

Impotence – evaluating traditional remedies

Impotence, and the evaluation of traditional ethnopharmaceutical remedies, are examined in this article. The modes of action of the remedies are described, and details of their chemical constituents given.

Male erectile dysfunction or impotence affects 10-15% of all men, which includes the figure of one in three men over the age of 60.

Impotence is defined as the inability to have an erection that is rigid enough and be able to sustain it long enough to complete sexual intercourse. About 50% of all diabetic men experience impotence after the age of 55.

Impotence is not a disease, but a secondary condition brought on by other, primary causes. Primary dysfunction is rare [Merck].

Causes of erectile dysfunction

Male erectile dysfunction can be caused by a number of factors:

- Psychological (mood disorders): about 10%.
- Physical (organic impotence): about 85%.
- Mixed origin (both physical and psychological).
- Unknown origin: about 5%.

An erection is triggered by the release of chemical messages sent by the nervous system. This chemical message involves the release of nitric oxide (NO) in the *corpus cavernosum* during sexual stimulation. The nitric oxide subsequently activates the enzyme guanylate cyclase, which in turn increases the levels of cyclic guanosine monophosphate (cGMP), that produces smooth muscle relaxation in the *corpus cavernosum* to allow the inflow of blood.

The failure to initiate an erection may arise through spinal injury, radical pelvic surgery, multiple sclerosis, Parkinson's disease and hormonal insufficiency. Poor blood flow into the penis and poor sustainability of an erection may be due to blocked arteries, hypertension, smoking,

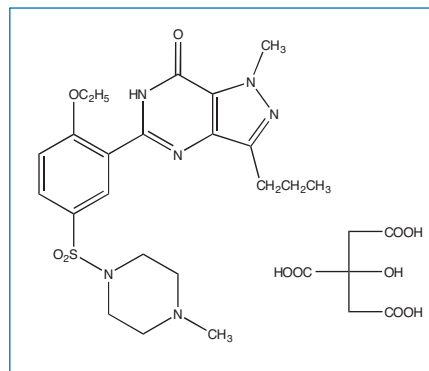


Figure 1: Sildenafil citrate.

diabetes or high cholesterol levels. Endocrine diseases such as diabetes, low testosterone (which can be caused by an overactive pituitary gland producing too much prolactin) or thyroid hormone levels also have a negative effect on the quality of an erection (if at all). The over use of alcohol, tobacco or abuse of drugs can also lead to impotence.

Treatment

There are a number of commercially available synthetic preparations for the treatment of impotence.

The major drug to be launched worldwide is Viagra or Sildenafil citrate (ex Pfizer Laboratories) (Fig. 1).

It is interesting to note that this preparation is an indole alkaloid, and that similar structures can be found in certain plant materials (especially in the plants of the family Apocynaceae).

The Chinese herb of choice as a treatment for impotence is Horny Goat Weed (*Epimedium sagittatum*). The "Sexual Plant", according to Chinese herbal legend, is a herb discovered by a goat herder, who observed that his goats became extremely sexually active after eating this particular plant. This herb strengthens sexual potential and has the ability to greatly reduce impotence. Analysis reveals a group of compounds in this herb that has an anti-platelet effect, which improves blood circulation.

Available are a variety of commercially available herbal treatments for impotence.

The sale of unlicensed preparations for the treatment of impotence is widespread, with advertisements appearing in newspapers, supplements and on the internet. Following are a few examples:

- Viagrene. Ingredients: Damiana, Schizendra, Mate, Guarana, caffeine (max 250), tropical fruits, acids, sugar, preservatives (E211), colouring (E133), water and carbonation.
- Formula X-A. Ingredients: Siberian Ginseng, Saw Palmetto, Gotu Kola, Damiana, Sarsaparilla, Parthenium, Horsetail, Garlic, Capsicum and Chickweed.
- Eros. Ingredients: Muria Puma, Smilax, Damiana, Wild Yam, Royal Jelly, water, B12 and Niacin.
- Male Plus. Ingredients: Muira puama, Catuaba, Sarsaparilla, Damiana.
- Herbal Passion. Ingredients: Yohimbe, Damiana, Oxytocin, Ginseng, *Tribulus terrestris*, Liquorice, Green Oats, Saw Palmetto, Capsicum, Lycopodium.
- Elixir of Maca. Ingredients: Maca (*Lepidium meyenii*), Yohimbe, Saw Palmetto (*Sabal serrulata*).

The use of a potpourri of ingredients is often justified by the producer with outlandish claims that are contrary to the guidelines recommended by the Medicines Control Agency (GN8). The targeting of a vulnerable section of the population is also contrary to accepted pharmaceutical practice.

These preparations often contain one



Horny Goat Weed.

or more traditional materials used for impotence, but also include “tonic” materials such as Ginseng (*Panax ginseng*), which has alterative effect, Guarana (*Paullinia cupana*) which is a rich source of tannin, Liquorice (*Glycyrrhiza glabra*) which is a natural source of sugars. Other, less justifiable materials, such as Saw Palmetto (cited for prostate conditions), Royal Jelly (which has no pharmacological action) and Capsicum (*Piper nigrum*) more often encountered as a topical rubefacient are also frequent components.

The lack of clinical evidence for these blended products, and the manner in which they are sold and marketed, tends to discourage any pharmacological trust that one might have in these materials.

Erotic foods

Women who eat chocolate have the highest levels of desire, arousal and satisfaction from sex. Those who have a daily intake of chocolate showed higher levels of desire than women who did not have this habit. Chocolate can have a positive physiological impact on a woman's sexuality, and women who have a low libido could become more amorous after eating chocolate and this delight could be particularly medicinal for women who shun sex because they are suffering from premenstrual tension. Work in this area was funded from a university research budget, not by the confectionery industry.

Theobromine (Fig. 2) can be useful for anti-depression treatment. Chocolate may possess natural analgesic properties and according to some sources eating high-fat, chocolate foods can trigger the brain's production of natural opiates. There are two anandamide-like compounds in chocolate, N-leoylethanolamine and N-linoleoylethanolamine, which both delay anandamide's breakdown. The nerve cells in the brain produce anandamide and this chemical activates the same cellular receptors as THC, the agent in marijuana smoke that causes a pleasurable “high”.

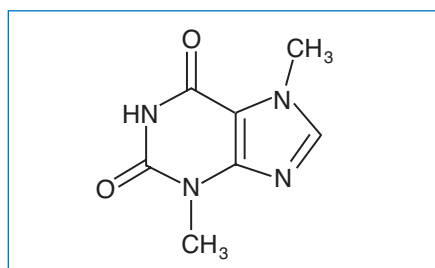


Figure 2: Theobromine.



