TRANSGENIC CROPS AND FOOD:
an informative approach

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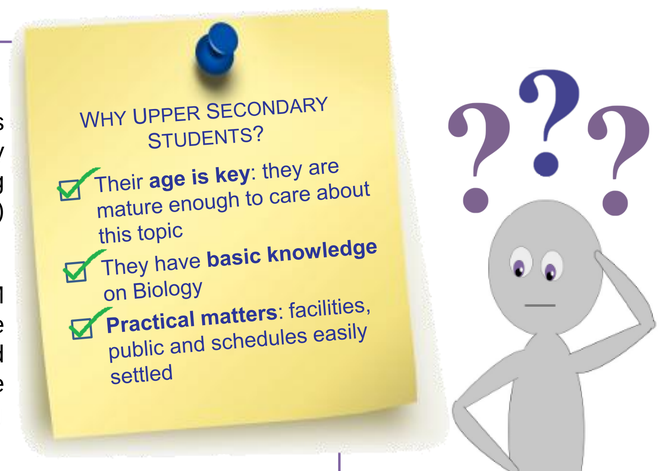
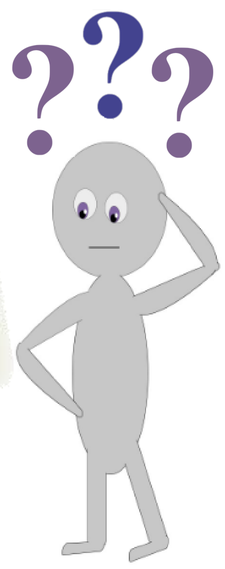
INTRODUCTION

The use of genetically modified organisms (GMOs) has increased since their creation, around forty years ago. They are being successfully employed in several fields including drugs' or enzymes' (widely utilised for industrial purposes) production and also in agriculture.

In Spain and the rest of the European Union, the only GM crop allowed to be grown is the Bt corn. However, the importation of GM products such as cotton or soy cultivated in other countries is allowed. Therefore, as consumers, we are susceptible to buying and using these products coming from transgenic organisms, even without knowing.





But what is a transgenic organism? As previously stated, ordinary people who may not be able to properly answer this question, are being exposed to them and the natural response to what we ignore is no other than fear. Furthermore, caught up as we are in the Digital Age, it is sometimes difficult to discern whether a source of information is trustworthy or not; especially regarding such a polemic topic.

In this circumstances, I consider it vital for people to receive objective and clear information, which would enable them to make a personal decision and defend their opinion by means of examples so they do not adopt the view imposed by third parties. This would be my role within this project.

OBJECTIVES

- Evaluating what kind of **opinion towards transgenic food** predominates within the students.
- Establishing a **link** between their **knowledge** on the topic and the **opinion** they have about it. I.e. finding out if they state an opinion without information on the topic, just based on what third parties have imposed to them.
- **Offering objective information** about transgenic crops and food, which is a scientific topic of common interest that has not received a positive reception from society.
- **Decreasing unfounded fears** about transgenic organisms and products obtained from them that gutter press and some organizations disseminate.
- Checking whether the **knowledge transfer via the conference** has been successful or not.
- **Analyzing if the students change their opinion** about transgenic crops and food **after receiving objective information on the topic**. This would mean their previous opinion was influenced by third parties.

MATERIAL AND METHODS

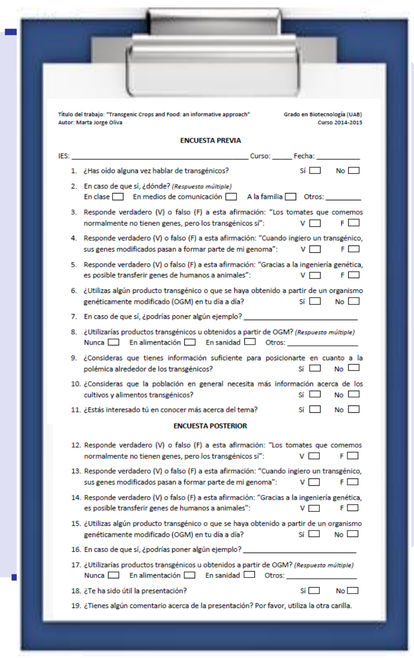
In order to make the transfer of information feasible, a total of **two conferences** in two different public High schools in Sabadell: IES Arraona and IES Agustí Serra i Fontanet, were conducted.

