manley, Wolfe, Macdonald & Firbank, 2005).

Besides these three motivations for the consumption of organic products previously addressed (health, product quality and concerning with the environment), some studies also indicate concern with the development of small producers for consumption as a motivational factor of these

products, as pointed out by Pimenta (2008) in a study held in Uberlândia, MG, Brazil and Sirieix, Santiago, Kledal and Watanabe (2007), in a research applied in the French consumer.

As for the perceived values in relation to consumer behavior towards organic products, Kny, Senna, Barata, Cesa, Correa, Goulard and Koehler (2005), it was identified four values in a survey conducted in the South Central region of the state of Bahia in Brazil, which are: social security (equality, world peace), integrity (inner harmony and national security), achievement and hedonism. Showing in this way, that there is no dominance between hedonistic values and collective values.

Another peculiarity about the consumers of organic products is about attention and perception of the presence of certification seals of the product origin, which according to Zamberlan, Büttenbender and Sparemberger (2006), in a survey conducted in Santa Maria in the state of Rio Grande do Sul, Brazil and, Sirieix *et al.* (2007), in a survey conducted in France, it was observed that this group of consumers is aware of the existence of the seal of certification and recognizes the organic product through this.

Some features are more common among consumers of organic products as the fact of living in big cities, having high degrees of education and income (Pimenta, 2008).

Neutzling, Callado, Gamarra and Rodriguez (2009) observed that consumers of organic products have high levels of education, being the greater portion of the group consisted by females and are between 22 and 35 years. Yet according to the authors, the level of education is related to willingness to pay higher prices for organic food, as well as age groups and economy class associated with frequency of buying organic food.

Silva, Cardoso, Souza and Almeid (2013) identified that most consumers of organic products is compounded by women with higher education and ages between 40 and 59 years. It was also observed that the respondents in stable union were majority (42%) and that 54% of consumers had incomes higher than ten minimum wages, which, according to the authors, indicates a relationship between income level and consumption of organics.

Thus, because the literature presents some common characteristics among consumers of organic products (Pimenta, 2008), and in other studies it was observed that consumers of organic products have the higher education and most are women (Neutzling *et al.*, 2009) gives rise to the following hypothesis:

H1. female people, with more education, or higher income have a higher frequency of consumption of organic products.

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3 METHODOLOGY

The research has a quantitative-descriptive character (Malhotra, 2006), it covered the inhabitants of the urban area of Campo Grande, in the state of Mato Grosso do Sul, who were 18 years or more, belonging to any of the economy classes, responsible, individually or no, for buying food for the family.

To calculate the sample size it was considered an infinite population, and stipulated a Confidence Gap (CG) of 95% and a standard error (SE) of 5%, taking into account equation (1) to calculate the size sample of an infinite population (Anderson, Sweeney & Williams, 2007), it came to a number of 384 individuals to be interviewed. However, for greater security, 400 questionnaires were applied, which consequently made the standard error (SE) to reach 4.9%, as shown in equation (2).

$$n = \left(\frac{Z}{e}\right)^2 . p . (1 - p)$$

$$n = \left(\frac{1,96}{0,05}\right)^2 . 0,25 = 384,16$$

(1)

$$400 = \left(\frac{1,96}{e}\right)^2 . 0,25 \Rightarrow e = 0,049$$

(2)

The questionnaire in question, in order to check the socioeconomic profile and frequency of consumption, presented in a structured way (Malhotra, 2006), being the scale for levels of consumption frequency distributed from the level "never used/unable to inform" (j=0) to "consume frequently" (j=3).

The application if the questionnaires took place in June, in the year 2010. For the application of these, it was used the technique of multiple stratified random sampling, which are excluded mutually, so that each element of the population is assigned to one stratum. The procedure was performed through successive pairings of sub-regions, blocks and houses.

The conduct of the data collection was done through the adoption of face to face interviews or direct questioning, with the approach taken directly into homes, that, had been asked the question -filter, which sought to identify whether the respondent was responsible for the purchase of food for the residence.