Erotic foods.

Lovers and oysters

Previous speculation about the powers of oysters has centered on the re-fuelling powers of their high zinc content. Zinc is found in sperm and men lose between one and three milligrams per ejaculation. Oysters contain two unusual amino acids: D-spartic acid (D-Asp) and N-methyl-D-aspartate (NMDA). Injecting the amino acids into rats triggered a chain reaction of hormones that ended with the

production of testosterone in males and progesterone in females. Increased levels of those hormones in the blood means that individuals are more active sexually.



Oysters.

Topical rubefacients

There are oils that irritate the skin and encourage skin flow to the surface of the skin in order to cool it. Oils that produce this effect are capsicum oil, ginger oil,

wintergreen, black pepper and other hot peppery materials like mustard and horseradish. These will cause huge increases in blood flow and despite the obvious discomfort could induce topically a state of arousal in man. The major problem is that these materials can transfer during coupling and might be unacceptable and uncomfortable to the woman.

Many products rely on the application of lubricious oils, an act that in itself is extremely pleasurable. A commercial product declared the composition *Helianthus Annus* (Sunflower), *Prunus Dulcis* (Sweet Almond), *Commiphora Myrrh* (Myrrh), *Cananga Odorata* (Ylang Ylang), *Hyssopus Officinalis* (Hyssop), *Melissa Officinalis* (Melissa), *Citrus Bergamia* (Bergamot), *Rosa Damascena* (Rose Absolute). This blend contained no rubefacient materials.

There are also gels which include the typical aphrodisiac plants, but which probably would have no effect topically even when applied directly to the genitalia. A typical composition might be: distilled

water, Aloe Vera gel, olive squalene, apricot kernel oil, vitamin C, extracts of Korean Red Ginseng, hawthorne berry, Ginkgo Biloba, Muira Pauma, Catuaba Bark, Cuscuta deed and many more in a formula which was said to be clinically proven.

Study of ethnobotanical literature

The literature surveyed has shown that there are many hundreds of plant materials cited for their use in the treatment of male erectile dysfunction. It is often not clear from the traditional use how these materials might act. However, in general they can be separated into several distinct groups:

Psychological action

- Mental stimulants (to combat tiredness).
- Psychotropic (to produce an abnormal state of reality).
- Sedatives (to allay stress and or have a calming effect).
 - Taken internally.
 - Inhaled.
- Phallic implication or placebo effect (having penile shape or form).

Physical action

- Induce physiological action on the corpus cavernosum.
- Physical stimulant (provide a tonic action).
- Replace deficiencies (e.g. oestrogenic, steroidal precursors, hormones, vitamins etc).
- Rubefacient action to increase blood flow to the tissue by topical application.

Objectives in the preparation of this article was to examine the many materials cited in the literature and to classify them where possible according to the groups above, and to examine the chemical composition of the pharmacologically active plants and to look for patterns and trends within those structures.

Potential remedies from ethnobotanical and traditional use

Acanthaceae

- *Asystasia calycina* – twigs are used [Burkhill, 1985].
- *Blepharis edulis* [Syn. *Acanthus repens*] – unspecified part of plant used [Jayaweera, 1981,1].
- *Blepharis ciliaris* – unspecified part of plant used [Duke].
- *Crossandra infunduliformis*.
- *Hygrophila spinosa* – seeds are used [Jayaweera, 1981,1; Watt & Breyer-Brandwijk], the plant is diuretic [Oliver-

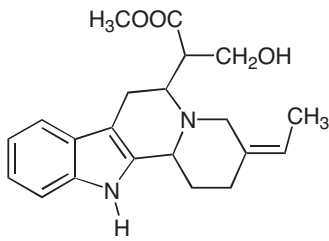


Figure 3: Akuammidine.

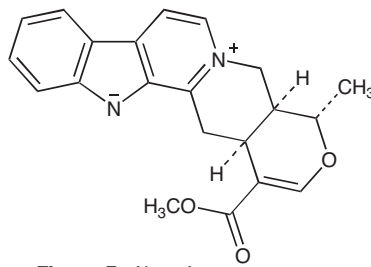


Figure 5: Alstonine.

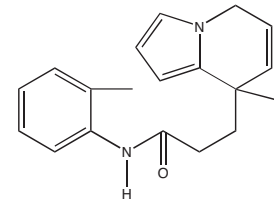


Figure 7: Rhazinilam.

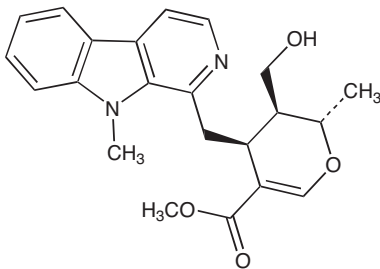


Figure 4: Alstonidine (stereoisomer of serpentine).

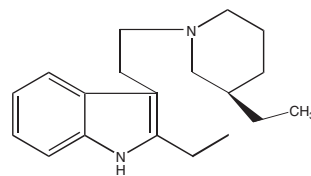


Figure 6: Quebrachamine.

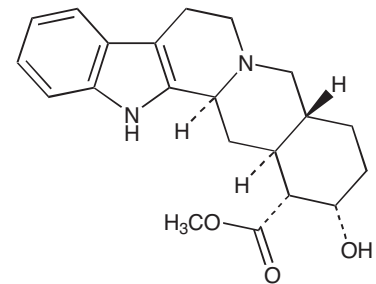


Figure 8: Yohimbine.

Bever] and contains diastase, lipase and protease.

- *Justicia nasuta* – the root boiled in milk is employed [Jayaweera, 1981,1]. The roots contain rhinacanthin and are also rich in potassium salts.
- *Justicia pectoralis*.
- *Phalopsis barberi* – part unspecified, but probably the leaves used [Burkhill, 1985].
- *Phalopsis falcisepala* – the sap is used [Burkhill, 1985].
- *Phalopsis imbricata* – the leaves are used [Burkhill, 1985].
- *Rhynacanthus communis*.
- *Rhynacanthus nasuta*.
- *Rhynacanthus rottlerianus*.
- *Ruellia albicaulis*.

The use of this family as aphrodisiacs is sparse in data and the action is likely due to the diuretic nature of these materials.

Apocynaceae

Many of this family are used in the treatment of oncolytic conditions.

- *Alstonia scholaris*.
Akuammidine (Fig. 3) is present in *Alstonia scholaris* [Aphrodisiac], *Alstonia boonei* (Apocynaceae) [Aphrodisiac], *Aspidosperma quebracho-blanco* (Apocynaceae) [Syn. *Schinopsis quebracho-lanco*] [Aphrodisiac].

