

Full Length Research

Foodstuffs consumption among primary, middle and high school students in Kenitra city

Noureddine. Rhaiem^{*1}, Rachid. Ijoub¹, Hasnae. Lamine², Mohammed. Ouhssine¹.

¹Laboratory of Biotechnology, Environment and Quality, Department of Biology, Faculty of Science, Ibn Tofail University, BP 133, 14000 Kenitra. Morocco.

²Laboratoire of Genetic and Biometric, Department of Biology, Faculty of Science, Ibn Tofail University, BP 133, 14000 Kenitra. Morocco. *Corresponding author: Rhaiem Noureddine. E-mail: rnourd@gmail.com.

Accepted 10 February 2016

The excessive consumption of food products that are full of additives is responsible for more health problems for the new generation. The aim of the present study was to reach the preference and pattern of food consumption among children and students. Four modes of food consumption were proposed: daily consumption, weekly consumption, monthly consumption and no consumption. A survey was conducted over 417 persons (males and females). The tool used in this research was a questionnaire. It was distributed to students of different levels (primary, middle and high school). The results of the statistical analysis showed, that among 417, 88,82% of students consume packaged products either one time per day or one time per week. For The Multiple Correspondence Analysis (MCA) of the daily and weekly consumption of foodstuffs by gender and school level, it has revealed three groups for daily mode consumption and two groups for weekly mode consumption. Each group of the above (daily and weekly) consumes a certain food differently. For the most consumed products per day and gender, we have found both boys and girls consume milk and cheese. As for weekly consumption, boys have consumed more fruit juices. However, girls prefer soft drinks. According to the school level, high school students consume foodstuffs more than other groups.

Keywords: food products, consumption, survey, gender, school level.

Rhaiem N, Ijoub I, Lamine H, Ouhssine M (2016). Foodstuffs consumption among primary, middle and high school students in Kenitra city. *Inter. J. Acad. Res. Educ. Rev.* 4(3): 71-77

INTRODUCTION

Foodstuffs (such as chips, ketchup, drinks, biscuits, milky products and others) are produced by the Industrial Technology of raw materials of agriculture and animals. They are intended for human consumption. Furthermore, the intensive exposure of the number of food products in the market has pushed consumers to explore the taste of each product; and eventually consume them. Recently, scientific researchers noted the significant increase in cases of allergies, intolerance and hypersensitivity [1, 2] following the ingestion of these foods among consumers.

The objective of this study is to determine the consumption mode of food products and to find out the most consumed products by students aged between 7-18 years.

MATERIALS AND METHODS

The study was conducted at three public schools located in Kenitra city, and it examined 417 students who were divided into three groups:

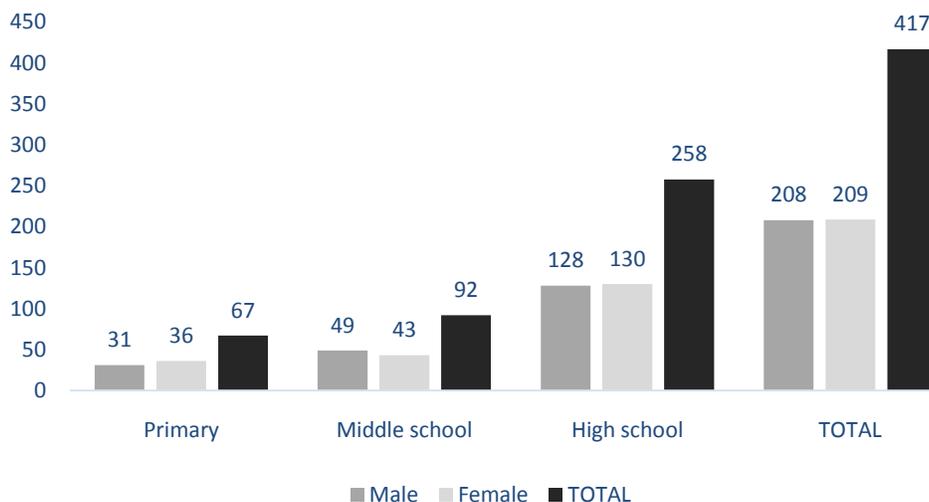


Figure 1: Distribution of students by gender and school level

- * Group 1: consists of students aged 7 to 10 years.
- * Group 2: consists of students aged 11 to 14 years;
- * Group 3: consists of adolescent students (15-18 years)