As a tool for processing and data analysis, it was used the statistical software STATA (Cleves, Gould, Gutierrez & Marchenko, 2008) in version 11.0, and the database generated from the research submitted to statistical/econometric tests.

Since the objective of the research was to identify the most significant socioeconomic variables that influence the level of frequency of consumption of organic products in the light Multinomial Logit Model (MNL) (Greene, 2003), it was used variables "frequency of use" (dependent variable) and data related to socioeconomic characteristics of the sample (independent variables), which were submitted to the model, so that it was possible to assess the probabilistic relationship between the frequency levels of consumption of organic products in relation to the set of regressors (gender, age, education, economic status and marital status). In the model in question, it was used the following specification:

$$\mathrm{Pr}ob(Y_i = j) = \frac{e^{\beta_j X_i}}{\sum_{k=0}^{3} e^{\beta_k' X_i}} \ ,$$

(3)

Which Y_j is random variable that represents the individual's choice, with Prob (Yi = j), the probability of a given individual (*i*) opts for the choice *j*; *X*, is the matrix of observable attributes for individuals, and β is the vector of parameters to be estimated.

According to Greene (2003) the estimated equations originate a set of probabilities for *j+1* choices of the individual (*i*) with certain characteristics (*Xi.*). An appropriate way to solve this problem is through the use of normalization, in which it admits that $\beta_0 = 0$. Thus there is:

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$$\Pr ob(Y_i = j) = \frac{e^{\beta_j' X_i}}{1 + \sum_{k=1}^{J} e^{\beta_k' X_i}} \ , \qquad \text{for } j = 1,2,3. \qquad (4)$$

Which j represents the level that the dependent variable can take, and j=3 represents the degree of frequent, j=2 sporadic consumption, j=1 and the rare consumption, j=0, never did use or unable to inform.

To check the effect of explanatory variables on Prob(Y_i=j) it was used the Relative Risk Ratio model (RRR), which, according to Bressan, Bressan, Lima and Braga (2008), it can be described by:

$$RRR = \frac{P(Y = j/x+1)/P(Y = k/x+1)}{P(Y = j/x)/P(Y = k/x)} \ . \qquad (5)$$

The model in question indicates effect on the probability of choosing alternative j, in relation to the alternative k, in terms of relative changes occurred in probability, which x represents the vector of attribute variables.

Another analysis developed in the research in question was the Marginal Effect (Long, 1997), which has the function to demonstrate the effect of

the explanatory variable on the probability of choice, ie, by obtaining the equation (6) and the marginal effect of X_i in P_j, being represented by:

$$\frac{\partial P_j}{\partial X_i} = \frac{\beta_j e^{\beta_j' X_i} \cdot \left[1 + \sum_{k=1}^{J} e^{\beta_k' X_i} \right] - e^{\beta_j' X_i} \cdot \sum_{k=1}^{J} \beta_k e^{\beta_k' X_i}}{\left[1 + \sum_{k=1}^{J} e^{\beta_k' X_i} \right]^2}$$

$$= \frac{e^{\beta_j' X_i}}{\left[1 + \sum_{k=1}^{J} e^{\beta_k' X_i} \right]} \cdot \left[\beta_j - \sum_{k=1}^{J} \frac{e^{\beta_k' X_i}}{\left[1 + \sum_{k=1}^{J} e^{\beta_k' X_i} \right]} \cdot \beta_k \right]$$

$$= P_j \left[\beta_j - \sum_{k=0}^{J} P_k \beta_k \right] = P_j \left[\beta_j - \overline{\beta} \right]. \qquad (6)$$

The independent variables used in the research, as well as its form of measurement are presented in Table 1:

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Table 1 - Independent variables used in the research

Independent variable	Measurement
Gender	0 (Male)
	1 (Female)
Age	Years old
Education	Years of study
Economy class	5 (Class A)
	4 (Class B)
	3 (Class C)
	2 (Class D)
	1 (Class E)
Marital Status	0 (Single)
	1 (Married/Stable union)

4 RESULTS AND DISCUSSION

Table 2 presents the socioeconomic characteristics obtained with the sample in question.

