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From sweeteners to cancer treatments: nature points to new products

Throughout history people have turned to nature for relief from illnesses and this remains true today. With new technologies, researchers have an even greater ability to identify natural products that may lead to treatment or prevention of a wide range of health problems.

Just as new approaches are making it easier to draw on nature for medical inspiration, researchers are raising concerns that loss of biodiversity may prevent the formulation of many useful compounds as the species that produce them may be lost before scientists have an opportunity to investigate their potential uses. Climate change, invasive species, habitat, over-harvesting, degradation, fragmentation and loss are the major contributors to this loss of potentially valuable species.

Drugs used to treat health complaints fall into two categories: those derived from natural sources (e.g. plants, marine organisms and microbes), and those synthesised by scientists. Both approaches have led to effective treatments. However, over the last three decades, about 60% of newly approved medicines in the United States have natural product origins.

Low calorie sugar substitutes and cancer treatments have been two foci of natural product discovery recently, and plants have proved fruitful sources of products in both areas.

Recent research has identified six new pervilleine compounds from the tropical plant, *Erythroxylumpervillei* (Baillon), harvested in Madagascar, that show promise for inhibiting the development of drug resistance to cancer treatments. Pervilleine A was found to restore the sensitivity of leukaemiccancer cells to chemotherapeutics, perhaps through inhibition of p-glycoprotein.

Low calorie alternatives to sugar are in great demand owing to health concerns surrounding high calorie diets and obesity. At least eight sweeteners have been identified from plants and are commercially available. These include the Paraguayan herb, *Stevia rebaudiana* (Bertoni) which was noted for its sweetness in the early 20th century. Several sweet-tasting compounds have been isolated from this plant, the two most abundant of which (stevioside and rebaudioside A) are commercially available in many parts of the world. Stevioside and rebaudioside A are both diterpene glycosides and extracts containing these compounds have been used in Japan as sweeteners since the 1970s.

Although only a relatively small number of plants have been tested for biologically active substances, many have produced products with novel mechanisms of action. Not only may plants hold many undiscovered effective drugs or products, but because they yield novel structures, they open up new avenues for medicinal chemists to explore.

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