The selected students were asked to fill in a questionnaire that includes identification of gender, school level, and consumption mode. The list of 12 food products was proposed. The selected products are those that are available at the food markets. They consist of the following foods: chewing gums, fruit juice, sweets, chips, chocolates, biscuits, soft drinks, ketchups, marmalade, cheese, ice cream, mayonnaise and milk [4]. Students were asked to choose the consumption mode for these products. Basically, there were 4 modes: daily consumption mode, weekly consumption mode, monthly consumption mode and no consumption. The collected data was put in Excel and was subjected to statistical analyses involving adequacies of tests like Chi-Square test and Multiple Correspondence Analysis (MCA).

RESULTS

The questionnaire was distributed to 600 students, and 183 surveys were discarded because of filling errors. The distribution of students by gender and school level is shown in Figure 1. The sex ratio (male / female) is balanced ($p > 0,05$).

Distribution of four Consumption Modes

The Figure 2 shows the distribution of 4 consumption modes of the food products among the two genders.

Daily food products consumption

Food products consumption by gender

The results of the daily consumption frequency of food products related to gender are showed in figure (3). The analysis of this figure shows that the daily consumption of males is also different from females. Indeed, the most consumed foodstuffs are chewing-gums, sweets, marmalade, cheese and milk. Boys consume more soft drinks, sweets, chewing-gums, Ketchup, casher, marmalade, cheese and ice cream, but girls prefer to take fruit juices, cookies and drink more milk than boys (Figure 3).

Food products consumption by school level

The separate analysis of 13 selected foodstuffs according to the school level shows that the consumption among high school students is much greater than middle school students, and even primary school students (Figure 4).

The result of MCA for daily food consumption

The overall analysis of daily food consumption among gender and school level by MCA is shown in graphic 5 (Figure 5).

Attached diagram of modality points.

The Multiple Correspondence Analysis (MCA) identified the following results:

- The first group of male students at middle and high school consumes large amounts of:

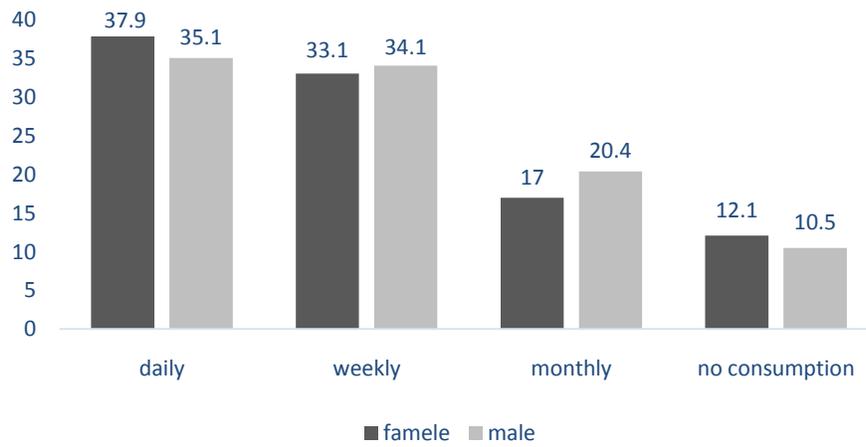


Figure 2: Distribution of surveyed students depending on consumption mode

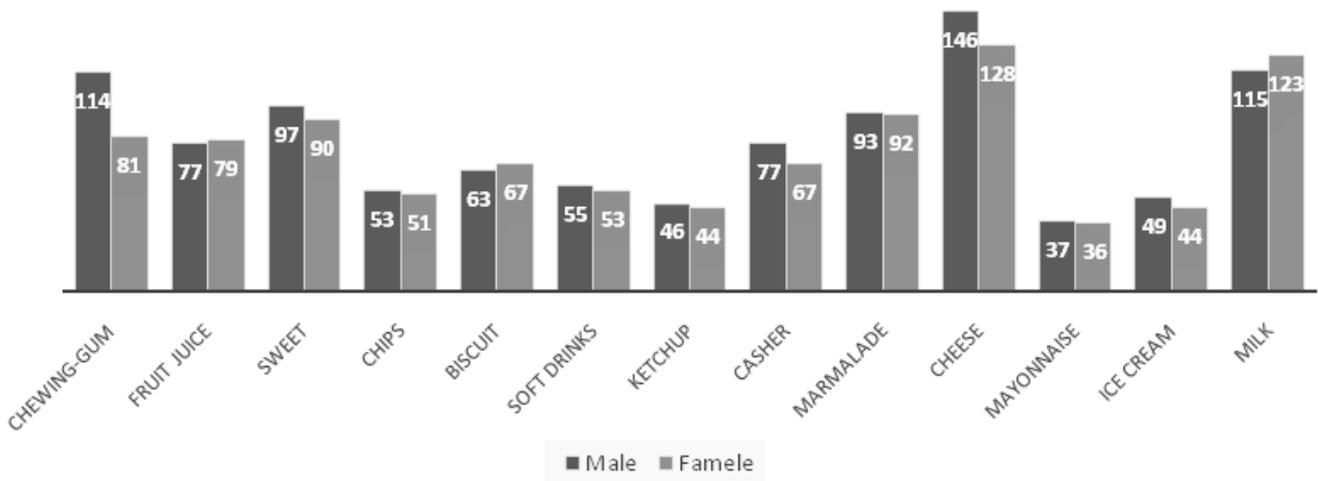