For better visualization and interpretation of data on the variables age and education, which are measured in age and years of study, respectively, it was determined the grouping of classes for these data.

Table 2 - Socioeconomic data sample

Independent variable	Measurement	%
Gender	Male	29,3
	Female	70,8
Age	From 20 to 29 years	16,3
	From 30 to 39 years	20,3
	From 40 to 49 years	17,3
	From 50 to 59 years	25
	60 years or more	21,3
Education	Until 4 years of study	30,5
	From 5 to 8 years of study	24
	From 9 to 11 years of study	32
	From 12 to 15 years of study	10,8
	16 years or more	2,8
Economic class	Class A	3,8
	Class B	22,5
	Class C	55
	Class D	15
	Class E	0,8

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Marital Status	Single	37,6
	Married/Stable union	62,5

Source: Datas of research**.**

The sample is compounded predominantly by females (70.8% vs. 29.3%), what may have happened because women are still primarily responsible for buying food in the family, as revealed Andreuccetti, Ferreira and Tavares (2005), Bezerra, Bezerra, Vieira, Baliero and Viana (2011) and Moura, Silva and Batalha (2006). A representative portion of sample (25%) are 50-59 years. As for the education the biggest part of the sample is from 9 to 11 years of education (32%), followed by the ones who are up to four years (30.5%). Regarding economy class, more than half of the sample (55%) is concentrated in the class C. In relation to marital status, the majority of the sample (62.5%) is married or in a stable situation.

Regarding the frequency of organic products consumption analyzed by the sample, as can be seen in Figure 1, the biggest group in question is the ones who don't consume or unable to inform (30.4%). Compounding the second biggest group, with 26.8% of individuals, are the ones who said that consume sporadically and, then, the group of those who rarely consume (23.3%), being the lowest of the group that often consume (19, 5%).
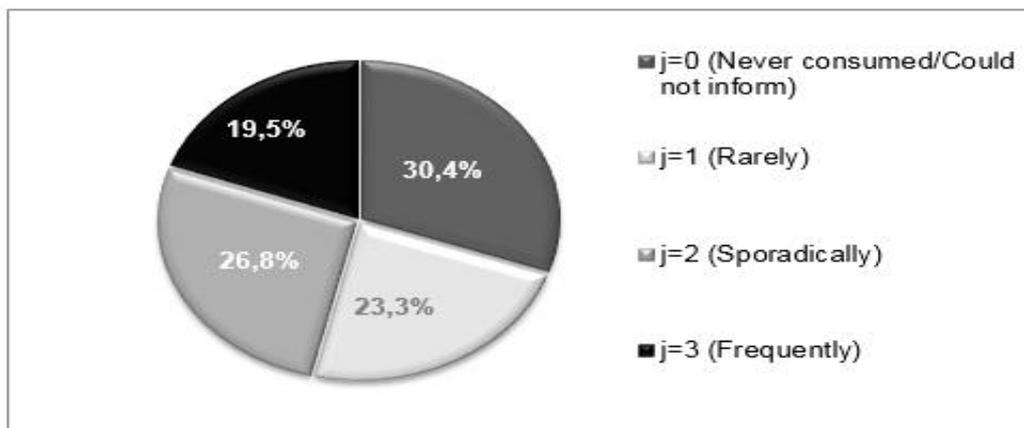
Figure 1 - Division of the sample according to the frequency of organic products consumption
Source: Data of research.

Below are tables of crossed data between the frequency of organic products consumption and the variables: gender (Table 3), age (Table 4), education (Table 5), Economy Class (Table 6) and marital status (Table 7), which are discussed below.