Alstonidine – stereoisomer of serpentine (Fig. 4) is found in *Alstonia constricta* (Apocynaceae) [Aphrodisiac], *Rauwolfia vomitoria* (Apocynaceae) [Aphrodisiac], *Rauwolfia obscura* (Apocynaceae), *Vinca rosea* (Apocynaceae).

Alstonine (Fig. 5) is found in *Alstonia*

constricta (Apocynaceae) [Aphrodisiac], *Rauwolfia vomitoria* (Apocynaceae) [Aphrodisiac], *Rauwolfia obscura* (Apocynaceae) [Aphrodisiac], *Vinca rosea* (Apocynaceae), *Strychnos* spp. (Loganiaceae) [Aphrodisiac].

- *Aspidosperma quebracho-blanco*
Quebrachamine (Fig. 6) is found in *Aspidosperma quebracho-blanco* (Apocynaceae) [Aphrodisiac].
Rhazinilam (Fig. 7) is present in *Kopsia singaporensis* (Apocynaceae), *Rhazya* spp. (Apocynaceae), *Aspidosperma quebracho-blanco* (Apocynaceae) [Aphrodisiac], *Vallesia glabra* (Apocynaceae)

- *Carissa edulis*
Carissa edulis roots are used in the treatment of sarcoma and contain carissin



Catharanthus roseus.

(a cardenolide) [Oliver-Bever, 1986]. The leaves significantly reduced blood glucose levels in STZ (streptozotocin) diabetic rates during the first three hours of treatment. [El-Fiky et al]. The root sap is considered to restore virility in Ghana [Burkhill, 1985].

- *Catharanthus lanceus*
Catharanthus lanceus (Lanceleaf Periwinkle) contains yohimbine.
Yohimbine (Fig. 8) is found in *Aspidosperma quebracho-blanco* (Apocynaceae) [Aphrodisiac], *Vallesia dichotoma* (Apocynaceae), *Vallesia glabra* (Apocynaceae), *Ervatamia hirta* (Apocynaceae), *Catharanthus lanceus* [Aphrodisiac], *Catharanthus roseus* [Aphrodisiac], *Pausinystalia johimbe* [Aphrodisiac], *Rauwolfia vomitoria* (Apocynaceae) [Aphrodisiac], *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac], *Capsella* spp., *Alchornea castaneifolia* [Aphrodisiac], *Uncaria rhynchophylla*.

- *Catharanthus roseus*
Catharanthus roseus (Madagascar Periwinkle) [Syn. *Lochnera rosea*, *Vinca roseus*] is traditionally used as a remedy for diabetes (commercial product called Vinculin), which is prepared from an infusion of the leaves [Wyk van; Oudtshoorn van, Gericke, 1997]. The roots and twigs, which are also hypoglycaemic contain catharanthine, lochnerine and vindoline (indole alkaloids) [Oliver-Bever, 1986]. Other indole alkaloids include vincristine and vinblastine which are oncolytic (Hodgkin's disease/lymphoma, childhood leukaemia, testicular teratoma) [Mann, 1989], and

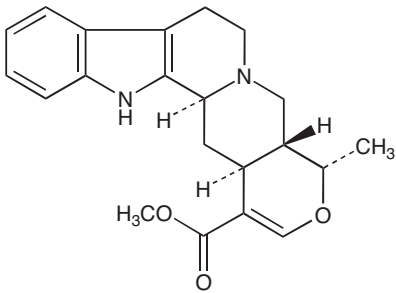


Figure 9: Ajmalicine or Raubasine.

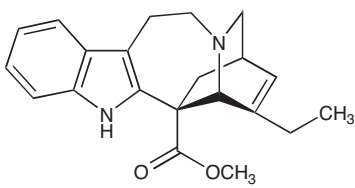


Figure 10: Catharanthine.

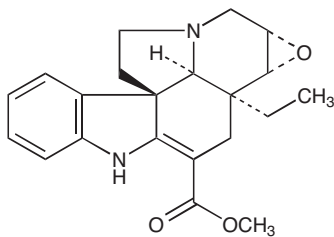


Figure 11: Lochnericine.

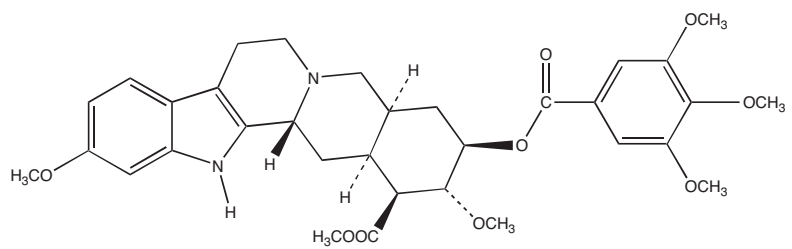


Figure 12: Reserpine.

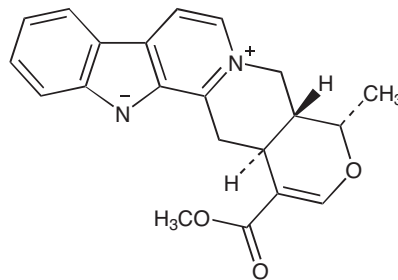


Figure 13: Serpentine.

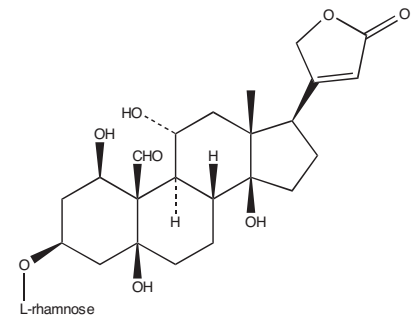


Figure 14: G-strophanthine.

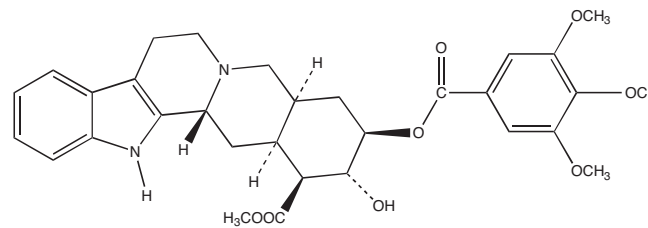


Figure 15: Raunescine.

reserpine and which are hypotensive and tranquilising.

Ajmalicine or Raubasine (Fig. 9) is found in *Catharanthus trichophyllus* (Apocynaceae), *Catharanthus roseus* (Apocynaceae) [Aphrodisiac], *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac], *Corynanthe yohimbe* (Rubiaceae) [Aphrodisiac].

