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Perception of the Students of the Third Year of High School on GMO Foods

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Abstract*—The GMO foods are increasingly embedded in our daily diet, being frequent in your market presence. These foods have as objective the improvement of the production quality and resistance to pests and herbicides. But even though these foods are being consumed, there is no consensus in the scientific community about the safety of these foods for human health and the environment. Soon the present work aimed to go into the field to assess the knowledge and the vision of the high school students of the private network on the GMO foods, this from the application of questionnaires in schools of the municipality of Gurupi-TO and investigate whether This topic is discussed in the classroom.*

***Keywords*—*Education, Transgenic, Knowledge, Foods*.**

I. INTRODUCTION

Genetically modified organisms (GMOs) or GM crops are those who have had your genetic material (DNA/RNA) changed in order to provide these features, such as increased productivity and greater resistance to pests. These changes are possible due to the advent of recombinant DNA technology, which allows the manipulation of the genetic material of an organism or, even, by transferring genes from one organism to another, even if they do not have any relationship Genetics [1].

Genetic engineering techniques make use of tools and innovative methodologies and, due to this, raise questions about the advantages and disadvantages linked to the use of GMOs both inside and outside the scientific community. Therefore, studies are carried out to try to clarify such points and define the weight of these in the commercialization of GM crops [2, 3].

The advantages of using GMOs can be observed in different segments of the industry, agribusiness, food sample, doctor and pharmacist. How can they be applied differently, transgenics feature several advantages, but at the same time, specific to each industrial area. The same is valid for the disadvantages linked to the use of this type of organism [4–6].

For the agribusiness area, the application of GMOs is focused on the improvement of cultivars, this can lead to food produc- tion safer, for example, enables the reduction of harmful compounds (mycotoxins, alkaloids, etc.) present in plants Convention members; reduces the use of pesticides/herbicides through the use of plants modified to be tolerant to these products, or that are resistant to pests [2, 5].

The advantages of the use of GMOs in agro-industry does not stop there, because they still allow the reproduction of plant varieties more efficiently, i.e. leads to decrease in the amount of land required for the same income that unmodified cultivars; development of plants resistant to adverse environmental conditions such as drought and salt; among other [5–7].

In the area support, the use of GM crops appears to assign functional foods/nutritional characteristics, or produce new types in order to diversify the diet of individuals that have food restriction due to allergies or intolerance. The use of GMOs in this industrial segment products originates with biofortification nutrients, beneficial to health and that may prevent disease [2]. Whereas the present study aims to analyze the level of knowledge of the non-scientific community and that the GMO foods are the most accessible to the population,

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another term such as "genetically modified micro-organisms (AGMs) "will be explored later.

As for the medical and pharmacological areas, it is remarkable the positive application of transgenics in the industry, as an example have the possibility of producing edible vaccines (e.g. milk and transgenic plants containing molecules able to promote immunization of individuals); cancer research through the use of transgenic viruses as vector; use of bacteria that secrete substances against diseases such as HIV; Finally, studies on the possibility of producing biopharmaceuticals through transgenic plants [8].

In spite of the benefits arising out of the use of genetically modified organisms, there are still doubts about the harm that can be tied to the same. So widespread, the issues raised the more relevant point to possible health risks, unexpected gene interaction, cancer risk, the possible emergence of allergies, horizontal gene transfer, increasing the chances of resistance to antibiotics, environmental risks, risks to biodiversity, among others [2].

Despite being a topic discussed and controversial enough at the present time, GMOs have been produced for some time, since the experiments undertaken by Mendel in the 19 century. With the advancement of technology, the methods of transformation of bodies were being improved and it was possible to obtain specific way modified organisms and to submit only desirable characteristics [9]. Initially, GMOs produced were more related to the areas of medicine and Pharmacology, only in the year 1996 the first genetically modified food (AGMs) were introduced on the market [6, 7].

Nowadays, in the context of GMOs, we live a moment totally opposite moments experienced a few years ago. Today these foods are entered in our daily diet and criticisms with respect to these foods have ceased, well different from the years 2000, where reports of the presence of genetically modified food in industrialized Brazil axis departments public opinion campaign conducted by Greenpeace, "GMO foods: not on my plate!".