Table 3 - Frequency of organic products consumption related to gender

Consumption	Gender	
	Male	Female
J=3 (Frequently)	12,82%	22,26%
J=2 (Sporadically)	24,79%	27,56%
J=1 (Rarely)	30,77%	20,14%
J=0 (Never consumed/Could not inform)	31,62%	30,04%

Source: Datas of research**.**

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Table 4 - Frequency of organic products consumption related to age

Consumption	Age				
	From 20 to 29 years	From 30 to 39 years	From 40 to 49 years	From 50 to 59 years	60 years or more
J=3 (Frequently)	23,10%	18,50%	23,20%	18,00%	16,50%
J=2 (Sporadically)	26,20%	23,50%	37,70%	28,00%	20,00%
J=1 (Rarely)	26,20%	27,20%	18,80%	23,00%	21,20%
J=0 (Never consumed/ Could not inform)	24,60%	30,80%	20,30%	31,00%	42,40%

Source: Datas of research.

Table 5 - Frequency of organic products consumption related to education

Consumption	Education				
	Until 4 years	From 5 to 8 years	From 9 to 11 years	From 12 to 15 years	16 years or more
J=3 (Frequently)	12,30%	33,30%	17,20%	16,30%	18,20%
J=2 (Sporadically)	18,90%	15,60%	32,00%	48,80%	63,60%
J=1 (Rarely)	18,00%	17,70%	32,00%	27,90%	9,10%
J=0 (Never consumed/ Could not inform)	50,80%	33,30%	18,70%	7,00%	9,10%

Source: Datas of research.

Table 6 - Frequency of organic products consumption related to economy class

Consumption	Economy class				
	Class A	Class B	Class C	Class D	Class E
J=3 (Frequently)	13,30%	19,60%	19,50%	21,70%	0,00%
J=2 (Sporadically)	73,30%	37,30%	20,50%	20,00%	33,30%
J=1 (Rarely)	13,30%	31,40%	22,30%	16,70%	0,00%
J=0 (Never consumed/ Could not inform)	0,00%	11,70%	37,70%	41,70%	66,60%

Source: Datas of research.

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Table 7 - Frequency of organic products consumption related to marital status

Consumption	Marital Status	
	Single	Married/Stable union
J=3 (Frequently)	16,00%	21,60%
J=2 (Sporadically)	26,00%	27,20%
J=1 (Rarely)	24,67%	22,40%
J=0 (Never consumed/ Could not inform)	33,33%	28,80%

Source: Datas of research.

Concerning the frequency of consumption in relation to independent variable gender, it was observed that females are the ones who consume organic products more often , which 22.26% declared often consume (versus 12.82% males) and 27.56% sporadically (versus 24.79% males) . Reinforcing the highest consumption of organic products among females is the fact that 20.14% of these consume, while 30.77% of males do. This result corroborates with research conducted by Neutzling *et al.* (2009) and Silva *et al.* (2013), where consisted that organic products consumers have as one of their characteristics are predominantly female.

In respect to the independent variable age, after stratification into groups, or age group, it was found that the group is characterized by containing the highest consumption being common (23.2%) and sporadic (37.70%), is the one formed by individuals who are 40-49 years. Results that were above the range noted by Neutzling *et al.* (2009), from 22 to 45 years, as higher consumption, but has a similar range to that found by Silva *et al.* (2013), whose range covers from 40 to 59 years. The highest incidence of individuals who had never used the product or could not answer, are found in the group in age 60 years or more.

In the scope of the independent variable education, after stratification into groups, it is observed that the sporadic consumption is positively correlated with this, as it grows incrementally individuals who are five to eight years of study to those with 16 or more, representing more than 60% (63.60%) cases in this. The reverse happens with the proportion of people who never consumed organic products or could not answer as the occurrence of this gradually decreases until the group of those with graduate degrees. Relationship between education and the consumption of organic products was also shown in the literature, as in research Callado, Gamarra and Rodriguez (2009), Fotopoulos,

Krystallis and Ness (2003), Pimenta (2008) and Trevisan and Casemiro (2009). That is, the level of education is significantly higher among people who consume organic products than among those who did not consume (Lima-Filho & Silva, 2012). Behavior that may be related to the greater concern of more educated about the environment, as well as to their level of information about the harmful effects of pesticides on health and on the attributes of organic products (Darolt, 2001).

