Plant products

Plants produce hundreds of thousands of complex "natural products" that are used in a wide variety of industrial applications. Natural products are, for example, a rich source of medicines.

Learning from the past

This plant, the rosy periwinkle from Madagascar has been used as a folk remedy for centuries. Modern studies have revealed that it contains over 100 different natural products called alkaloids, many of which are biologically active. One of the alkaloids, vinblastine, is used as a chemotherapy drug to treat cancers, including Hodgkin's lymphoma, bladder, breast, head, neck, ovarian and testicular cancer.

Harvesting problems

Vinblastine is present in leaves in very tiny amounts, so extracting usable quantities directly from plants is not viable. However, scientists have discovered that two key building blocks used by the plant to make vinblastine called vindoline and catharanthine, are present in much larger quantities in leaves. Researchers have developed a way of extracting the building blocks from the plant and finishing the process of creating vinblastine using a technique called semi-synthesis, which sticks the building blocks together.

We could do better!

Although semi-synthesis provides more vinblastine than can be gained by extraction from plants, it is a costly process, meaning the price of the drug remains high. Researchers are working hard to uncover the instructions within the plant’s genetic material (the genes) used by rosy periwinkle to make vinblastine. If all the genes can be identified, like pieces of a jigsaw puzzle, then the instructions could be used to make large quantities of vinblastine in a host system like tobacco plants or yeast. This would reduce the cost of drug production greatly.

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