The production of AGMs if given by the fact of providing best quality, foods containing higher amounts of nutrients, or reducing the use of chemical agents in the field, improving the resistance to environmental stress conditions food, such as droughts and flash floods. It is possible to say that the cultivation of genetically modified foods, also, the optimization of production, making it produced a greater amount of farming per hectare, so it would be a way to meet the food demand of the globe [6, 7, 10].

The use of transgenic cultivars presents some advantages already clarified by research, such as increased resistance of plants to insecticides, droughts, disease, salt, increase in the quality and quantity of nutrients from food, reduction of land destined for Agriculture, reduction of inputs used in the cultivation, among others. Still, there are controversies regarding the consumption of AGMs, mainly in that it is tangent to the safety of these or other products containing traces of GM crops [6, 11].

Although the aggregate benefits to the use of genetically modified food are considerable, discussions about your consumption raised several controversial issues, such as the possibility of mutations, allergies, and carcinogenic effects. Concerned about the withdrawals, researchers were able to demonstrate that AGMs consumption does not cause damage to the body. However, instituted a culture of prejudice, fear and lack of information of the population about the use of transgenics [5, 6, 12].

In Brazil, GMO foods or contain traces of GMOs shall include, on the packaging, a symbol to indicate the nature of this. Despite providing essential information about the product, the symbol used for signaling is similar to others which refer to street signs, radioactive elements, and high voltage. In this way, the portion of the population that has a poor knowledge regarding AGMs understands that products containing such emblem should be carefully considered, thoughtful, or even dangerous to health products. Thus, policies of awareness and dissemination of information should be carried out so that there is acceptance
of transgenic origin food products.

II. MATERIALS AND METHODS

The method used was the experimental study of quantitative and qualitative type. The quantitative methodology aims to work with numeric data collected during the research, by applying statistical techniques, while the qualitative method aims to evaluate and interpret aspects raised the subject researched.

The target audience for this research were students of the last year of high school or private schools of the municipality of Gurupi-TO. Data collection was performed with the application of 35 structured questionnaires according to the purpose of the research, which is to raise data to evaluate the level of knowledge of young people about the AGMs.

The questionnaire consisted of 20 questions initially contemplating the General information of the participant, where there has been focus on 9 of these issues which sought to understand the knowledge of the student interviewed about the existence, production,

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consumption, and disclosure relating to GMO foods, which was set taking into account the knowledge of students about biology and genetics. In this way, the aim is to better understand the level of knowledge of young people with education about the AGMs, the myths that still are believed, prejudices, and erroneous information that is disseminated to the population. Soon, the data obtained may lead to planning methods to be addressed to enrich the knowledge of such a group, on genetically modified food.

III. RESULTS AND DISCUSSION

After the application of the questionnaires, data were evaluated and tabulated, seeking to evaluate the knowledge and degree of acceptance about genetically modified foods by high school students from the private network of Gurupi-TO. The questionnaire was answered by 35 students and contained multiple choice questions related to the definition, transgenic foods consumption and labeling. Of those surveyed, 49% were male and 51% female with ages of 17 to 18 years (Fig 1).

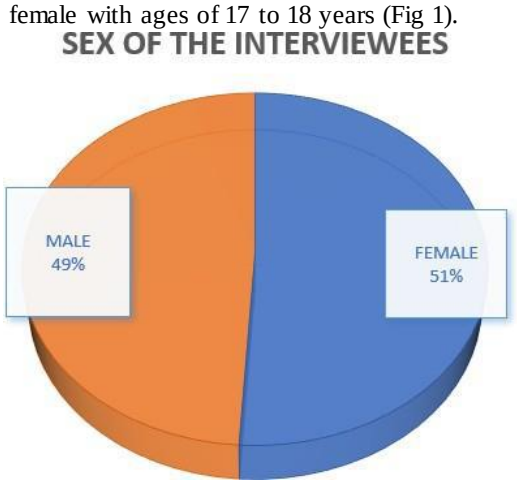

Fig. 1: Sex of respondents.