Figure 3: Distribution of the daily food products consumption by gender.

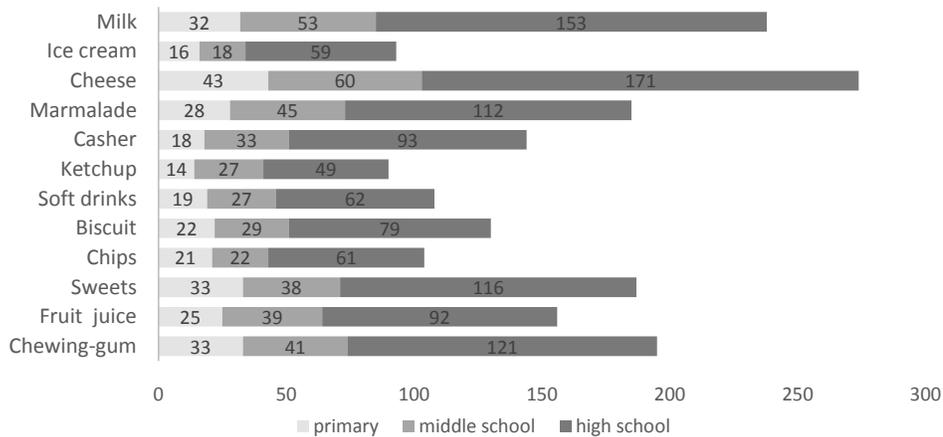
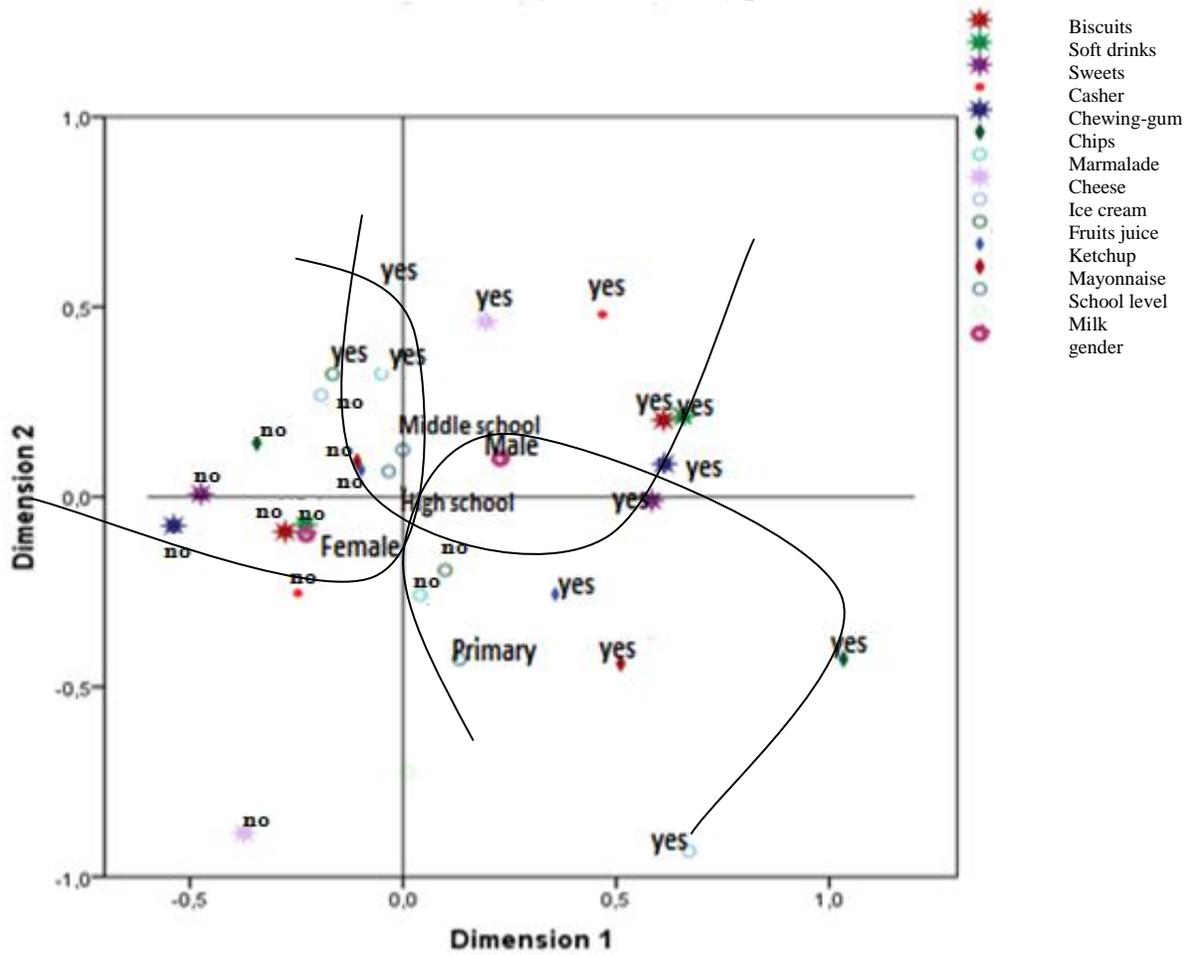