Catharanthine (Fig. 10) is found in *Catharanthus roseus* (Apocynaceae) [Aphrodisiac].

Lochnericine (Fig. 11) is found in *Vinca rosea* (Apocynaceae), *Catharanthus roseus* (Apocynaceae) [Aphrodisiac]

Reserpine (Fig. 12) is found in *Rauwolfia tetraphylla* (Apocynaceae) [Aphrodisiac], *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac], *Rauwolfia*

vomitaria (Apocynaceae) [Aphrodisiac], *Rauwolfia caffra* (Apocynaceae) [Aphrodisiac], *Vinca minor* (Apocynaceae).

Serpentine (Fig. 13) is found in *Catharanthus roseus* (Apocynaceae), *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac], *Vinca minor* (Apocynaceae), *Strychnos* spp. (Loganiaceae).

Ajmalicine may improve cerebral blood flow [Lawrence, 1994]. The hypoglycaemic alkaloids leurosine, vindoline and vindolinine were more potent than tolbutamide. However, it was suggested that these alkaloids be separated from the oncolytic materials present in the plant [Svoboda et al., 1964]. Also contains yohimbine.

Intraperitoneal injection of the total leaf alkaloids vinblastine and vincristine

produced degenerative changes in the spermatogenic elements of the testes in animals and oligospermia in men. [Joshi & Ambaye, 1968; Bustos-Obregon & Fesito, 1974; Vilar, 1974; Cooke et al., 1978; Parvinen et al., 1978; Farnsworth & Waller, 1982].

● *Funtumia elastica*

Funtumia elastica (West African rubber tree): the latex is used for impotence [Abbiw, 1990]. The young leaves are mixed with those of *Phyllanthus muellerianus* (Euphorbiaceae) to improve male fertility. Possible source of strophanthine (usually obtained from *Strophanthus* species) (Fig. 14).

● *Holarrhena antidysentrica*

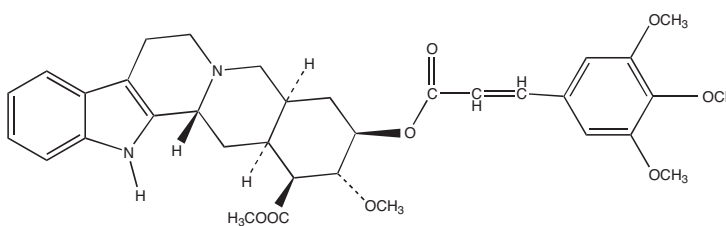


Figure 16: Rescinnamine.

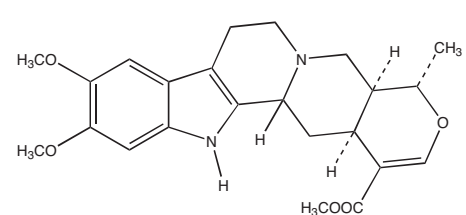


Figure 17: Reserpiline.

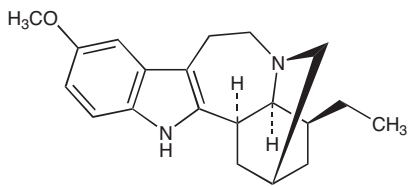


Figure 18: Ibogaine.

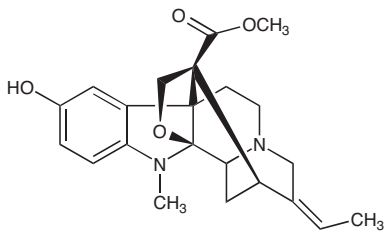


Figure 19: Akuammine.

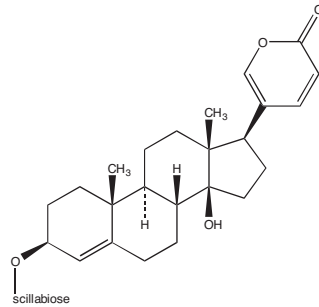


Figure 20: Scillaren A.

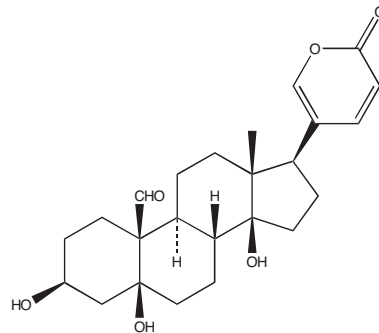


Figure 21: Hellebrigenin.

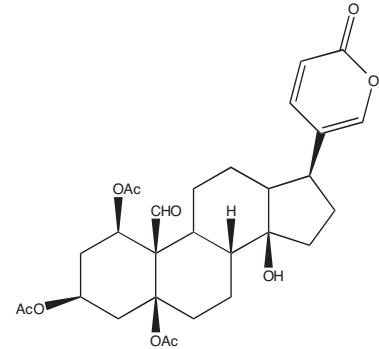


Figure 22: Melianthugenin.

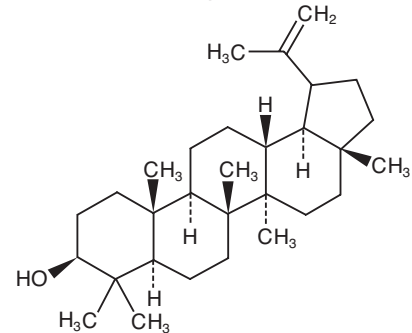


Figure 23: Lupeol.

- *Rauwolfia serpentina*

Raunescine (Fig. 15) is found in *Rauwolfia tetraphylla* (Apocynaceae) [Aphrodisiac], *Rauwolfia* spp. (Apocynaceae) [Aphrodisiac], *Rauwolfia canescens* (Apocynaceae) [Aphrodisiac].

Rescinnamine (Fig. 16) is found in *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac].

Reserpiline (Fig. 17) is found in *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac].

- *Rauwolfia vomitoria*
- *Saba florida*
- *Strophanthus gratus*

- *Tabernaemontana iboga*

Tabernaemontana iboga contains a psychoactive drug called ibogaine, which is an hallucinogen, stimulant and aphrodisiac [Richardson, 1988; Watson, 1993]. It is also recommended for the treatment of diabetes.

Ibogaine (Fig. 18) is found in *Tabernaemontana ibogaine* (Apocynaceae) [Aphrodisiac], *Evertamia hirta* (Apocynaceae).

- *Vinca major*

Akuammine (Fig. 19) is found in *Picalima nitida* (Apocynaceae), *Vinca major* (Apocynaceae) [Aphrodisiac].

- *Wrightia tinctoria*

Wrightia tinctoria is cited as an aphrodisiac [Duke & Beckstrom-Sternberg].