As for independent variable economy class, sporadic use of the products has shown higher among individuals of class A (73.3%) and B (37.3%), being followed by the class E (33.3%). The highest proportions of individuals who had never used organic products are included in the class D (41.7 %) and class E (66.6%). In addition, individuals who rarely consume less products are class A (13,3%). This result shows a positive correlation between economic status (income) and the level of consumption of organic products, which was also found in other studies (Darolt, 2001; Pimenta, 2008; Silva *et al.*, 2013; Suszek, 2006). What can arise because of the price of these products is greater than that of conventional products, making it difficult to use for people with low income (Rodrigues *et al.*, 2009; Sangkumchaliang & Huang, 2012). In addition, consumers with higher purchasing power, because they are more demanding and have more access to information, seek in organic products a healthier consumption (Borguini, 2002; Trevizan & Casemiro, 2009).

Concerning the independent variable marital status, it can be seen that the highest frequent consumption focuses among married individuals or in a stable relationship (21.6%), still belonging to this group , individuals with sporadic higher consumption (27.20% versus 26% of the single groups). Moreover, this is the group for the individuals responsible for the lower rare consumption (22.4%).

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For estimation of the Multinomial Logit model (MNL), it was considered as the base category $j=0$ (never consumed/unable to inform), depending on the results be interpreted using as basis the largest group among the frequencies in the sample analyzed. Table 8 shows the coefficients obtained from the MNL model at different levels of frequency of consumption of organic products by the sample. As the coefficients in question does not represent the marginal responses, it is also presented in the table Relative Risk Ratio (RRR), which should be interpreted as relative changes in the probabilities presented or the way the odds ratio of the logistic model.

Table 8 - MNL model estimative based on consumption frequency ($j=0$ base: never consumed/could not inform)

| Explanatory variables | Frequency of organic products consumption categories | | | | | |
| | Rarely ($j=1$) | | Sporadically ($j=2$) | | Frequently ($j=3$) | |
	Coef.	RRR	Coef.	RRR	Coef.	RRR
Gender	-0,3526[ns]	0,7028[ns]	0,1928[ns]	1,2127[ns]	0,6408***	1,8981***
	-0,3031	-0,213	-0,3144	-0,3814	-0,3575	-0,6787
Age	-0,0060[ns]	0,9939[ns]	0,0018[ns]	1,0018[ns]	-0,0037[ns]	0,9962[ns]
	-0,0107	-0,0106	-0,0107	-0,0107	-0,0112	-0,0112
Education	0,1530*	1,1654*	0,2080*	1,2312*	0,1615*	1,1753*
	-0,052	(0, 0606)	-0,0518	-0,0638	-0,0547	-0,0644
Economy class	0,3971[ns]	1,4875[ns]	0,4893**	1,6312**	0,0781[ns]	1,0813[ns]
	-0,2593	-0,3858	-0,2573	-0,4197	-0,268	-0,2898
Marital Status	-0,0937[ns]	0,9105[ns]	0,0799[ns]	1,0831[ns]	0,4038[ns]	1,4975[ns]
	-0,2985	-0,2718	-0,2988	-0,3236	-0,3226	-0,4831
Constant	*-2,1424**		*-3,6852**		*-2,5134**	
	-0,9055		*-0,9258*		*-0,9741*	

Source: Datas of research.