Figure 4: Distribution of students answering "yes" for daily food products consumption by school level.

Attached diagram of modality points



Standardization of the main variable

Figure 5: Graphic of the daily food products consumption by gender and school level

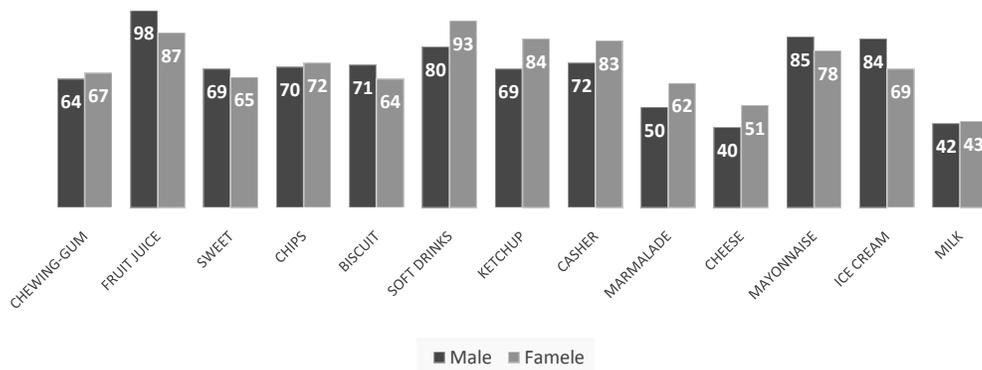


Figure 6: Distribution of the weekly food products consumption by gender

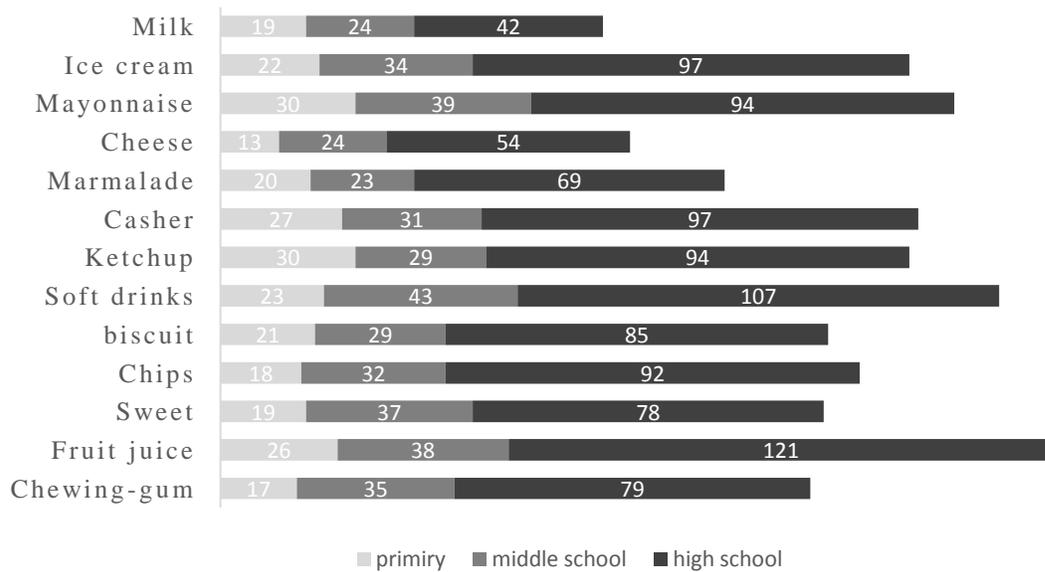


Figure7: Distribution of students answering "yes" for weekly food products consumption by school level.

chewing gum, soft drinks, sweets, cheese, cookies and casher.

- The second group of primary school students preferentially eats the following foods: chips, ketchup, mayonnaise and ice cream.

- The third group of girls at middle and high school consumes more fruit juices, marmalade. It also consumes more the milky products than boys.

Weekly food products consumption

Weekly food products consumption by males and females

The Figure 6 shows the weekly food products consumption by gender.

Weekly food products consumption by school level.

The figure 7 shows the weekly consumption of food products by the students of the three grades. The analysis of this graph shows that some foods are greatly consumed by students every week such as the fruit juice (44%), soft drinks (41%), mayonnaise (39%) and ice cream (39%).

The result of MCA for weekly food consumption

The overall analysis of the weekly foodstuffs consumption by gender and school level is shown in Figure 8.

The Multiple Correspondence Analysis (MCA) of the weekly food consumption allowed classifying students to two distinct groups (fig.8). The first group consisted of middle school students whom weekly consume the following products: sweet, casher, chewing gum, fruit juice and ice-cream. The second group included high school and primary school students who slightly consume mentioned foodstuffs, weekly.

DISCUSSION

The daily and weekly consumption frequency displays no significant difference at 5% error ($p > 0, 05$). Regarding the daily consumption, the frequency of consumed products among gender is in the order: 37, 9% for females and 35, 1% for males. The situation is the inverse for the weekly consumption; the frequency appears significantly different ($p < 0, 05$). It is 20, 4% for males and 17% for females. In parallel, 22, 6% (12% for females and 10% for males) of a surveyed student answered "no" to foodstuffs consumption. Data of the Chi-Square test of independence suggest that the daily consumption mode of products is not perceptible between boys and girls, except for chewing-gum (chi-square = 10,79 at $p = 0,001$) and cheese (chi-square = 3,70 at $p = 0,05$); for boys (27, 34%) and for girls (19, 42%). As well for cheese, the consumption by boys is more important (35%) than girls 30% (3). Mayonnaise, ketchup and ice cream are less daily consumed by students. The analysis of « school level » variety shows no significant difference. Therefore, the average of