Erythroxylaceae

- *Erythroxylum coca*
- *Erythroxylum catuaba* [Syn. *Juniperus brasiliensis*] or Catuaba

Hyacinthaceae

- *Scilla natalensis*

Scilla natalensis – the bulb is used in decoction as an enema for female infertility and to enhance male potency and libido. The plant is said to contain saponins and cardiac glycosides of the bufadienolide type, e.g. Scillaren A. (Fig. 20).

Melanthaceae

- *Bersama abyssinica*

Bersama abyssinica Fresen: the stem bark extract has been used as an aphrodisiac [Iwu, 1993]. It contains a mixture of cardenolides including abyssinol A, B, C, bersaldegénin, hellebrigenin (Fig. 21), and bufadienolide-O-acetate, as well as saponins, mangiferine, and gallic acid derivatives.

- *Bersama lucens*

Bersama lucens is known as glossy bersama and the stem bark and/or roots are used to treat impotence and sterility [Wyk van; Oudtshoorn van, Gericke, 1997]. A tincture of the bark is used to treat nervous disorders. The major active component is a toxic cardiac glycoside melianthugenin (Fig. 22).

Olacaceae

- *Liriosma ovata*

Liriosma ovata Miers. is better known as Muira-puama and the dried roots contain esters of behenic and arachidic acids and lupeol, together with free lupeol, campesterol and β -sitosterol. These materials would be unlikely to account for the plants aphrodisiac activity, and thus it must be concluded that the active compounds are unknown [Wren, 1994]. Identification is confused, and the plant has been identified as *Acanthea virilis* (Acanthaceae family) [Merck, 1940], others suggest that the plant is *Ptychopetalum olacoides* Benth and *Ptychopetalum uncinatum* Anselmino [Tyler, Brady & Robbers, 1988]. It is indicated for impotence [BHP, 1983] and is reported in Brazil to be one of the most powerful treatments [Wren, 1985].

Lupeol (Fig. 24) is found in *Liriosma ovata* (Olacaceae) [Aphrodisiac], *Lupinus luteus* (Leguminosae), *Phyllanthus emblica* (Euphorbiaceae) [*Phyllanthus floribundus*, *Phyllanthus muellerianus*, and *Phyllanthus stolzianus* are all Aphrodisiac].

The liquid extract of the plant is either taken internally in liquid extract

- 10-60 drops [Wren, 1985].
- 0.5-5 ml liquid extract of root [Wren, 1994].
- 1-4 ml @ 3 t.p.d. [Merck, 1940].
- 2 tbsp in 1 pint water boiled for 15 min, 30 ml of decoction pre-intercourse [Watson].
- 30 g of bark in 2 cups vodka, infuse 2 weeks. 1 ounce pre-intercourse [Watson].

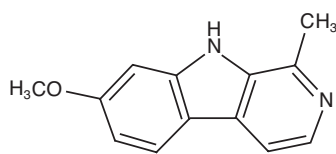


Figure 24: Harmine.

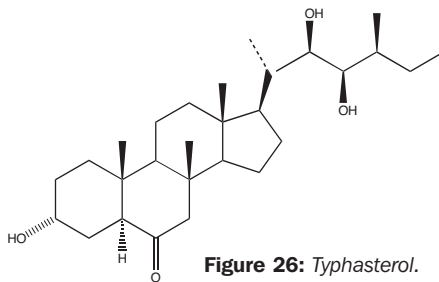


Figure 26: Typhasterol.

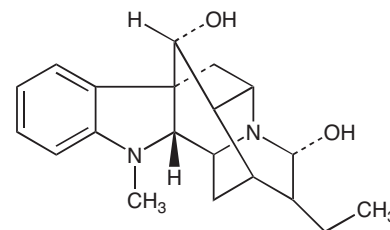


Figure 25: Ajmaline.

- *Muira puama* (Syn. *Ptychopetalum uncinatum*, or *P. olacoides*)
- *Olex subscorpioidea*
- *Ptychopetalum olacoides*
- *Ximenia americana* L., also known as Wild Olive [Abbiw, 1990] or Olax [Lewis & Elvin-Lewis, 1977].

Rubiaceae

- *Avranthe cladantha*
- *Bertia racemosa*
- *Brenania brieyi*
- *Catunaregam nilotica*
- *Chiococca alba* [Seaforth, 1988]
- *Chione venosa*
- *Corynanthe pachyceras*

- *Corynanthe yohimbe*

Corynanthe yohimbe, also known as Yohimbe, contains the alkaloid yohimbine (also known as quebrachine, aphrodine and corynine) which resembles reserpine (but with antiadrenaline action and effect on heart muscle) [Evans & Trease, 1989]. It is an analogue of harmine (Fig. 24) and so can have mild hallucinogenic properties [Spoeke, 1990]. Harmine itself is cited for its aphrodisiac properties [Duke & Beckstrom-Sternberg]. It also has local anaesthetic properties [Greenish, 1929]. The dose is important, since too high a dose can lead to depression [Wren, 1994]. For yohimbine structure see *Catharanthus lanceus* (already mentioned).

Yohimbine has been used as a pharmacological probe for the study of α_2 -adrenoceptor and used therapeutically as an adrenergic blocking agent [Merck, 1996], but does not affect β -adrenergic receptors [Martindale, 1967]. It has also been found that it causes pre-synaptic inhibition of noradrenergic neurons [Costa & Marino, 1989]. Yohimbine hydrochloride has been found to increase sexual motivation in rats [Clark et al., 1984]. Yohimbine, isoxsuprine and pentoxifylline were not useful in vasculogenic impotence [Knoll et al., 1996].

Ajmaline (Fig. 25) is found in *Rauwolfia serpentina* (Apocynaceae) [Aphrodisiac], *Rauwolfia caffra* (Apocynaceae)

[Aphrodisiac], *Ophioxylon serpentinum*, *Vinca minor* (Apocynaceae), *Corynanthe yohimbe* (Rubiaceae) [Aphrodisiac].

It inhibits monoamine oxidase and may cause alarming increases in blood pressure when taken with cheese, red wine or other supplements containing tyramines [Winter-Griffith, 1988].