Wherein: * meaning to 1%; ** meaning to 5%; * meaning to 10%; [ns] not significant; the values in parentheses are standard deviations.**

By Table 8, it shows that for category $j=1$, from the six estimated coefficients, one was statistically significant, it means that only one of the estimated coefficients interferes significantly in the probability of the consumer rarely consume organic products , plus the constant. This is the coefficient of the explanatory variable "education", which it was positive and showed RRR higher than 1, indicating that an increase in the level of this variable increases the chances of consumers rarely consume organic products ($j=1$) in relation to base ($j=0$) of the dependent variable, in other words, the more years of schooling more likely a consumer will rarely consume towards consumers that never consumed or were unable to inform ($j=0$).

For ($j=2$) of the MNL, from the six estimated coefficients, three were statistically significant, this means that these three estimated coefficients influence the probability of consumer sporadically consume organic products. These are the coefficients of the explanatory variables "education", "economy class" and "constant". The coefficients of the explanatory variables "education" and "economy class" were positive and RRR of each was greater than 1, indicating that an increase in the level of these variables increases the chances of consumers consume organic products occasionally ($j=2$) relative to the base ($j=0$) of the dependent variable, in other words, the more years of schooling and higher economy class more likely a consumer will consume

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sporadically for consumers who never consumed or were unable to inform (j=0).

For (j=3) of the MNL, from the six estimated coefficients, three were statistically significant, this means that these three estimated coefficients influence the probability of consumer sporadically consume organic products. These are the coefficients of the explanatory variables "gender", "education" and "constant". The coefficients of the explanatory variables "gender" and "education" were positive and RRR of each was greater than 1, indicating that an increase in the level of these variables increases the chances of consumers often consume organic products (j=3) in relation to base (j=0) of the dependent variable, in other words, if the individual is female (code 1) instead of being male

(code 0) and have more years of education will be higher the probability of to consume frequently relative to consumers who never consumed or could not inform (j = 0).

The coefficients of the explanatory variables, obtained with Multinomial Logit model (MNL), do not reflect the Marginal Effect (ME) of these on the probability of occurrence of each frequency of consumption of organic products. Thus, the MEs of each frequency level were obtained according to equation (6). Thus, Table 9 shows the values of Marginal Effects (ME) of the variables "gender", "age", "education", "economy class" and "marital status" on the four levels of frequency of consumption of organic products.

Table 9 - Marginal Effects (MEs) of the explanatory variables on the probability of occurrence of frequencies

Explanatory Variables	Never consumed/Unable to inform (j=0)	Rarely (j=1)	Sporadically(j=2)	Frequently(j=3)
Gender	-0,0206^{ns}	-0,1136**	0,0310^{ns}	0,1032*
	-0,052	-0,0513	-0,0492	-0,0418
Age	0,0004^{ns}	-0,0010^{ns}	0,0009^{ns}	-0,0004^{ns}
	-0,0017	-0,0016	-0,0017	-0,0015
Education	-0,0356*	0,0065^{ns}	0,0219*	0,0071^{ns}
	-0,0083	-0,0079	-0,0082	-0,0075
Economy Class	-0,0689***	0,0373^{ns}	0,0656***	-0,0340^{ns}
	-0,0419	-0,0404	-0,0419	-0,0376
Marital Status	-0,0219^{ns}	-0,0428^{ns}	0,0006^{ns}	0,0640^{ns}
	-0,0497	-0,0476	-0,0486	-0,0425
Probability of occurrence	Prob(j=0)= 28,16%	Prob(j=1)= 24,53%	Prob(j=2)= 26,87%	Prob(j=3)= 20,42%

Source: Datas of research.

