

**Welcome to the first addition of Bio Bits, an informal and easy to read newsletter to keep you up-to-date with the latest biotechnology news in the Northern Territory, Australia and around the world.**

## **So what is Biotechnology?**

**Biotechnology** is the use of living things and technologies to make useful products and solve problems. The sector is divided into agricultural, environmental, industrial and medical biotechnology.

- The production of beer, cheese, yoghurt and wine are all examples of some of the oldest forms of biotechnology!
- Approximately 50% of drugs in clinical use come from natural products or synthetic copies of natural products.

## **Industrial Biotechnology**

Industrial Biotechnology is the application of modern biotechnology for the industrial production of energy and products. This method uses inherently clean processes, adapts and modifies the biological organisms, processes, products and systems found in nature, with less waste generation and reduced energy consumption. The production of bioplastics from corn starch is an example of industrial biotechnology.



- The starch from corn can be used to produce bioplastics which are completely biodegradable. An example of this is the plastic tray contained in a box of Cadbury Milk Chocolates. Next time you are lucky enough to be eating a box, try putting the plastic tray into a glass or bowl of water and watch it dissolve before your very eyes!

## **Agricultural Biotechnology**

Agricultural Biotechnology is the application of biotechnology to improve plant and animal production and to create new, high-value products eg. hybrid varieties of plants for higher yield, disease resistance and the like.

New biotechnologies complement and enhance conventional agricultural approaches in plant and animal breeding, veterinary products, diagnostics and food and beverage processing. Biotechnology techniques can be used to achieve a higher crop yield, the ability to withstand harsh environmental conditions, and pest resistance. Biotechnology is also used to engineer crops for uses other than food, such as for industrial and medical applications.

## **Environmental Biotechnology**

Environmental Biotechnology includes the application of biotechnology to a wide range of issues, such as the biocontrol of pest animals and weeds; diagnostics; waste management; bioremediation; and biomonitoring of the health of the environment. Biotechnology aims to achieve low emission processes by replacing existing processes with greener options and utilising waste

streams to make by-products. There are areas of overlap between environmental and industrial biotechnology, such as the extraction of methane from landfill sites for the generation of electricity.



- 600 tonnes of banana waste makes 222,000 litres of biodiesel!
- Methane gas from the Shoal Bay tip generates enough electricity to power around 8 000 homes.

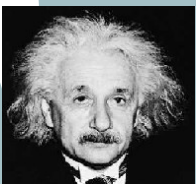
## Medical Biotechnology

Medical biotechnology is a crucial component of the health and medical research sector, with enormous potential for addressing future health challenges. Its many applications include the development of drugs, vaccines, medical devices, identification of disease, and medical treatments.



- Paclitaxel, the active ingredient in Taxol, an important drug in the treatment of breast cancer, is extracted from the needles and bark of the ground hemlock, *Taxus canadensis*.

## What the 'bio' terms mean . . .



- ❖ **Nutraceuticals** are usually (but not always) of plant origins. These products can be shown to have some therapeutic claims eg. Kakadu plum fruit is rich in Vitamin C.
- ❖ **Bioprospecting** is identifying new substances that could be used in biotechnology and is classically identified as the production of new drugs. Crude extracts of sponges from Darwin Harbour have been shown to have a number of potentially useful medical applications.
- ❖ **Genome** is the total genetic profile of a living organism.
- ❖ **Recombinant DNA Technology** is the technique for combining genetic material from different sources. For example, researchers in Melbourne have produced a lettuce containing an active measles vaccine.

## Look out for the next edition of Bio Bits coming soon!

Some of things that you'll be able to find out about are:

- DNA for Dummies
- Bio news from around Australia and the world
- The Drug Development Process

If you would like more information on any of the topics covered, or have something that you'd like included, please contact

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