

## People and Plants

Ethnobotany Science is the scientific study of the traditional knowledge and customs of a people concerning plants and their medical, religious, and other uses. Directly and indirectly man depends on plant for his food and some other needs. The plants used by man as food are grouped as follows:

- 1) **Starch Plants**: These are sources of carbohydrate that supply energy needs of man. They are:
  - ❖ **Cereals**: the grass family (poaceae) rice, maize, sorghum, millet etc
  - ❖ **Pseudocereals**: they are non-grass family whose grains are also consumed e.g. grain amaranthus (*Amaranthus caudatus*) pigweed and buckwheat (*Fagopyrum esculentum*).
  - ❖ **Root and Tubers Crops**: e.g. sweet potato, Irish potato, yam, cassava, cocoyam.

They are the main sources of industrial and pharmaceutical starch.

- 2) **Sugar Plants**: they produce sweet carbohydrates used to sweeten other foods and in the production of alcohol e.g. sugarcane, sugar beet, palm juice, sugar sorghum.
- 3) **Oil Olants**: oil is important as food source because oil supplies an average of 38kj energy. Oil is important in cooking (to modify taste and fragrance of food), they are sources of vitamins A,D,E,&F, phospholipids and steroids. Apart from cooking oil is important in lighting, burning, soap making, lubrication, painting, insecticides (Neem seed oil), detergents, biodiesel for agricultural machineries.

Sources of oil include fish oil, coconut, sunflower, rapeseed, groundnut, butter. The camphor nut oil has been reported to be highly drying and can be used as a replacement of linseed oil used to manufacture paints and varnish.

- 4) **Essential Oils**: they are volatile oils that will not have a grease spot when a droplet is places on the filter paper. Being highly volatile they have distinctive odours and are used in various industries which include; perfume and cosmetics, industries for products like soap, ointments, powder etc.
  - In pharmaceutical preparations because of their antiseptic properties and to improve taste e.g. toothpaste.
  - They are used to mask the odour of plastic, household spray, detergents etc. They are used as solvents for technical purposes.
  - They are used in food industry to produce lemonades, liqueurs, and confectionary.
  - Some pant sources of essential oil are peel of lemon, lime and grape fruit, grass oils of

Lemon grass (*Cymbopogon citratus* (DC.) Stapf.) , Eucalyptus oil, lavender oil.

**PROTEIN PROVIDING PLANTS**: they are sources of plants protein. Examples are *Vigna unguiculata*, *Cayanus cajan* etc.

**VEGETABLES**: there are three the groups of vegetables based on their part of part consumed. They are:

- ❖ Leaf vegetables: *Amaranthus*, Celosia, Bitter leaf. They are sources of minerals, vitamins and proteins.
- ❖ Fruit vegetables: they contain fewer nutrients but they stimulate appetite by their taste and smell e.g. tomato, beetroot.
- ❖ Tuber/root vegetable: e.g. onion, ginger, garlic and carrot. They serve as spices.

**FRUITS**: they are plant products taken mostly for their refreshing or aromatic taste. The fruits of such plants are flashy and juicy are mostly edible raw. They form the original food of man and also attract animals in the wild. They play important role in nutrition and health.

**The contents of fruits that are of their importance in healthcare delivery are:**

- ❖ **Organic acids**: (malic acid, tartaric acid and citric acid): they act as mild laxatives (encourage defecation) or diuretics (encourage urination). These are the basis of fruit cures.
- ❖ **Pectin and Phenolic compounds**: they regulate the pH in the intestine.

Normalize the intestinal flora and detoxify heavy metals.

- ❖ **The flavonoids**: (e.g. hesperidin and naringin in citrus fruits): strengthens the body tissues and regulate capillary permeability.
- ❖ **Vitamin A**: e.g. mango, pawpaw.
- ❖ **Vitamin C**: e.g. citrus, guava.

**NUTS**: they are fruits with dry shells e.g. coconut, walnuts. The health importance of nuts is in their high nutritional value energy content and protein content for example:

	% protein	% oil	% starch and sugar
Cashew nut	20	45	26
Almond	20	55	20
Walnut	15	65	13

**BEVERAGES AND STIMUALNTS**: these are plants that contain chemical compounds that give physical and mental alertness, suppress hunger and thirst, breakdown psydic inhibitions to produce fantastic dreams (hallucination) and sedate. Some are narcotics. Examples of plants includes tobacco, coffee, cacao, tea, Indian hemp, kolanut etc.