Wherein: * meaning to 1%; ** meaning to 5%; * meaning to 10%; ^{ns} not significant; the values in parentheses are standard deviations.**

In regards to the consumption level j=0 (never used or unable to inform), the highlight is the marginal effect of "education", with the most significant relation (1%), which increased to a level in this, the probability of an individual belonging to this group decreases by 3.56 percentage points (pp). Another important point is related to the "economy class", which for an economy class level added the same, the probability of belonging to this group

decreases by 6.89 pp. In relation to "marital status", which according to the scale (0 - single(a), 1 - married/stable union), if there is an increase in one unit in this, ie, the individual is married or living in a stable relationship over being single, the probability of the same belong to this group decreases by 2.19 pp. In similar proportion is the variable "gender", which according to the scale (0 - male, 1 - female), if we increase by one unit in this variable, ie the

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individual being female rather than male, the probability of belonging to this group decreased by 2.06 percentage points. MEs being seen in "education" and "economy class" more significant, it can be concluded that these are the most important variables to adopt some level of frequency of consumption of organic products. The general probability, the chances of an individual belonging to this class is 28,16 pp, considering the averages of the variables for the class.

Regarding the level of consuming j=1 (rarely), it highlights the effect of the variable "gender" to the extent that if the scale is increased by one unit in this variable, ie, being female instead of being male the probability of belonging to this group decreases by 11.36 percentage points, in addition, this variable was the only representative to present significance (10%). Another appropriate observation variable is the "marital status", which this group to increase by one unit, ie, the individual is married or living in a stable relationship over being single, the probability of belonging to this group grows 4.28 percentage points . Regarding economy class variable for an increase in a level of this, the chances of an individual belonging to it increases by 3.73 percentage points. Overall probability of this class, considering the averages of the variables for the class is 24.53 pp, ie, this is the chance of an individual rarely consume organic products.

Regarding the frequency level j=2 (sporadic), it highlights the marginal effect of "education", with the most significant (1%), which increased to a level in this, the probability of an individual belonging to this group is increased by 2.19 pp. Another significant correlation (10%) was found in the "economy class", which for increasing a level that the probability of individuals sporadically consuming organic products increases by 6.56 percentage points. Another relevant point to be analyzed, in spite of low significance , is the behavior of the "gender" variable, then the variable "education", to a level which these added, the probability of an individual belonging to this group increases, respectively, 3.10 and 2.19 percentage points. Regarding the overall probability an individual has 26.87 pp to be part of this level of consumption, considering the averages of the variables for the class.

Regarding the marginal effect on the probability of adopting the level of frequency of consumption of organic products j=3 (frequent), there is the effect of gender, which if there is a unit increase in this variable, ie, be female rather than male, it is increased by 10.32 percentage points the probability of an individual belonging to this level of frequency, beyond this it appears to be the variable that showed the strongest associations of established correlation (significant at 1%). Another observation

to be made at this level of frequency is about the marginal effect of marital status variable, for which the increase in a unit of this, ie, the individual being married over being single, the probability of belonging to this consumption class increases by 6.4 percentage points. Regarding the overall probability, it is observed that an individual has, considering the averages of the variables for the class, 20.42 pp probability of belonging to this level of frequency of consumption.

Thus, after analysis on the Multinomial Logit model (MNL), and in the verification of the effect of explanatory variables on the probability of j (Relative Risk Ratio - RRR) it could be shown that the variables "gender", "education" and "economy class" are more statistically significant with respect to the probability of consumption of organic products, that is, the higher the levels of these variables, the greater the chance of the individual belonging to one of the levels of consumption. Results corroborate studies made by Darolt (2001), Fotopoulos, Krystallis and Ness (2003), Neutzling *et al.* (2009), Pimenta (2008), Silva *et al.* (2013), Suszek (2006) and Trevisan and Casemiro (2009), in which the variables showed a correlation with the consumption of organic products. Differently, the variables "age" and "marital status" no influence significantly on the probability of a customer belongs to any of consumption levels (j1, j2 ou j3) relative to the base (j=0), which can be analyzed in contrast with the research of Neutzling *et al.* (2009) and Silva *et al.* (2013), in which, age was shown to be a variable that kept correlation with the consumption of organic products.