- *Craterispermum schweinfurthii*
- *Crossopteryx febrifuga*
- *Fadogia agrestis*
- *Fadogia ancylantha*
- *Galium aparine*
- *Galium triflorum*
- *Galium verum*
- *Gardenia spp*
- *Gardenia ternifolia*
- *Genipa americana*
- *Hallea ledermannii*
- *Hallea stipulosa*
- *Heinsia crinita*
- *Keetia venosa*
- *Massularia acuminata*
- *Mitchella repens*
- *Morinda officinalis*
- *Morinda royoc*
- *Nauclea vanderbuchii*
- *Oldenlandia corymbosa*
- *Pausinystalia johimbe* (see *Corynanthe yohimbe* above)
- *Pausinystalia macroceras*
- *Rubia peregrina*
- *Sarcocephalus latifolius*
- *Scherbournia bignoniiflora*
- *Uncaria africana*
- *Uncaria talbotii*
- *Warszewiczia coccinea*

Typhaceae

- *Typha capensis*

Typha capensis or Bulrush: a decoction of the rhizomes is used to enhance male libido and potency. It is also taken to for unspecified problems relating to the genitals, to improve circulation and improve the fertility in women [Wyk van; Oudtshoorn van, Gericke, 1997]. The Zulu use it for the same purposes [Pujol, 1993].

There is speculation that these effects are due to typhasterol (Fig. 26) and other related steroid-like constituents present in the plant, which are a class known as the

ecdysteroids. There are indications that these phytoosteroids can be metabolised in mammals to either androgen or oestrogen-like substances.

Turneraceae

- *Turnera diffusa* (Fig. 27)

Turnera diffusa [Syn. *Turnera aphrodisiaca*], also known as Damiana, is widely listed as an aphrodisiac [Grieve, 1984, 1998; Wren, 1985; BHP, 1983; BPC, 1934; Leyel, 1987; Lust, 1986; Hoffmann, 1987; Merck, 1940; Leung, 1980; Hutchens, 1973, 1992].

The major pharmacological component is declared as a bitter principle damianin (7%), although extensive searches have failed to identify the structure of this material. The leaf or stem is used. The plant also contains gum (13.5%), starch (6%), sugars, tetraphyllin B (0.26%, a cyanogenetic glycoside), arbutin (up to 0.7%, a phenolic glycoside), and tannins (3.5%, unspecified). A volatile oil is also present (0.5-1.0%). [Newall, Anderson and Phillipson, 1996]. The volatile oil contains at least 20 components from which the sesquiterpenes d-Cadinene (10%), α -copaene (3%) and calamenene (3%), the monoterpenes α -pinene (2%) and β -pinene (1%), and also thymol (4%) have been identified. 1,8-cineole and p-cymol were reported, but not found in subsequent investigations [2,3]. Small amounts of triacontane $\text{CH}_3(\text{CH}_2)_{24}\text{CH}_2\text{OH}$, β -sitosterol and gonzalitosin 1 (5-hydroxy-7,3',4'-trimethoxyflavone) are also present. [Bradley, 1992]

The origin of the plant being used was in the 1870s when an American pharmaceutical firm Helmick and Company, of Washington DC, introduced the plant as a "powerful aphrodisiac to improve the sexual ability of the enfeebled and aged, and apparently to have a specific effect upon all the organs of the pelvis, giving increased tone and activity to all the secretions in that vicinity." [Crellin & Philpott, 1990]. The National Dispensatory of 1884 noted that damiana had been widely and boldly advertised as a remedy for sexual impotence, "but there is not the slightest reason for confiding in this statement of its virtues."

The British Medical Association was very scathing of many of the commercial preparations. As an example, a product "Therapion" (The expiring lamp of life lighted up afresh) a recuperative medicine contained a plethora of ingredients including liquorice, gentian, damiana and unidentified alkaloid [BMA, 1909]. "Cocaphos" was marketed as a nerve tonic and recuperative stimulant contained (undeclared) damiana, but little or no coca as implied in the label. Another "Murrays Combined Treatment", claimed permanent cure for spermatorrhoea, impotence and other disorders also contained damiana [BMA, 1912].

The plant has been described as having testostermimetic action that generally provides a stimulating and enhancing influence on those functions related to the male reproductive system [Mills, 1989; Hoffmann, 1996]. It has been speculated that it acts through its mildly irritant volatile oil causing increased peristalsis and mild stimulation of the genito-urinary tract during excretion [BPC, 1923]. Numerous references mention the use of the plant for the treatment of nervous tension and depression as a general tonic [Tlalaj & Czechowicz, 1989; Mitton & Mitton, 1976]. Another reference cites the use with oats for general depression, and if anxiety is a problem, then combined with skullcap or wood betony [Ody, 1993; Hoffman, 1996]. The somewhat outdated term "neurasthenia" has been used to describe the overall indication for damiana [Powell, 1981]. Hypoglycaemic activity and CNS depressant activity have also been reported [Newall, Anderson and Phillipson, 1996].

Studying the literature, one is left with certain clues as to the true beneficial composition of the preparation. Coca has been proposed as one additive in some of the earlier preparations [Tyler, Brady & Robbers, 1988].

Adulteration could have been made with other plant materials as well. "Tired businessmen dropped in for a tonic made out of Kola (*Cola* spp.) – as stimulating as caffeine – and Damiana (*Turnera diffusa* var., *aphrodisiaca*) which, as its official name suggests, is believed in Mexico to be especially good for tired businessmen." [Griggs, 1987]

Nonetheless, numerous preparations exist commercially (see above also), such as Dorwest Damiana and Cola tablets, Frank Roberts Strength Tablets, Gerard House Vig-a-Tea, Potter's Elixir of Damiana and Saw Palmetto etc [Ody, 1996]. Though in reality, these products are best considered as they are in Mexico – as a tea substitute [Bellamy & Pfister, 1992].

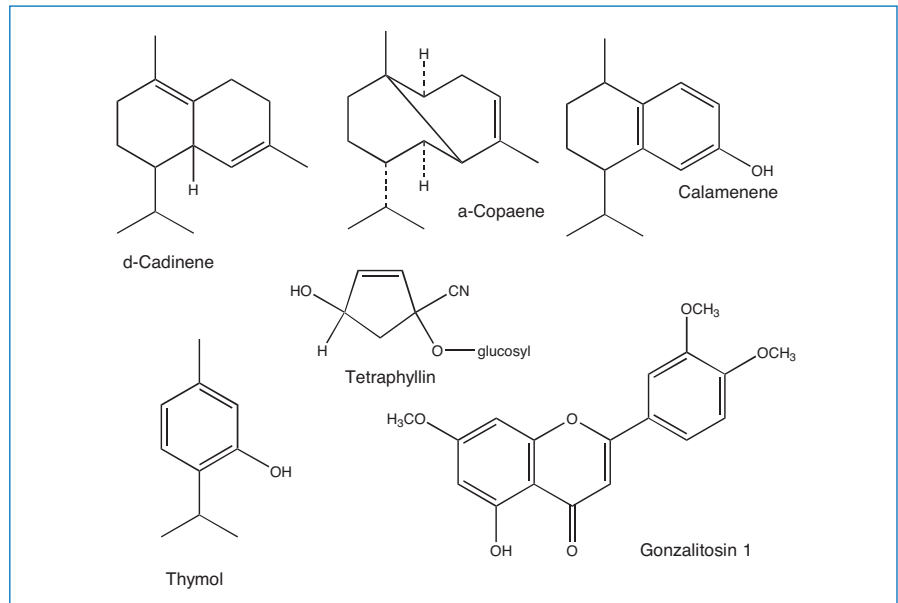


Figure 27: *Turnera diffusa* components.