**SPICES:** These are plants that have seasoning and condiment qualities. They are used to improve the taste of food. They include mustard, capsicum pepper. Vanilla, ginger, thyme, garlic etc.

**FIBRE PLANTS:** these are plants from vegetables fibres and finest fabric that can be detained for processing into textiles use for clothing and bed-linen, bags, and other packaging materials, floor coverings, booms and binding materials. Plants materials included in the fibre work are: hemp, cotton, kenaf, jute, agave, raffia. some less important fibre plants are: kapok, hemp, urena, luffa.

**ELASTOMERS:** these are natural and synthetic polymers with rubber-elastic properties. The most outstanding source of natural elastomer is rubber plant (*Hevea brasillensis*). The natural elastomer has its uses in the production of tyres and inner tube because of ready vulcanization. It is also used in making the protective wears against AIDS virus and other sexually transmitted diseases (STD diseases).

**GUMS AND MUCILAGES:** they are polymeric carbohydrates obtained from some plants for use in food industries as stabilizers, emulsifiers and to increase viscosity. They are also used as binders for drugs in pharmaceutical industries and as stay in textiles.

Sources in plants include: bark gums, endosperm of seeds for endosperm gum, seed coat for seed coat gums and from mucilaginous covering for mucilage gums. Sources especially of mucilage's are algae and bacteria.

**RESINS:** just like gum, they are exudates produced as a result of wounding the bark of a plant. They are exuded in liquid state, but many solidify in the air due to evaporation of water. The volatile component of resin can be collected by distillation for use in perfumery. The remains called resins are hard and used technically for lacquers, varnishes. Some plants sources are *Finus pinaster*, *Daniella oliveri* etc.

**TANNING MATERIALS:** They are phenolic compounds obtained from the bark, wood, roots and fruits of some plants for use in leather formation from animal skins and technically to reduce the viscosity of drilling slurry from deep-drilling projects. Some plant source are *Rhizophora mucronata*, *Eucalyptus spp.*, *Caesalpinia spinosa*, *Acacia decurens* etc.

**DYES and COLOURINGS:** these are obtained from pigments of plants origin and are used for beautification of body, for clothing, decoration of homes, and in colouring in foods and drinks. They play

major roles in the modern food and cosmetics industries. The colours obtained from vegetable pigment include:

- ❖ Red colour from the **anthocyanins** in the vacuole.
- ❖ Yellow colour from the carotenoids in the plastids.
- ❖ Green colour is obtained from chlorophyll in the plastids.
- ❖ Blue from flowers of *Chloria ternatea* or *anthocyanus*.. The pigments obtained in the plastid are useful in cosmetic preparation and those of vacuole are used in drinks and confectionery industries. Dye is also used for cloth colouring e.g. indigo. Some plants sources of dyes include: *Bixa orellana*, *Lawsonia inermis*, *Morinda* sp., *Hibiscus* etc.

**WAXES:** they are fatty substances with a high melting point of 50-90oc obtained from exudates of some plants e.g. jojoba whose seeds contain 47-62% wax. They are used to coat fruits against desiccation, in cosmetics especially the production of lipstick, chew gum, carbon paper, shoe creams, floor polish etc.

**FORAGE & PASTURE PLANTS:** they are plants used for the nourishment of the various domestic animals. The forage plants may be trees, shrubs or creeping in habit. They are used as fodder plants. Some plants used for human nutrition and livestock are maize, sorghum, cassava, cowpea, breadfruit, banana/plantain. Some forage and fodder plants are *Andropogon gayanus*, *Andropogon tectorum*, *Axonopus compressus*, *Cynodon dactylon*, *Panicum maximum*, *Centrosema pubescences*, e.t.c.

**GREEN MANURE PLANTS:** these plants grown for incorporation into the soil to improve the status of organic matter and various plant nutrients on decomposition. They may as well be cut and used for mulching i.e. to cover the soil surface from direct sunlight and rain. Green manuring and mulching increases earthworm activities in the soil to increase soil nutrients status. The plants used for green manuring must be fast-growing, deep rooted and possibly able to fix atmospheric nitrogen. Examples include Mexican sunflower, *Crotalaria spp.*, *Sebania sesban*, *Senna detusifolia*.

