

Bio-insecticides, bio-pesticides, bio-herbicides and bio-fertilizers

Many plant species exhibit natural properties that offer opportunities for production of insecticides, pesticides, herbicides or fertilizers. These products are less harmful to the environment, improve soil fertility rate and are more affordable to the poor rural peasant farmers than conventional, synthetic products that are unaffordable. Plants such as *Warburgia sprague* (East African Greenheart), *Azadirachta indica* (Neem), *Zanthoxylum usambarensis* (Mugucuwa in Kikuyu), *Bidens pilosa* (Black jack, Spanish needle (English) or Kichoma mguu, Kichoma nguo (Swahili)) are among the plant species used for developing natural insecticidal and pesticide products.

Another example: *Croton megalocarpus*

It's also known as mukinduri in Kikuyu) and is used for producing a range of fertilizer products and animal feed supplements by extracting and processing the oil from the seeds.



Seeds of *Croton megalocarpus*

Biofuels

The use of biofuels is a way to reduce the demand for and use of fossil fuels (the "common" fuels of today). Plant parts such as seeds are harvested for their oil; the oil is converted to biomass fuel. A majority of the biofuels are made from plants indigenous to the drier areas of Africa. In most developing nations like Kenya, plants such as *Croton megalocarpus* (known as mukinduri in Kikuyu), *Ricinus communis* (Castor oil plant or Bariki in Kikuyu), *Moringa oliefera* (Wonder tree or Ben oil tree), *Elaies guineensis* (African oil palm or Mjengwa in Swahili) and now *Citrullus colocynthis* (Bitter apple) are being utilized for oil extraction into bio diesel.

More information about plant species and their properties can be found in the High Value Plants Directory, developed by ABCIC. See www.abcic.org

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Bio-products



Bamboo for decoration

Bioprospecting is an umbrella term describing the process of discovery and commercialization of new products based on biological resources. Bioprospecting often draws on indigenous knowledge about uses and characteristics of plants and animals.

Much of biodiversity, and therefore of (potentially) useful plant species, are found in the tropics, most of which are located in developing countries. Indigenous knowledge on the use and potential of plant extracts for medicinal use are of key importance to the development of such products.

Herbal medicine

For long, plant species have been used as a source for medicine and today they still are the basis of a wide range of medicinal products throughout Africa and the rest of the world in traditional as well as conventional medicine. Their use is less common in clinical settings, but their value is more and more acknowledged since in recent years scientific evidence about the effectiveness of herbal medicine has become more widely available.



Acacia nilotica

An example: *Acacia nilotica*

This tree is commonly known as Gum Arabic Tree or Prickly Acacia. Local names are Munga (Giriama), Kisemei, Musemei (Kamba), OI-Erbat, OI-Kiroriti (Maasai) or Lkoloriti (Samburu).

Use

The Gum Arabic Tree is a native tree species to semi-arid lands in Africa and in Kenya can be found in Rift Valley province. It used for treating ailments such as diarrhea, genito-urinary infections, gingivitis, gonorrhoea, indigestion problems, pneumonia, measles, pustular diseases, chest pains, coughs, fevers, typhoid fevers, sore throats and toothaches. It contains antibacterial properties and acts as an aphrodisiac.

Cosmetic products

Use of plants for cosmetic products goes back ages and is still very common and popular. Herbal products contain free-radical scavenging properties that aid in smoothening the skin, protect the skin from the sun's intense rays, whitening the skin and have anti-microbial effects that are of medicinal benefits.

An example: *Aloe barbadensis*

Also known as *Aloe vera*. This is a very common plant used for both cosmetic and as an alternative for medicines for treating many ailments including cancerous tumors. *Aloe vera* has anti-microbial properties that aid in protecting the skin from infections and also for toning it. It makes body soaps, hair shampoos, body lotions, facial creams and health drinks.



Aloe vera products

Dyes or colorants

Natural extracts from plants have for long been used to dye fabric from the ancient Egyptian, Greek and African context. Synthetic dye products have since replaced the natural products but the latter are being brought back for use due to their mild effects, as opposed to the synthetic products that can have adverse effects on skin e.g. Natural dyes or colourants are used in a wide range of industries such as food for making food colours, colouring beverages and soft drinks, paint making and varnishes for furniture.



Flower of Solanum dasyphyllum

An example: *Solanum dasyphyllum*

This plant is commonly known as African eggplant. Local names are: Nyanya chungu, Ngogwe or Nyanya (Swahili). Extracts from its flowers are used for making dye products. This plant species is found from the West African region to the upper Southern Africa region. It is a medicinal plant and both its young leaves and fruits are cooked and eaten as a vegetable dish.