Vitaceae

● *Rhoicissus tridentata*

Rhoicissus or Wild Grape: the roots or tubers are used for infertility and dysmenorrhoea. The components are likely to be polyphenols, anthocyanins and proanthocyanidins.

Conclusions

It has been shown that the presence of indole alkaloids is most likely to be the future source of a herbal Viagra. This work continues. The use of these materials topically will be unlikely to have any effect on libido or the male erection, but may have effect when taken orally. PC

● Content of this article was presented at *Aphrodisia*, a feature of the In-Cosmetics event recently held in Paris. The presentation was assisted by the part sponsorship of Symrise Ltd.

References

- 1 Abbiw D.K. *Useful plants of Ghana – West African use of wild and cultivated plants*. Intermediate Technology Publications and the Royal Botanic Gardens Kew. 1990. ISBN No. 1-85339-043-7 or 1-85339-080-1 (Hardback).
- 2 Anon: Insulin Dependent Diabetes Trust Database. (1998). <http://www.traders.co.uk/insulintrust/male1.htm>.
- 3 Bellamy D., and Pfister, A. *World Medicine – Plants, Patients and People*. 1992. Blackwell Publishers. ISBN No. 0-631-16933-4.
- 4 Bradley P.R. *British Herbal Compendium* Volume 1. 1992. BHMA. ISBN No. 0-903032-09-0.
- 5 *British Herbal Pharmacopoeia, The*: 1983. ISBN No. 0-903032-07-4. British Herbal Manufacturers Association (B.H.M.A.).
- 6 British Medical Association. *Secret Remedies – what they cost and what they contain*. 1909.
- 7 British Medical Association. *More Secret Remedies – what they cost and what they contain*. 1909. Second series. 1912.
- 8 British Pharmaceutical Codex, The. 1923. *An Imperial Dispensatory for the use of Medical Practitioners and Pharmacists*. The Pharmaceutical Press. London.
- 9 British Pharmaceutical Codex, The. 1934. *An Imperial Dispensatory for the use of Medical Practitioners and Pharmacists*. The Pharmaceutical Press. London.
- 10 Burkill H.M. *The useful plants of West Tropical Africa*. Edition 2. Vol. 1. Families A-D. Royal Botanic Gardens Kew. 1985. ISBN No. 0-947643-01-X.
- 11 Bustos-Obregon E. and Fesito R. (1974). The effect of vinblastine sulfate on rat spermatogenesis. *Archives Biologie* (Bruxelles), 85, 353.
- 12 Clark J.T., Smith E.R., Davidson J.M. (1984): Enhancement of sexual motivation in male rats by Yohimbine. *Science* (1984 Aug 24) 225 (4664): 8479.
- 13 Cooke R.A., Nikles A., and Roeser H.P. (1978). A comparison of the antifertility effects of alkylating agents and Vinca alkaloids in male rats. *British Journal of Pharmacology*, 63, 677.
- 14 Costa R., Marino A. [On the eventual psychotropic, cardiovascular and aphrodisiac properties of yohimbine, an old drug with new indications] *Sulle eventuali proprietà psicotrope, cardioangioattive e afrodisiache della yohimbina, vecchio farmaco con nuove indicazioni*. *Clin Ter* (1989 May 15) 129 (3): 159-68. (Published in Italian).
- 15 Crellin J.K. and Philpott, J. *Herbal Medicine Past and Present*. Volume II. A Reference Guide to Medicinal Plants. Duke University Press (Durham and London). 1990. ISBN No. 0-8223-1019-8.
- 16 Duke J. A mini course in Medical Botany, Module 10 Arabic Plants. University of Maryland Foundation.
- 17 Duke J. and Beckstrom-Sternberg S.M. *Phytochemeco Database – USDA-ARS-NGRL*.

EthnobotDB – worldwide plant uses, ACEDB version: 4.0. <http://probe.nalusda.gov:8000/related/aboutethnobotdb.html>

18 Efamol literature: *Essential Fatty Acids – A review of Evening Primrose Oil.*

19 Evans W.C. and Trease G.E. *Pharmacognosy.* (1989). 13th edition. Balliere Tindall ISBN No. 0-7020-1357-9.

20 Farnsworth N.R. and Waller D.P. (1982). Current status of plant products reported to inhibit sperm. *Research Frontiers of Fertility Regulation* 2, 1-16.

21 Greenish H.G. *A text book of materia medica, being an account of the more important crude drugs of vegetable and animal origin.* 5th edition. 1929. J. & A. Churchill, Portman Square, London.

22 Grieve M. *A Modern Herbal*, 1984 Sawas Publishing.

23 Grieve M. *A Modern Herbal – the medicinal, culinary, cosmetic and economic properties, cultivation and folklore of herbs, grasses, fungi, shrubs and trees with all their modern scientific uses.* 1998 Tiger Books International, London. ISBN No. 1-85501-249-9.

24 Hoffmann D. *The Herb Users Guide.* 1987 Thorsons Publishing. ISBN No. 0-7225-1288-0.

25 Hoffmann D. *The complete illustrated Holistic Herbal – a safe and practical guide to making and using herbal remedies.* 1996. Element Books. ISBN No. 1-85230-847-8 (Hardback), 1-85230-758-7 (Paperback).

26 Hutchens A.R. *Indian Herbalogy of North America.* 1973 First paperback edition. Shambhala. ISBN No. 0-87773-639-1.

27 Hutchens A. *A Handbook of Native American Herbs – the pocket guide to 125 medicinal plants and their uses.* Shambhala. 1992. ISBN No. 0-87773-699-5.

28 Iwu M.M. *Handbook of African Medicinal Plants.* CRC Press. 1993. ISBN No. 0-8493-4266-X.

29 Jayaweera D.M.A. *Medicinal Plants used in Ceylon Part 1.* National Science Council of Sri Lanka. Colombo 1981.

30 Joshi M.S. and Ambaye R.Y. (1968) Effect of alkaloids from *Vinca rosea* L. on spermatogenesis in male rats. *Indian Journal of Experimental Biology*, 6, 256-7.