Far from entering in technical details, the main purpose was to **offer a general view and give basic data and examples** about:

- What a transgenic organism is
- Use of GMOs in day by day life
- GMOs in agriculture (why have they been introduced in the field?)
- Situation of GM plants and food in the world and especially in the European Union
- Environmental and human health concerns linked to GM plants and food: do they pose a real threat?

To achieve the established objectives, the attendees would be given a survey to be filled out a few minutes before the conference starts (**previous survey**) and a second one right after it (**posterior survey**).

The surveys include **theoretical and opinion questions** which are **repeated in some cases** to detect any possible repercussion the conference may have.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ENCUESTA PREVIA

IES: _____ Curso: ____ Fecha: _____

1. ¿Has oído alguna vez hablar de transgénicos? Sí ☐ No ☐
2. En caso de que sí, ¿dónde? *(Respuesta múltiple)*
   En clase ☐ En medios de comunicación ☐ A la familia ☐ Otros: _____
3. Responde verdadero (V) o falso (F) a esta afirmación: "Los tomates que comemos normalmente no tienen genes, pero los transgénicos sí": V ☐ F ☐
4. Responde verdadero (V) o falso (F) a esta afirmación: "Cuando ingiero un transgénico, sus genes modificados pasan a formar parte de mi genoma": V ☐ F ☐
5. Responde verdadero (V) o falso (F) a esta afirmación: "Gracias a la ingeniería genética, es posible transferir genes de humanos a animales": V ☐ F ☐
6. ¿Utilizas algún producto transgénico o que se haya obtenido a partir de un organismo genéticamente modificado (OGM) en tu día a día? Sí ☐ No ☐
7. En caso de que sí, ¿podrías poner algún ejemplo? _____
8. ¿Utilizarías productos transgénicos u obtenidos a partir de OGM? *(Respuesta múltiple)*
   Nunca ☐ En alimentación ☐ En sanidad ☐ Otros: _____
9. ¿Consideras que tienes información suficiente para posicionarte en cuanto a la polémica alrededor de los transgénicos? Sí ☐ No ☐
10. ¿Consideras que la población en general necesita más información acerca de los cultivos y alimentos transgénicos? Sí ☐ No ☐
11. ¿Estás interesado tú en conocer más acerca del tema? Sí ☐ No ☐

ENCUESTA POSTERIOR

12. Responde verdadero (V) o falso (F) a esta afirmación: "Los tomates que comemos normalmente no tienen genes, pero los transgénicos sí": V ☐ F ☐
13. Responde verdadero (V) o falso (F) a esta afirmación: "Cuando ingiero un transgénico, sus genes modificados pasan a formar parte de mi genoma": V ☐ F ☐
14. Responde verdadero (V) o falso (F) a esta afirmación: "Gracias a la ingeniería genética, es posible transferir genes de humanos a animales": V ☐ F ☐
15. ¿Utilizas algún producto transgénico o que se haya obtenido a partir de un organismo genéticamente modificado (OGM) en tu día a día? Sí ☐ No ☐
16. En caso de que sí, ¿podrías poner algún ejemplo? _____
17. ¿Utilizarías productos transgénicos u obtenidos a partir de OGM? *(Respuesta múltiple)*
    Nunca ☐ En alimentación ☐ En sanidad ☐ Otros: _____
18. ¿Te ha sido útil la presentación? Sí ☐ No ☐
19. ¿Tienes algún comentario acerca de la presentación? Por favor, utiliza la otra carilla.

RESULTS

Regarding the **opinion of the sample towards transgenic food before the conference** took place, we will refer to **question 8**, **Fig. 1**. When the students are asked if they would ever use transgenic or obtained from GMOs products, only a **9% answer never.** A 52% would accept them in the health field and a **37% in food**.

Secondly, to see if there is a **relationship between negative opinion and ignorance on the topic**, 3 aspects were analyzed:

- Through **questions 1 and 2**, **Fig. 2**, it showed up that the great majority, a **96%, had already heard about GMOs**, mostly thank to their teachers.
- **Questions 3**, **4 and 5** attempted to test the sample's theoretical knowledge. **Most of the students answered correctly**: 68, 76 and 56% respectively.
- To test the sample from a practical approach, they were asked **questions 6 and 7**, **Fig. 3**. **63%** answered they **do not consume GMOs or products obtained from them**. From the 37% that consider they do, **only 19% give a correct example**. 45% give a wrong one and 36% abstain from giving one.

