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# Top 10 Medicinal Plants and their Groundbreaking Impact on Modern Medicine


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**Top 10 Medicinal Plants**  
*And their Groundbreaking Impact on Modern Medicine*

By. Jordan Patterson

**Introduction:**

This paper describes ten plants that having been groundbreaking drugs in the past century that were all derived from plants. I chose to do my project on this topic because of my families history with natural medicine. In 1999 my mother was diagnosed with Bile Duct cancer and the doctors gave her only a couple of weeks to live. The doctors recommended chemotherapy and radiation, but the results seemed negative for the situation. After some extensive research, my parents found St. Georges Medicinal Wellness Center located in the tiny village of Bad Aibling, Germany. This hospital along with offering traditional medicine techniques for cancer like chemotherapy and radiation, also offered medicinal wellness as an individualized health care. The hospital refers to the program as an integrative cancer therapy concept. From what I remember from the times that I was fortunate to travel to the clinic, she would get a round of chemotherapy followed by a natural medicine, homeopathic remedy, or massage therapy. Although ultimately my mother lost her battle with cancer, she surpassed the doctor's expectations of several weeks to over seven years. I truly believe that the natural medicine treatments in combination with the western medicine that were used at this clinic added valuable years to her life.

## Part 1: Digitalis Flower for the Heart

### *Common Names*

Common names for this plant include the following: foxglove, purple foxglove, throatwort, fairy finger, fairy cap, lady's thimble, scotch mercury, lion's mouth, witch's bells, dead man's bells, and woolly foxglove<sup>4</sup>.

### *Scientific Name*

The scientific name is *Digitalis purpurea* or *Digitalis lanata*<sup>4</sup>.

### *Picture*



### *Description of common structure of the plant:*

Digitalis is a shrubby plant that produces two to five foot tall flowers. The flowers range from pink, red, purple, white, and yellow. Digitalis usually blooms in the months of May and June. Although these plants are biennial and only last for 2-3 years, they grow and multiply with ease. These plants are low maintenance and also deer resistant<sup>2</sup>.

### *Natural Habitat:*

This plant is native to western, southern, and central Europe, for example, the countries of Great Britain, Norway, and Spain. It also grows in the northeastern and northwestern parts of North America. The plant grows in neutral pH, well-drained soil, and in full to part sun. It can also grow in acidic soil and is able to thrive in cold temperatures. Consequently, the plants thrive in wild habitats such as temperate woodlands, open woods, hedge banks, sea cliffs, dry hilly pastures, and rocky mountain slopes. They are commonly grown in gardens as well<sup>6</sup>.



### *Discovery of the Plant for a medicinal use:*

William Withering was the man who discovered the use of digitalis in medicine. In the 18<sup>th</sup> century Withering used different concoctions as a treatment for asthma, epilepsy, and insanity. Although these attempts did not develop into general use, it would take more than one hundred years to realize the true powers of the drug. In the 19<sup>th</sup> century a few papers were written to show that the drug slowed the heart by acting on the vagus nerve. Some papers also showed that there were hypertensive actions on circulation due to digitalis. In a book entitled “Neale’s Medical digest” there were over 32 conditions for which digitalis was prescribed. The four main physiological effects which digitalis possessed are the following: strengthen the pulse, slow fast pulse, slow heart rate, decrease the amount of blood circulating, and decrease the amount of inflammation in tissues, and acting as a diuretic<sup>3</sup>.

### *How does it work?*

Medications that contain digitalis strengthen the force of the heartbeat by increasing the amount of calcium in the heart cells. When the medicine reaches the heart muscle it attaches to sodium and potassium receptors. These receptors control the amount of calcium in the heart muscle by preventing the calcium from leaving the cells. As calcium builds up in the cells it causes a stronger heartbeat. Medications that contain digitalis also control irregular heart rhythms by slowing the signals that start in the sinoatrial node (SA node). This lowers the number of signals that travel through the atrioventricular node (AV node). In other words, fewer signals means fewer heart rhythms<sup>1</sup>. Another less common way in which digitalis has an effect is working with the nervous system to help stop the production of kidney hormones. When this happens blood vessels relax thus taking stress off the heart<sup>5</sup>.

### *Uses:*

Digitalis today is used to treat congestive heart failure and heart rhythm problems. It can increase blood flow throughout the body and reduce swelling in the hands and ankles<sup>1</sup>.

### *Common Brand Names in the USA that use the plant as an ingredient:*

There are many different brand names for pharmaceuticals that use digitalis. The following are examples of these: Lanoxicaps, Lanoxin, Lanoxin, Elixir Pediatric, Lanoxin Injection, and Lanoxin Injection Pediatric. These all are some form of digoxin, which is the most active glycoside found in the raw plant.<sup>1</sup> Digoxin (C<sub>41</sub>H<sub>64</sub>O<sub>14</sub>) is usually taken orally. However, due to its toxicity, periodic blood samples need to be taken because it has a narrow therapeutic index (the therapeutic dose is close to the toxic dose).

### *Side Effects of the drug:*

There are several common side effects that medications containing digitalis can produce in a person’s body. The most common side effects for the toxicity are nausea, vomiting, diarrhea, and blurred vision. Some serious side effects are irregular heartbeat cause dizziness, heart palpitations, and shortness of breath, sweating or fainting; hallucinations; tiredness; and loss of appetite. Additionally, side effects in men can be erectile dysfunction and breast enlargement<sup>1</sup>.