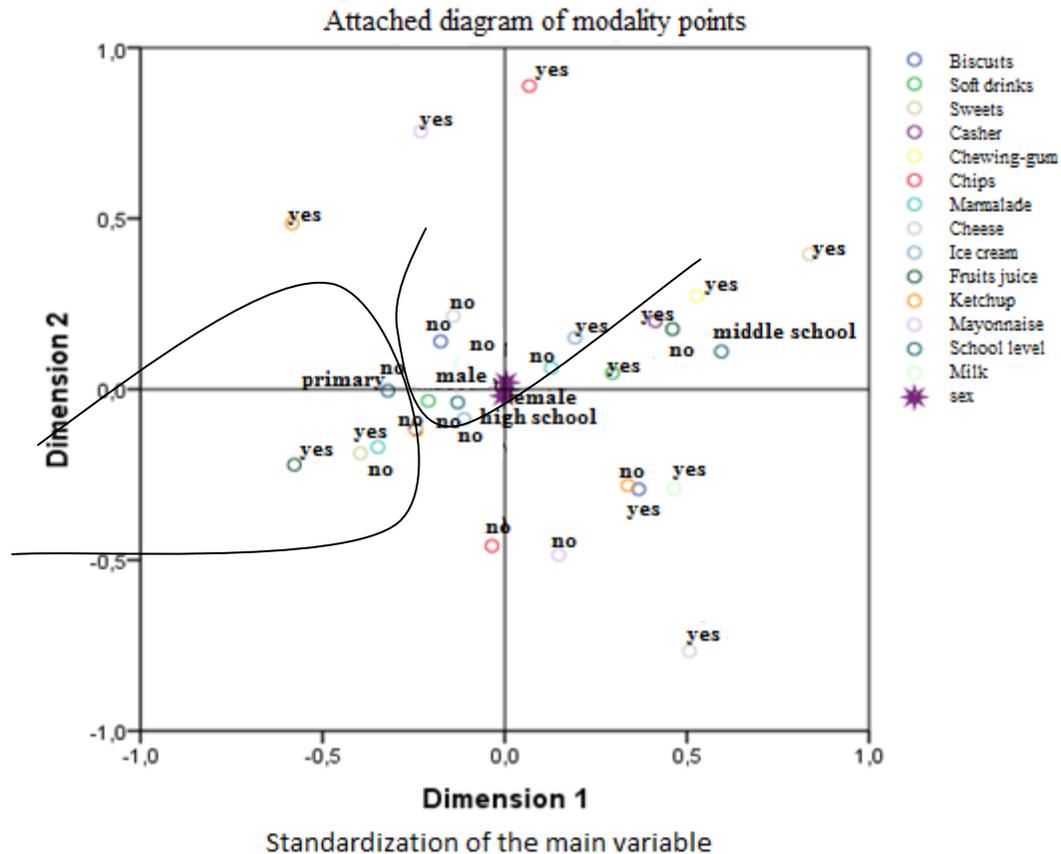


Figure 8: Representation of the weekly food products consumption by gender and school level.

consumed foodstuffs per day/ school level is 4, $74 \pm 2, 05$. The results of the statistical analysis showed that cheese consumption occupies the first choice among students in three school levels with 65, 71%, followed by milk (57, 07%). Then, sweets and chewing-gums came with mostly the same consumption rate: (44, 84%) and (44,93%), respectively. This important consumption of the last two products was reported by some researchers with their negative impact on the health of consumers [5]. Whereas, ketchup (21, 58%), ice cream (22, 30%) and chips (25%) are daily less consumed. The results of the daily products consumption (low by primary school, medium by middle school and high by adolescent students) are the reverse according to another study [6]. The consumption of sweet (by children) is reasonable because it is necessary for their growth [8]. This may be explained by the physiological needs of the human body [9] because as a child grows, he needs more calories [10]. The distribution of students according to weekly consumption of industrially processed foods is shown in Figure 6. Through the investigation, we have found out that the most consumed products are: fruit juices, drinks,

ketchup, casher, mayonnaise, and ice cream. Among 417 surveyed students 45,5 % of boys intensively eat every week the following products: fruit juice, sweets, cookies, mayonnaise and ice cream. 47,9 % of girls consume more soft drinks, ketchup, casher, chewing-gum, marmalade and cheese. Concerning milk consumption, only 10% of boys and 10% of girls answered "yes". But, the rest of the food consumption is almost the same among boys and girls (fig.6). The weekly consumption of juice varies among the three groups of students. Indeed; 25% of primary students drink fruit juice every week, 41% of middle school students and finally 47% of high school students. Hence, there is a positive correlation between students' age and consumption of fruit juice. For the consumption of soft drinks, 37% of high school students consume less soft drink than middle school students (47%). The consumption of ice cream and mayonnaise was respectively remarked with high percentage (37%) and (36%) among high school students compared with other school levels.