Most students, 40% of respondents, say make use of GMO foods, the rest is divided into 31% which doesn't make the use of GMO foods and 29% who don't know how to make use or not, just do not know the definition and do not seek to observe the presence of them on the switch shows (Fig 2). We realize that the vast majority never heard or know what the exact definition of GMO foods (Fig 2), 34% of respondents claim to know the definition of GMO foods, this percentage is lower than the 37 percent who declared themselves do not have knowledge.

Students said knowing the definition of GMO foods, responded that these foods are genetically modified to assist in the planting, while others said they are foods with high nutritional value. The percentage of students who said not knowing the definition shows us that is necessary more information on GMO foods of high school students in the schools of the town of Gurupi-TO.

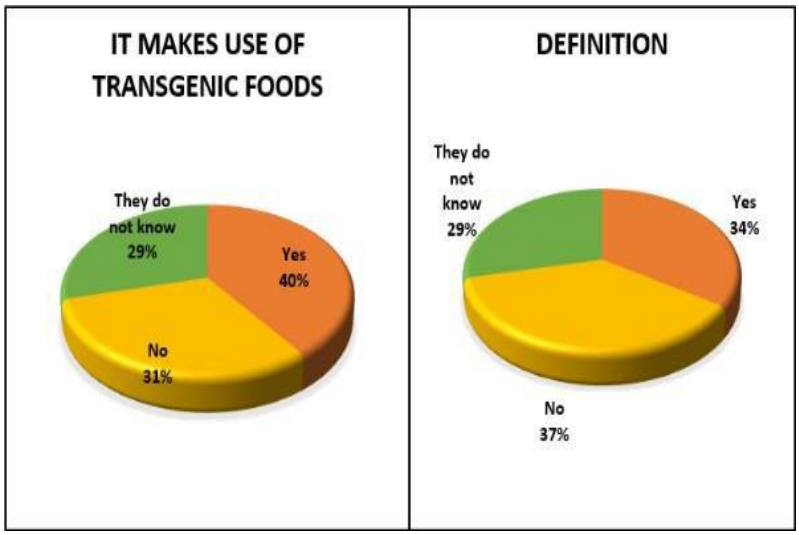

Fig. 2: Use of GMO foods and knowledge of definition.

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When asked about the possible human health impacts most students (32%) agree that GMO foods are safe to human health, this most 32% agree fully while 23 percent agree partly and 31% do not know about the safety of these foods, and those who disagree (14%) the statement represent a part of who don't know about the AGMs (Fig 3). It is obvious that, when comparing the GMO foods with organic food, the students gave their opinions by the alternative of not knowing (40%) If the GMO foods are healthier or not.

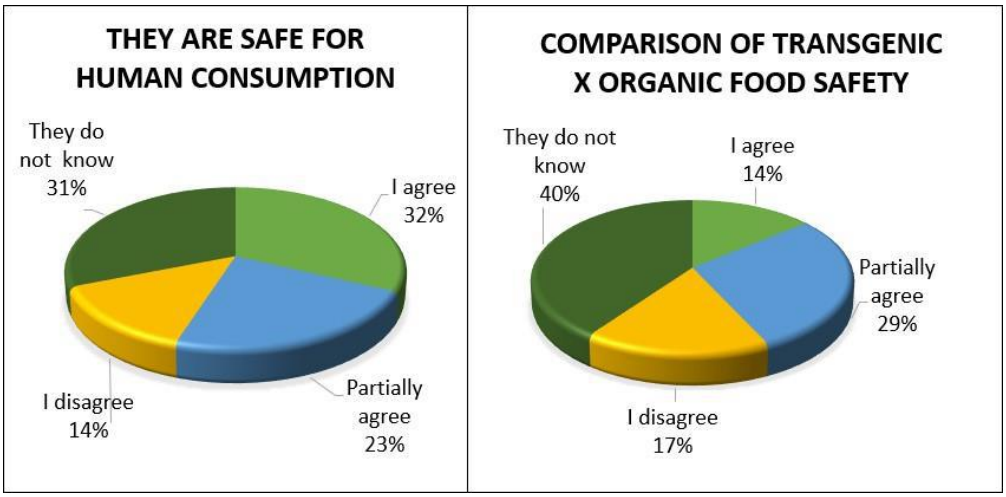

Fig.3: Security relationship of consumption of GMO foods and comparison of these with organic food.