**GROUND COVER PLANTS:** these are deep-rooting, fast-growing and low nutrient demanding plants growing within plantation crops like rubber, oil pal e.tc. They may be creeping or erect shrubby plants. They function by protecting the soil from the impact of raindrops and the scorching effects of direct sunlight. They also prevent the growth of unwanted weed flower like *Imperata cylindrica*. Examples of ground cover plants are *Mimosa invisa*, *Pueraria phaseoloides*, *Centrosema pubescence*, *Sema sophera* etc.

**SOIL STABILIZING PLANTS:** as a result and deforestation, erosion occur to degrade the soil. In the regions barriers are constructed with deep-rooted shrubs like *Prosopis* and *Acacia spp.*, to stabilize the loose sand. However in the humid region, the concern is to diminish the effect of flowing water especially in the terraced slopes. Grasses which form a thick root mass is used e.g. *Vertiveria zizanioides*, *Cymbopogon citratus* (lemon grass). Also banks and hedges of ditches can be protected from collapse by growing creeping plants like *Cynodon dactylon*, *Passiflora foetida*, *Alternanthera brasilensis* etc.

**WIND BREAKS PLANTS:** these are plants grown to break the speeds of strong winds thus protecting the sensitive crops like plantain/banana and cassava in the humid region and reducing soil erosion by wind in the arid region. Plants used are: Neem (*Azadirachita indica*), cashew (*Anacardium occidentale*). They also provide firewood and are loped for charcoal production. They are useful as avenue trees to enhance the aesthetics of the environment and prevent storm from destroying the buildings. Examples of avenue plants are: *Piuns spp.*, *Eucalyptus spp.*, *Thildergadia batteni*, etc.

**SHADE TREES:** these are plants grown to nurse tropical tree/cash crops in the forest few months/years of growth. Coca and kolanut are provided with 'nurse plants' on transplanting primarily to reduce transpiration until the root system of the young seedlings are well developed. Good shade plants must have high crown which is not too dense as to reduce the sunlight more than 25%. Examples of such plants are Plantain, cassava, *crotalaria spp*, etc.

**FENCING PLANTS:** these are plants used to mark boundaries of fields and to keep away ravaging wild and domestic animals. Thorny plants and plants with bad-tasting or smelling leaves are useful for this purpose. Examples are *Jaropha spp.*, *Croton spp.*, *Euphorbia kamerunica*, *Thevetia nerifolia*.

Plants are used for entertainment, divination, coronation, magic, body beautification etc

- ☐ ☐ For musical instrument and plant tools like *Celtis zeniken*, *Azalia Africana*.
- ☐ ☐ Societal sanitation of criminals e.g. *Myrianthus antoreus*
- ☐ ☐ Coronation e.g. *Newtouldia laevis*
- ☐ ☐ Body beautification: *Lawsonia inermis*, *Pterocampus osun*.

## **Medicinal Plants**

Sofowora (1982) describe a medicinal plant as any plant which contains a substance(s) that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. Most of the medicinal plants are in the wild form where they are gathered. Due to the urbanization and industrialization expansion of agricultural activities, most of the habitat of these plants is being destroyed thus resulting in the threat of their population. This calls for the domestication of these wild plant to prevent their extinction and sustain the supply most especially those containing active substituent that cannot be synthesized by pharmacochemical industries and which cannot be substituted by other compounds.

## **Storage of Medicinal Plants**

Many medicinal plants are seasonal, some not easily accessible, available only in deep forests or mountain peaks. Such restrictions necessitate ways and devices to store them for future use. Dirt and other foreign substances should be removed. If washing is needed, it should be done quickly to minimize deterioration and loss of active substances. As a rule, all parts of the plant collected should be dried as soon as possible to avoid unnecessary waste of the drug materials through natural processes of denaturation, decay and fungal attacks. Some commonly used storage methods used by the Chinese are as follows:

- 1) **Sun-drying method**: Spread the herbs over the dry beaches, patio or benches that are under the direct scorch of the sun until the materials turn dry and brownish.



