Teaching Teachers about Biotechnology in Argentina

SUMMARY: In 2003-04, when the Ministry of Education in Argentina instituted a requirement that biotechnology be taught in schools, most teachers had not been trained in this new area of science and had few resources for planning lessons. A panel of experts came together to design a training course and educational materials, which is offered free-of-charge around the country through the Por Qué Biotecnología (Why Biotechnology) programme. Today more than 10,000 school teachers have been trained.

Biotechnology crops have been grown in Argentina since 1996, and the country was the world's second largest producer of biotech crops for more than 10 years. An important factor in public education and awareness-building is the national mandate to teach biotech to schoolchildren. The Por Qué Biotecnología (Why Biotechnology) programme supports teachers by providing resources, strategies and educational tools on all aspects of biotechnology.

por qué Biotecnología

ArgenBio
Consejo Argentino para la Información y el Desarrollo de la Biotecnología

Why teachers

As in many other countries, teachers are held in special regard in Argentina. Education is very important and teachers are well respected for their role in educating children. Thanks to the national public education system, the literacy rate is 97 percent, and many public school teachers in Argentina teach at more than one school in order to reach children in the 23 provinces of the second-largest country in South America. However, educational resources can be scarce, especially on emerging topics such as biotechnology which have only recently been added to the curriculum in teachers' colleges.

Years before a national mandate to teach biotechnology came into effect, ArgenBio, the national non-profit biotechnology association, was working to develop educational materials for teachers. Teachers are educated people who are also citizens, parents and consumers, and they are excellent replicators of information, spreading their knowledge not only to their students but also to colleagues, families, friends and other contacts. ArgenBio saw teachers as important partners for sharing information about biotechnology to different audiences.

ArgenBio's work with teachers quickly became formalised as the Por Qué Biotecnología programme, dedicated to providing resources, strategies and educational tools on all aspects of biotechnology to schools, museums and other educational institutions. A panel of four experts in biology and biotechnology from prestigious public research institutions, plus one highly-experienced secondary school teacher with a degree in biotechnology was commissioned to develop a training course for teachers and the initial content for science-based education materials that could be adopted and used in any school, working closely with ArgenBio.

The programme was offered to the education authorities and those in charge of training teachers, first in the capital city of Buenos Aires. Word quickly spread, and there was a great response from teachers around the country. Prior to the offering of this programme, the internet and media reports were the only other resources most educators had to prepare their lessons.

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How to teach biotechnology

A five-person expert panel still oversees the Why Biotechnology programme today, delivering training programmes on-site at schools that request it, and regularly updating resource material.

The teachers' training course lasts about four hours and is most often attended by general science and biology teachers – although curious environmental science, chemistry, physics and geography teachers have been known to join as well. The course is also tailored according to the location and resources of the school. For example, in the rural areas, teachers may already know more about agriculture than they do in urban areas, but they may have fewer resources to do certain activities or experiments.

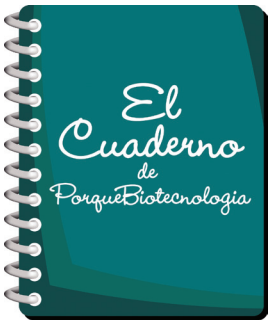
The first part of the teachers' course is a standard seminar on biotechnology, including traditional tools, genetic engineering, and applications in industry, health, agriculture and animals. Next there is an in-depth section on agricultural biotechnology, the main focus of ArgenBio's work, because it is an important, high-profile topic in Argentina, and conflicting, non-science-based, and often inaccurate information about agricultural biotechnology has been widely spread among the general public. The course concludes with an introduction to the teaching materials that are available and the Why Biotechnology website www.porquebiotecnologia.com.ar, which contains even more information.

The teaching materials cover all aspects of biotechnology, including medical, pharmaceutical and industrial applications, as well as agricultural biotechnology. The materials are specially designed for students in their final years of primary school (10-12 years old) and those in secondary school (ages 13-18).

There are different materials for different levels of students but everything is designed to be as flexible as possible to meet teachers' specific needs and available resources. For example, some science experiments in the programme are very simple and can be completed in one two-hour lesson, while other, more elaborate projects are designed to run over the course of a four-month semester and require more equipment. The materials are offered in both print and electronic formats to fit a variety of teaching styles.

Accessing an on-line teacher's aide

All of the Why Biotechnology resources are available on-line for download and printing. Most of the teachers who have taken the Why Biotechnology course – and many who haven't – access further information on the internet and subscribe to regular email updates on newly available materials.



The Why Biotechnology website for teachers is open to all and contains lesson plans, experiment designs and detailed background material on more than 100 different topics. The on-line "Cuadernos," or notebooks, cover topics in agricultural biotechnology (such as biotech crops, plant breeding, biodiversity and farming practices), as well as non-agriculture subjects (including recombinant pharmaceuticals and applications of biotechnology in the food, textile, detergent and other industries). The Cuadernos also cover general science topics such as molecular and cell biology.

Each Cuaderno provides information on the theory behind the topic, recommended teaching methods, activities, reference materials and links to other related topics. For example, Cuaderno No. 6 addresses agricultural biotechnology broadly, and suggests how teachers can describe biotechnology as complementary to other forms of agriculture, not a replacement. It recommends an activity for students to research the biotech crops approved in Argentina, perhaps working with a social sciences teacher. This Cuaderno also references a dozen or more other Cuadernos, making connections between the broad topic and particular crops applications or issues such as exports, biofuels and food traceability.

A lasting resource

Today, almost 15 years after agricultural biotechnology was introduced in Argentina, some textbooks now include information on biotechnology; other courses on biotechnology are offered periodically. However, ArgenBio has been the first institution that offered courses in biotechnology and was a pioneer in developing material on the subject in Argentina. ArgenBio's Why Biotechnology programme has now reached more than 10,000 teachers with practical, science-based material and continues to make an important contribution to biotechnology education and awareness-building in Argentina.

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