If treating the symbolism of GMO foods about of 57% of respondents claimed to have seen or know the meaning of the symbol "T", while 56% said they had knowledge of what is the "T" symbol. Some employees showed knowledge of the meaning of the symbol of transgenics in packaging, however, most people don't know that the meaning is related to GMO foods. With respect to the meaning of the symbol related to GMO foods, 43% claimed not to know the meaning, which was checked on the issue essay explaining what is GMO foods (Fig 4).

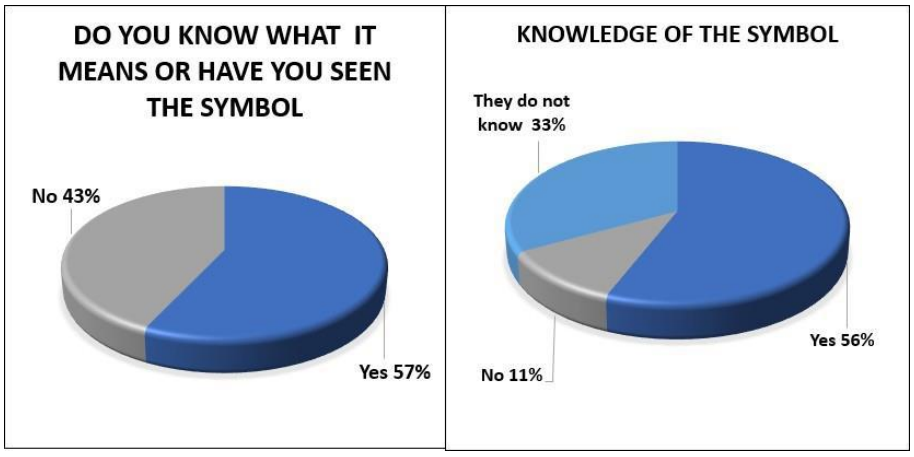

Fig.4: Demonstration of the issues regarding symbolism AGMs.

It is obvious that the majority of respondents chose not to express an opinion with respect to the consumption of these foods, due to little understanding about the subject, but 34% of the students are aware that people consume GM crops without knowledge of the same, as seen in the previous charts. The population lacks information on transgenics, and when they receive is because of adverse two sides both beneficial as evil in relation to the consumption of these foods, soon more information is required.

In view of all this lack of knowledge and dissemination, the students gave their opinions about the best alternatives to the disclosure of AGMs. The values obtained showed that 32% opted for the internet and social networking, 19%, 17% in schools packs, 12% in two categories, newspaper/radio and tv, and 8% did not know to opine (Fig 5).

Taking into account the data collected in a recent

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survey it can be affirmed that there should be greater dissemination of information about GMO foods since there is still little information or erroneous information regarding this type of product. The lack of information undermines the right of consumer choice because she didn't know the product you are choosing and consuming.

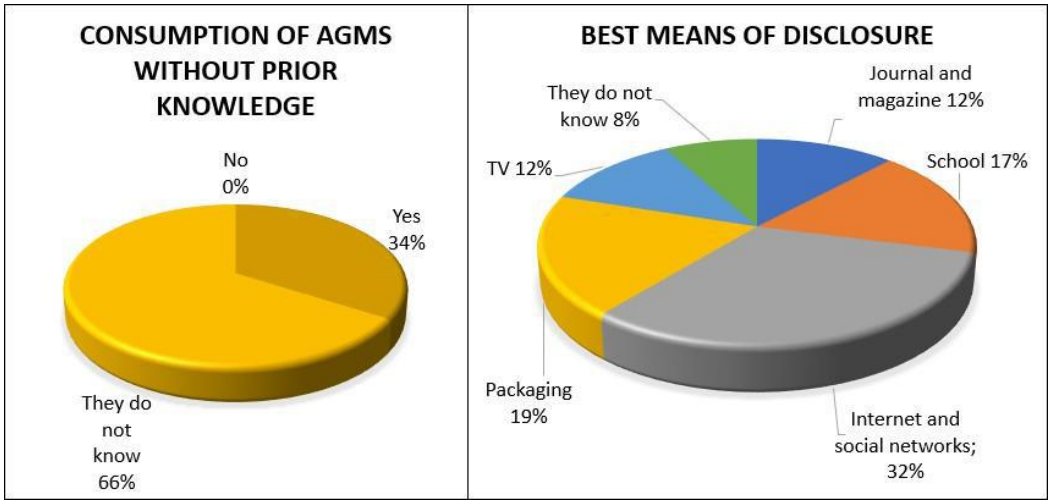

Fig. 5: GMO consumption without having knowledge and some means of disseminating AGMs.