- 2) **Shade-drying method**: Some plant materials are preferably dried under shade at room temperature by wind action- because of heat-labile substances that they contain. As such, free circulation of air is important. Drying processes should be shortened, if higher drug contents are to be sought for. Floral and fruit materials should be dried by this methods.
- 3) **Heat-drying method**: Some materials may be placed over an oven and dried under the intense heat released or under regulated soft heat. Plants that contain high sugar and starch are best

preserved by this method. In places where the rain falls throughout the year, this method is strongly recommended.

- 4) **Other Special Methods**: Succulent materials are usually washed first in boiling water or steam-cooked in a container before actually drying it. For spiny and hairy materials, remove the unwanted appendages. Some plant materials (e.g. succulent materials) may require cutting or sectioning before drying. In general, the moisture content of the dried plant materials should be less than 10% before storage. Moisture.

### **Socio-Cultural uses of Plants**

Content higher than 10% usually leads to growth of microorganisms and pest infestation with consequent drug deterioration. The dried plant materials should be placed in plastic containers or tightly covered bottles; brown coloured bottles are preferred as they minimize deterioration due to sunlight. Dry charcoal (separated from the medicinal plant) may be placed inside the bottles to absorb moisture. The storage place should be dry, well-ventilated, and spacious, lest fungi and insects may invade rampantly. Drug materials (dry ones) after proper processing can be kept in large open wooden shelves. The humidity of the storehouse should then be as low as possible. Materials rich in volatile oils are advised to be kept in airtight containers.

Otherwise, their efficacy will decrease as time passes by. If all factors are favourable, the prepared drugs can be used even after years of storage.

### **MEDICINAL PROPERTIES OF PLANTS.**

The medicinal properties of plants include;

- **Abortifacient** (مجهض)- substances that causes abortion.
- **Adaptogen** - Substances that modulate hormones.
- **Alterative** - blood cleanser that restores proper functioning of the body.
- **Anodyne** – pain suppressants.
- **Anti-allergic** – substances that reduces allergic reaction.
- **Anti-bacterial/virus/fungi** – substances that prevents bacteria, virus and fungal infections respectively.
- **Anti-depressant** – relives depression.
- **Anti- haemorrhage** – substances that halt bleeding.
- **Anti-hydrotic** – drugs which checks ppersperation.
- **Anti-neoplastic** – substabces that prevent abnormal growth.
- **Anti-pyretic** - prevents fever.



- Anti-rheumatic – relieves rheumatic pains.
- Anti-septic – substances that inhibit the growth of bacteria, fungi, and viruses e.g. Neem aqueous extract.
- Anti-spasmodic – substances that relieve muscular spasm.
- Anti-tussive – substances that prevent coughing.
- Aperitive – stimulates appetite.
- Astringent – substances that shrink tissues and prevent secretion of fluids i.e. unwanted discharge.
- Cathartic – drugs that purge the system; strong laxative.
- Depurative – blood purifying substances.
- Diaphoretic – substances that increase perspiration.
- Diuretic – substances that increase urination.
- Emetic – substances that cause vomiting.
- Emmenagogue – substances that bring on menstruation.
- Emollient – substances that soften the tissues.
- Eupptic – substances that promote good digestion.
- Expectorant – substances that promote ejection of fluid from the lung and trachea.
- Haemostatic – substances that prevent bleeding and promote clotting.
- Laxative – substances that promote defecation.
- Nutritive – substances that promote good nutrition.
- orexigenic – substances that stimulate appetite.
- Oxytocic – substances that promote contraction of the uterus, aiding childbirth.
- Relaxant – promotes relaxation (either muscular or psychological)
- Spasmolytic – relieves spasms or convulsions.
- Stimulant – stimulates activity of the body.
- Stomachic – stimulates activity of the body.
- Suppurative – hasten pus production.

## HERBAL MEDICINE PREPARATION

This aims at extraction of active ingredients contained in plant materials for use in the management of ailments. They include among others the following:

- 1) **Decoction** : (الإستخلاص بالإغلاء) putting the plant materials in cold water, boiling for 15-30 minutes, filter the mixture and administer when cold enough.



- 2) **Infusion**: the process involves steeping the plant material (cut into pieces), into water, either boiled or cold water and leave for some minutes/hours. Strain the water for oral administration or bathing. This is adopted for materials with readily dissolvable active principles.