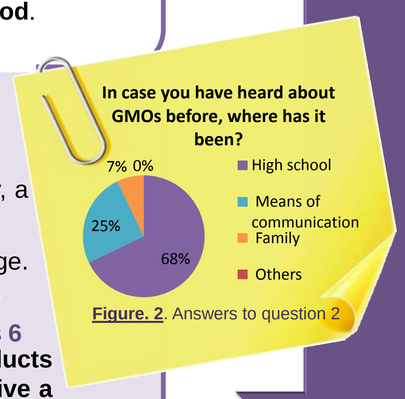


Figure. 2. Answers to question 2

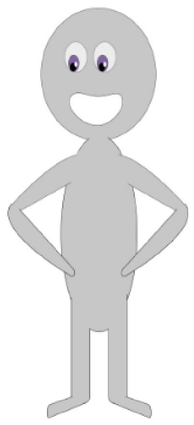
To find out the **perception of the sample about the lack of information on the topic**, **questions 9**, **10 and 11** were formulated. **86%** consider they **lack information to form their own opinion** on the topic and 81% are interested in knowing more. **99%** think that **population requires more information** about it.

Questions 12, **13**, **14**, **15 and 16** were asked to **evaluate the knowledge transfer** via the conference. In this case, the percentage of right answers to the theoretical questions (12, 13 and 14) are 77, 80 and 81% respectively.

Regarding the practical questions: 15 and 16, this second time a **76% consider they are consumers of transgenic products** and an **89%** (**Fig.3**) of those **was able to give a correct example** of it.

In order to determine the **opinion of the sample towards transgenic food after the conference**, **question 17** was formulated (**Fig.1**). This time, **48%** of the sample would accept to consume transgenic or obtained from GMOs products to **feed themselves**, 44% in the health field, 4% in other fields such as engineering, industry, agriculture… and a **4% would never use them**.

In **questions 18 and 19**, the sample was asked for their **opinion about the presentation**. A **98% found it useful** and the general idea of their comments is that they liked it a lot, finding it interesting and illuminating.



CONCLUSIONS

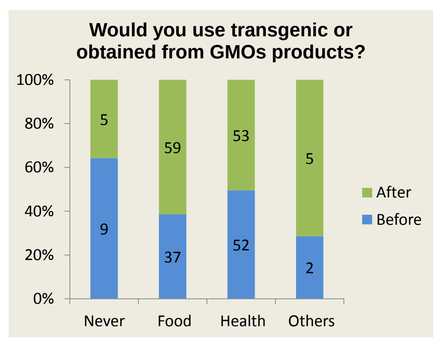


Figure. 1. Number of students choosing each option to questions 8 (before the conference) and 17 (after the conference)

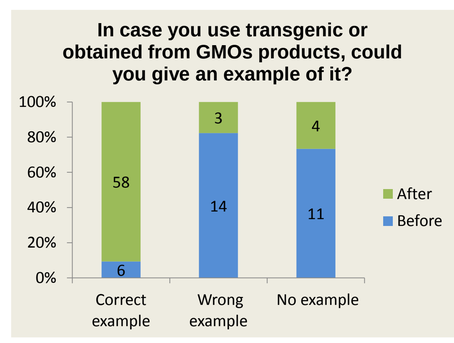


Figure. 3. Number of students choosing each option to questions 7 (before the conference) and 16 (after the conference)

- ✓ Far from having a bad opinion about this new technology, **the sample shows a general acceptance** to transgenic and obtained from GMOs products.
- ✓ Despite having answered correctly to the majority of the theoretical questions, the results to the practical ones and the students' global perception conclude a **lack of information**. Given that their major source of information on this topic is the academic one, it can be stated that what they learn about GMOs at High school is not enough for them to have a complete vision on the topic.
- ✓ Thank to the conference, the **students gained a global vision of GMOs**. An example of it can be seen in **Fig. 3**: they are not only able to give correct examples but also within and outside the agriculture field.
- ✓ After the conference, there is an **increase of acceptance towards GMOs in food** (**Fig. 1**). Parting from a good level of acceptance, ¼ of the sample does not mark the "food" square in the first place due to a lack of objective information.
- ✓ **The activity has been a success**: only a 2% of the sample did not find the conference useful, which means that even the 17% that was not interested in knowing more about the topic has learned something thank to the presentation.

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