IV. CONCLUSION

One can understand that more than 85% of high school students did not know the private network to respond to what is a transgenic food according to the descriptive issue. The results showed that there is a lack of knowledge of the students and probably about transgenic foods supermarket consumers are, however, some students know the meaning, or a brief knowledge of genetics modified. On the study of the population has been established that there is misinformation about the presence of GMO in processed products and also the meaning of the symbol "T" and the risk of consumption of AGA. Lack of information impairs the right of consumer choice because he didn't know the product is chosen and consume.

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REFERENCES

[1] Shew, A. M., Nalley, L. L., Danforth, D. M., Dixon, B. L., Nayga, R. M., Delwaide, A.-C., & Valent, B. (2016). Are all GMOs the same? Consumer acceptance of cisgenic rice in India. *Plant Biotechnology Journal*, *14*(1), 4–7. https://doi.org/10.1111/pbi.12442

[2] Hug, K. (2008). Genetically modified organisms: Do the benefits outweigh the risks? *Medicina*, *44*(2), 87. https://doi.org/10.3390/medicina44020012

[3] Pozzetti, V. C., & Rodrigues, C. B. (2018). Alimentos Transgênicos e o princípio da dignidade da pessoa humana. *Revista Jurídica (FURB)*, *22*(48), 7874.

[4] Cortese, R. D. molin, Martinelli, S. S., Fabri, R. K., & Cavalli, S. B. (2017). Alimentação na atualidade: reflexões sobre o consumo de alimentos geneticamente modificados. *Agroecologia*, 71–79.

[5] DeFrancesco, L. (2013). How safe does transgenic food need to be? *Nature Biotechnology*, *31*, 794–802. https://doi.org/10.1038/nbt.2686

[6] Huesing, J. E., Andres, D., Braverman, M. P., Burns, A., Felsot, A. S., Harrigan, G. G., … Jansen van Rijssen, W. (2016). Global adoption of genetically modified (GM) crops: challenges for the public sector. *Journal of agricultural and food chemistry*, *64*(2), 394–402

[7] Rzymski, P., & Królczyk, A. (2016). Attitudes toward genetically modified organisms in Poland: to GMO or not to GMO? *Food Security*, *8*(3), 689–697.

[8] Silva, M. C. da, Carvalho, C. A. de, Barroqueiro, Â. T. S., Sousa, R. M. L. de, Castro, A. C. P. de, & Santos, A. F. dos. (2017). Alimentos transgênicos: conhecimento entre acadêmicos de nutrição. *Revista de Investigação Biomédica*, *9*(1), 31–39. https://doi.org/10.24863/rib.v9i1.85

[9] Barrows, G., Sexton, S., & Zilberman, D. (2014). Agricultural biotechnology: the promise and prospects of genetically modified crops. *Journal of Economic Perspectives*, *28*(1), 99–120.

[10] Skamnioti, P., & Gurr, S. J. (2009). Against the grain: safeguarding rice from rice blast disease. *Trends in biotechnology*, *27*(3), 141–150.

https://dx.doi.org/10.22161/ijaers.6.5.21 *ISSN: 2349-6495(P) | 2456-1908(O)*

[11] Neto, J. B. de L., Souza, F. A. P. de, Pereira, I. dos S., Santos, V. N. dos, & Vandesmet, L. C. S. (2018). Transgenia Alimentar: uma abordagem científica e segurança alimentar. *Mostra Científica em Biomedicina*, *3*(1). Recuperado de http://publicacoesacademicas.unicatolicaquixada.edu.br/index.php/mostrabiomedicina/article/view/2424

[12] Scott, S. E., Inbar, Y., & Rozin, P. (2016). Evidence for absolute moral opposition to genetically modified food in the United States. *Perspectives on Psychological Science*, *11*(3), 315–324.