31 Knoll L.D., Benson R.C. Jr., Bihartz D.L., Minich P.J., Furlow W.L. A randomized crossover study using yohimbine and isoxsuprine versus pentoxifylline in the management of vasculogenic impotence [see comments] *J Urol* (1996 Jan) 155 (1): 144-6.

32 Lawrence. *Review of Natural Products* (1994). July 1994. Copyright 1994 by Facts and Comparisons (ISSN 0734-4961). 111 West Port Plaza Suite 400, St. Louis, Missouri 63146-3098.

33 Leung A.Y. *Encyclopedia of Common Natural Ingredients used in food, drugs and cosmetics.* 1st edition. John Wiley 1980 ISBN No. 0-471-04954-9.

34 Lewis W.H. and Elvin-Lewis M.P.F. *Medical Botany – plants affecting man's health.* John



Theobroma cacao.

Wiley & Sons. 1977. ISBN No. 0-471-53320-3 (Hardback) 0-471-86134-0 (Paperback).

35 Lyle C.F. *Elixirs of Life.* 1987 Faber and Faber. ISBN No. 0-571-14849-2.

36 Lust J. *The Herb Book*, 1986, 16th impression, Bantam Publishing. ISBN No. 0-553-17273-5.

37 Mann J. *Murder, Magic and Medicine* (1989). *Chemistry in Britain.* May 1989. Pp 478-482.

38 *Martindale Extra Pharmacopoeia.* 25th edition. Editor R.G. Todd. 1967. The Pharmaceutical Press.

39 Merck. *The Merck Manual*, Illustrated. 16th edition (CMC) on CD ROM.

40 Merck. *The Merck Index* 5th Edition. *An encyclopaedia of chemicals drugs and biologicals.* 1940. Published Merck.

41 Merck. *The Merck Index.* 12th edition. (1996) Merck & Co. Inc. Whitehouse Station, NJ, USA. ISBN No. 0911910-12-3.

42 Mills S.Y.: *The A-Z of Modern Herbalism, A comprehensive guide to Practical Herbal Therapy.* Thorsons 1989 (retitled) ISBN No. 0-7225-1882-X. signed edition.

43 Mitton F. and Mitton V. *Mitton's Practical Modern Herbal.* W. Foulsham & Co. Ltd. Slough, Berks. 1976. ISBN No. 0-572-00901-1.

44 Newall C.A., Anderson L.A. and Phillipson J.D. *Herbal Medicines – a guide for health-care professionals.* London. The Pharmaceutical Press. 1996. ISBN No. 0-85369-289-0.

45 Ody P. *Handbook of over-the-counter herbal medicines.* 1996. Kyle Cathie. ISBN No. 1-85626-235-9.

46 Ody P. *The Herb Society's Complete Medicinal Herbal – a practical guide to medicinal herbs, with remedies for common ailments.* Dorling Kindersley. 1993. ISBN No. 0-7513-0025-X.

47 Oliver-Bever B. *Medicinal Plants in Nigeria – being a course of four lectures delivered in April 1959 in the Pharmacy Department of the Nigerian College of Arts, Science and Technology, Ibadan.* Published as a private edition 1960 by the Nigerian College of Arts, Science and Technology.

48 Oliver-Bever B. *Medicinal Plants in tropical West Africa.* Cambridge University Press, Cambridge. 1986. ISBN No. 0-521-26815-X.

49 Powell E.F.W. *The Natural Home Physician, A Book for Every Household.* Health Science Press 1981 reprinted 2nd ed. ISBN No. 0-85032-092-5.

50 Pujol J. *NaturAfrica – The Herbalist Handbook (African Flora, Medicinal Plants).* Printed by Newset. Publisher not given, date unknown, purchased 1993 in Malawi.

51 Richardson P.M. (This vol of 25). Solomon H. Snyder and Malcom Lader: *The Encyclopaedia of Psychoactive Drugs. Flowering Plants. Magic in Bloom.* 1988. Burke Publishing Co. ISBN No. 0-222-01449-0 (hardback). ISBN No. 0-222-01450-4 (Paperback).

52 Seaforth C.E. *Natural products in Caribbean folk medicine.* The University of the West Indies. 1988.

53 Spoerke D.G. *Herbal Medications.* Woodbridge Press (Santa Barbara, California 93160). 1990. ISBN No. 0-88007-181-8.

54 *Standard of Asean Herbal Medicine.* Volume 1. Published by Asean Countries. Jakarta, Indonesia. 1993.

55 Svoboda G.H., Gorman M., Root M.A. (1964). Alkaloids of *Vinca rosea*. A preliminary report on the hypoglycaemic activity. *Lloydia*, 27, 361-3.

56 Talalaj S. and Czechowicz A.S. *Herbal Remedies – harmful and beneficial effects.* Published by Hill Content Publishing. 1989 (first edition). ISBN No. 0-85572-1898.

57 Tyler V.E., Brady L.R., Robbers J.E. (1988) *Pharmacognosy.* 9th edition. Lea & Febiger. ISBN No. 0-8121-1071-4.

58 University of the Philippines: *Plants of the Philippines.* M&L Licudine Enterprises. First Printing 1971. 2nd. edition 1980. Printed in the Philippines. Chairman: Consuelo V. Asis. Director: Dolores F. Hernandez.

59 Vilar O. (1974) Effect of cytostatic drugs on human testicular function. *In Male Fertility and Sterility*, Proceedings of the Serona Symposium, Vol.5, ed. R.E. Mancini and L. Martini, Academic Press, London, p.423.

60 Watson C. *Love Potions – a guide to aphrodisiacs.* Optima Books. 1993. ISBN No. 0-356-21049-9.

61 Watt J.M. and Breyer-Brandwijk M.G. *The Medicinal and Poisonous Plants of Southern and Eastern Africa.* 1962. E. & S. Livingstone Ltd., Edinburgh and London.

62 Winter-Griffith H. *The Vital Vitamin Fact File.* 1988. Thorsons Publishing ISBN No. 0-7225-1693-2.

63 Wren R.C. *Potter's New Cyclopaedia of Botanical Drugs and Preparations*, 1985 8th impression, published C.W.Daniels. ISBN No. 0-85032-009-7.

64 Wren R.C. rewritten by E.M. Williamson and F.J. Evans: *Potter's New Cyclopaedia of Botanical Drugs and Preparations*, 1994, published C.W. Daniels. ISBN No. 0-85207-197-3.

65 Wyk B.-E. van, Oudtshoorn B. van, and Gericke N. *Medicinal Plants of South Africa.* Briza Publications, Pretoria, South Africa. First edition 1997. ISBN No. 1-875093-09-5.