CONCLUSION

Based on the results of the survey of foodstuffs consumption by primary, college and high school students, boys and girls are equal in the daily consumption which indicates that the risk of exposure to food additives is more important among boys as well as girls [11, 12]. The most consumed packaged products per day for boys are: cheese, milk and chewing-gum. But, the girls are more admired by milk and cheese. For the weekly mode, boys consume more fruit juices; however, girls prefer soft drinks. Mayonnaise, ketchup, chips and ice cream was consumed less often by day; but cheese and milk were the top choices; 65,71% for cheese, followed by milk 57,07%. For daily and weekly consumption depending on school level, high school students consume more food products than college school and primary school students.

ACKNOWLEDGEMENTS

This study was realized by all memberships, the delegation, the survey students and the directors of the three institutions (primary, middle and high school).

REFERENCES

- [1]: Gouget. C. 2012. Additifs Alimentaires Danger. Le guide indispensable pour ne plus vous empoisonner. Escalquens :Edition: Chariot d'or, pp: 157.
- [2]: Schab. D. W. And Trinh. N. H. 2004. Do artificial food colors promote hyperactivity in children with hyperactive syndromes a meta-analysis of double-blind placebo-controlled trials. *Journal of Developmental and Behavioral Pediatrics*. 25 (6), pp: 423-434.
- [3]: Sakamaki. R, Amamoto. R, Mochida. Y, Shinfuku. N and Toyama. K. A. 2005. Comparative study of food habits and body shape perception of university students in japan and korea. *Nutrition Journal*, 4:31.
- [4]: R'haïem. N, Chahboun. N. Abed. H, esmail.a, Berny. E. H, Hammoumi. A, Ouhssine. M. 2013. *Bulletin. Société. Pharmacologie. Bordeaux, additifs alimentaires du marché de kénitra*. 152 (1-4), 53-64.
- [5]: Intervention de l'Afssa au colloque « La situation nutritionnelle en France» 2007.
- [6]: Rapport final de l'Afssa, 2002. Comparaison de deux enquêtes nationales de consommation alimentaire auprès des adolescents et des adultes – Baromètre santé nutrition et INCA (1998-99) : éléments de méthode et résultats.
- [7]: Observatoire régional de santé de Bretagne - La santé des jeunes en Bretagne – 2007.
- [8]: Mennella. J. A, Finkbeiner. S, Lipchock. S. V, Hwang. L. D, Reed. D. R. 2014. Preferences for salty and sweet tastes are elevated and related to each other during childhood. *PLoS One*. 9 (3): e 92201. doi: 10.1371/journal.pone.0092201. E collection.
- [9]: Coldwell. S. E, Oswald. T. K, Reed. D. R. A. 2009. Marker of growth differs between adolescents with high vs. low sugar preference. *PhysiolBehav*. 96: 574–580.
- [10]: Weir. A.Westerhoff. P.Fabricius.L.Hristovski. K.von Goetz. N. 2012. Titanium Dioxide Nanoparticles in Food and Personal Care Products. *Environment Science and Technology*, 46 (4), pp 2242–2250.
- [11]: Soffritti. M., Belpoggi. F., Esposti. D., Lambertini. L., Tibaldi. E. And Rigano. A. 2006. First experimental demonstration of the multipotential carcinogenic effects of aspartame administered in the feed to Sprague-Dawley rats. - *Environ. Health Perspect*. 114 (3), pp: 379-383.
- [12]: Dutau. G., Rancé. F., S. Fejji. A. Juchet. F. Brémont, P. Nouilhan, 1996. Intolérance aux additifs alimentaires chez l'enfant : mythe ou réalité. *Revue Française. Allergologie. Immunologie. Clinique*,. 36(2), pp: 129-142.