Regards the analysis of the Marginal Effect (ME) of each variable on the probability of consumption of organic products, it is observed that the "education" and "economy class" proved representative and positively correlated in the consumption of organic products, that is, each increased level of education and economy class, also increases the likelihood of a higher frequency of consumption of organic products as well as an increase in a level of such, decreases the probability of an individual make part of the group j=0, that is, do not consume organics. In addition, there was the realization of the importance of the variable "sex", as if the individual is female (which is increasing at a level of gender, in which male means zero and female means one), the probability of the same rarely consume (j=1) decreases and increases the probability of it often consume (j=3), a result which agrees with Darolt (2001), Fotopoulos, Krystallis and Ness (2003), Neutzling *et al.* (2009), Pimenta (2008), Silva *et al.* (2013), Suszek (2006) and Trevisan and Casemiro (2009), as they have the same correlations between the independent variables and the use of organics. In addition, women and men have different consumption patterns, and the female eating pattern is

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healthier than the male (Kiefer, Rathmanner & Kunze, 2005), and one of the factors perceived regarding organic products over conventional products is the healthiness (Sangkumchaliang & Huang, 2012).

5 FINAL CONSIDERATIONS

In this article it was researched determinants of consumers of organic products in Campo Grande, in more detail, the socioeconomic variables that influence the consumption of organic products in that region. It was identified that the most statistically representative variables as determinants for frequency of consumption of organic products are "gender", "education" and "economy class".

Submitting data to the Multinomial Logit model (MNL), along checking the effect of explanatory variables on the probability of frequency of consumption through the Relative Risk Ratio (RRR), it was observed that the variables "gender", "education" and "constant" are relevant with regard to the chances of an individual often consuming organic products (j=3), and if there are more women and an increase in the level of education it raises the chances of individuals belong to the group who frequently consume organic products.

Using the analysis of Marginal Effect (ME), taking as a basis the frequency j=0 (never used/unable to inform), it was observed a higher importance of "economy class" and "education", respectively, for not belonging to this group, in other words, an increase in these variables increases the probability of an individual consuming organic products (rarely consume: j=1, sporadically: j=2, or frequently: j=3). Another important variable to the consumption of organic products was the variable "gender", upon which it was observed that individuals who rarely consume (j=1), the probability of being male is considerably higher, moreover, the probability an individual consuming organic products often (j=3) increases, substantially, if the individual is female. Thus, can not be rejected the hypothesis H1, because research has identified that the variables "sex", "education" and "economy class" significantly explain the frequency of consumption of organic products, and when the consumer is female, have higher education or is of higher economy class, the higher the frequency of consumption of organic products.

Thus, this research brings contributions to the Academy, as it adds analyzes of socioeconomic variables as determinants of the consumption of organic products, enriching the literature and providing a source of foundation and comparison to several other studies that there may be advances in the analysis of this theme.

This study also contributes to the management environment, because it clarifies important factors on the determinants of consumption of organic products, being a source of analysis and foundation for market research, in addition providing new insight around this specific niche of consumers, making part of a market with great growth trend.

In the scope of public policies, this research also presents itself as relevant as it enables the public power to better understand the profile of consumers of organic products, and develop advertising campaigns for food and nutritional security for public more specific, since the data presented here show that socioeconomic factors most influence the frequency of consumption of organic.

As for limitations, it may be noted as such that the results were obtained only in Campo Grande - MS. In this sense, if this research had been extended to other cities in other states is possible that the results were different. Another limiting factor in the survey is that were not included in the study variables related to the certification of organic products, which would be important to assess the perceived difference between what, in fact, is organic produce, according to guidelines established by law, with other perceived product as "natural" by not using fertilizers or chemical pesticides.

As for suggestions for future research, in function of better clarify the purchase and consumption behavior and to allow provide greater consistency and clarity to the results obtained in quantitative studies, as this one, is indicated to conduct more deepened studies, with the use of techniques appropriate qualitative. In addition, taking into account that the market segmentation is most often carried out basing only on socioeconomic data, it would be important to the academy an approach focusing on the predominant dimensions of the organic products consumer's lifestyle.

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