At time, the cold infusion is called **Macerate**.

- 3) **Tincture**: these are alcohol extraction of active principles in a medicinal plant.

Alcohol effects dissolution of relevant ingredients than water and at the same time act as preventatives.

Apart from alcohol, glycerine or vinegar may be used. Also, mixture of alcohol and water at specific proportion may be used.

- 4) **Pills**: these are powders or herbal extracts incorporated in a suitable base such as starch, glycerine, gum or mucilage.. The mixture is made into a ball, held together by filler ingredients and may be coated.
- 5) **Capsules**: the dry powdered herbs are packed into gelatinous container that will readily dissolve on contact with water. It helps in decent presentation of powdered herbal preparation.
- 6) **Cozenges**: powdered herb is combined with sugar and mucilage. It is mostly used for preparations for oral and respiratory complaints like tonsillitis (belubelu, inflammation of the tonsil), mouth ulcers, sore throat and coughs.
- 7) **Syrup**: this is masking a fluid preparation that has unpleasant taste with a sweetener like honey or sugar syrup. This is mostly used to prepare cough mixture or teething mixture for children. Simple syrup base is prepared by pouring 500ml of boiling water on 1:1kg of sugar. Heat and stir the mixture until the sugar dissolves and the mixture starts to boil. It is used for decoction and infusion, dissolve 350g directly in 500ml of the liquid preparation and heat gently until fully dissolve. It is advisable to use for gargles and cough medicines only.
- 8) **Oxymel**: is a mixture of 5 parts of honey and 1 part vinegar into which the juice of unpleasantly tasting herbs plant parts is mixed e.g. juice of garlic.
- 9) **Ointments**: these are semi-solid herbal preparation that vary in texture from greasy to thick paste, depending on materials used as base. The base may be petroleum jelly or Shea butter or bleached palm oil. The base act as carrier for preparation for external use and are not suppose to be absorbed through the skin. Also used for the treatment of nasal blockage.
- 10) **Suppositories (التحاميل)**: these are carriers of herbal preparation, especially powders meant for insertion into the orifices of the body e.g. ear, nose, rectum etc. Some laxatives and abortifacients are packed as suppositories. The materials used must be firm enough in the traditional system of medicine, the Ayurveda, and various folk medicines. The fruits when fully ripe are used as a dietary source.

- 11) **Impresses:** these are hot application of some herbal preparation aid absorption from the skin surface. The aim is to accelerate healing process.
- 12) **Poultices:** the fresh plant part is marched or pounded into a paste that are either placed directly on the skin or placed in between gauze and tied to the affected skin. It is often used to treat wounds and hasten suppuration of boils.
- 13) **Liniments:** they are preparations made for external uses in massaging to stimulate muscles and ligaments. Massaging helps absorption into skin to reach the affected part. Shea butter can be used as liniments or may carry some other herbal preparations for healing of painful joints and muscles.
- 14) **Herbal oil:** these are essential oil used in phytotherapy. To prepare, cut the herb finely, cover with oil in a container. Place in the sun or in a warm place for 2-3weeks, shaking the container daily. Filter the oil into a dark glass container and store away for use. Mostly use in massaging, as perfume, mixed into body cosmetics or drops into boiling water.
- 15) **Incense:** The dry preparations of some plants with essential oil are burnt on coal fire to evaporate the oil which is released to the environment. Plants identified for sanctification are used this way.

**Adaptogen:** (in herbal medicine) a natural substance considered to help the body adapt to stress and to exert a normalizing effect upon bodily processes. A well-known example is a ginseng.

#### Some perceived weaknesses of Ethnobotany.

- Shallowness or poor orientation of courses.
- Lack of respect for discipline; not appreciated by other professional people or government officials.
- Lack of research funding.
- Lack of good mentors.
- Lack of jobs.
- Poorly developed methodologies.
- Lack of national critical masses of ethnobotanists.
- Few networks, including working relationships, in developing countries.
- Lack of support for research on society/environment relationships, which are not seen as important.
- Little motivation for interdisciplinary approaches in academia or professional fields.
- Difficulties in determining priorities.
- Few in-depth courses.

- Lack of formation of human resources.
- Low local academic levels of some contributing disciplines.
- The results of the study were not adequately disseminated..