### *Toxicity*

All parts of digitalis are toxic. It is estimated that the toxicity of digitalis even in the medical use is in between five to twenty five percent. The ingestion of even a very small amount of the plant can be fatal<sup>4</sup>.

## **Part 2: Yew: The Goddess Tree**

### *Common Names*

Yew has several common names that the plant is called around the world some of the more common ones are the following: Arbre Sacré des Druides, Chinwood, Common Yew, English Yew, Himalayan Yew, If, If à Baies, If Commun, If de l'Himalaya, If de l'Ouest, Ifreteau, Pacific Yew, Taleespatra, Talispatra, Taxus baccata, Taxus brevifolia, Tejo, and Western Yew<sup>22</sup>.

### *Scientific Names*

The scientific names for European yew is *Taxus baccata* and for Pacific yew and Western yew are *Taxus brevifolis*.

### *Picture*



### *Description of common structure of the plant*

The yew can grow in a tree or shrub form. It is a dioecious plant, which means that it has male and female forms. The bark of the tree is reddish-brown and it is scaly. The branches grow upwards and the twigs are irregular alternates. The leaves appear to be forked and they are flexible. The male trees flower in winter or early spring. Only one seed is formed from each female flower. The fruit on the female trees grow through the summer<sup>24</sup>. This tree has pointed, flat, dark green evergreen needles. The seeds develop into a bright red fruit. It is considered a low maintenance plant that prefers a slightly acidic to near neutral pH, but is somewhat intolerant of winter temperature extremes. Some of the natural predators are black Vine Weevils scale insects, sooty mold, root rot, needle blight, twig blight and phytophthora canker. They are also resistant to rabbits<sup>27 29</sup>.

### *Natural habitat*

The yew tree is a very hearty tree that is capable of surviving lots of soil types including limestone and chalk, although it prefers moist and well-drained soil. The tree flourishes in full shade and can only withstand small amounts of sunshine. This tree is often found lining cemeteries and churchyards. The trees are found in Great Britain, Ireland, most of Europe, Asia,

North Africa, Iran, as well as the northeastern half of North America<sup>26</sup>. The majority of the yew is found in the British Isles and 85% of the trees there are found in churchyards<sup>31</sup>.

#### *Discovery of the Plant for a medicinal use*

During the middle ages the yew wood was used to make spears, bows, and darts. Before modern medicine the flesh from the yew berries were used to treat heart issues and problems with the cardiovascular system<sup>26</sup>. The yew tree is considered sacred in lots of different cultures. For example, it is thought that the yew tree was one of the only evergreen trees in Britain. Christians in the area observed the tree as a symbolism for everlasting life. It is believed that the yew tree was in the Garden of Eden, the first Christmas tree, and the Tree of Life. This tree is also very important in the subjects of graveyards, poetry, magical uses, and churchyards<sup>30</sup>. Unfortunately the discovery of the anti-cancer agent in the yew bark in 1966 has caused the destruction of the species, in fact, over 90% of Asian yews have been destroyed<sup>31</sup>.

#### *How does it work?*

The yew plant works by affecting various parts of the body including nerves, the heart, and muscles. Taxol, which is the major product of the yew plant, works by stopping the cancer cells from dividing and multiplying. It also kills the cancer cells and stops the cancer from growing back. This drug also can affect normal healthy cells including hair and blood cells. For this reason, the patient must have regular blood tests and have regimens completed at regular intervals to make sure that cancer cells stay dead and normal cells stay healthy<sup>28</sup>.

#### *Uses:*

Yew is used to cure the following medical conditions: menstrual disorders, abortion, tapeworm, swollen tonsils, epilepsy, kidney problems, liver problems, breast cancer, advanced non-small lung cancer, and ovarian cancer<sup>22</sup>.

#### *Common Brand Names in the USA that use the plant as an ingredient*

The major drug that comes from the yew plant is Taxol. Taxol is harvested from the Pacific Yew. The highest concentration of Taxol is found in the bark of the yew tree. The Bristol Myers Squibb (BMS) Company has the exclusive right to harvest yew bark on federal forestlands in the Pacific Northwest. BMS now produces TAXOL by semi-synthesis with compounds obtained from the yew as well as hybrids. Other companies around the world are now using similar ways to obtain a drug similar to Taxol<sup>25</sup>.

#### *Side Effects of the drug*

Yew can cause severe stomach problems, cause the heart rate to slow dangerously low, nausea, dry mouth, vomiting, stomach pain, dizziness, weakness, nervousness, heart problems, and even death<sup>23</sup>. The biggest side effect of the drug Taxol is involving the bone marrow, which is where blood cells are made. This drug can decrease the production of blood cells, which can make people more prone to infection<sup>22</sup>.

#### *Toxicity*

All parts of the yew plant are poisonous. In children even eating just one berry can be fatal. The ingredients in the plant that make the plant poisonous are the chemical taxine and taxol. These chemicals are found in various species of the yew plant. Although the whole plant is poisonous, the most poison is found in the seeds or berries<sup>23</sup>.

### Part 3: Catharanthus: Humble Garden Plant

#### *Common Names*

Common names for this plant include Madagascar periwinkle, vinca, Cape periwinkle, rose periwinkle, rosy periwinkle, cayenne jasmine, *Ammocallis rosea*, *Catharanthe*, *Catharanthus*, Chang Chu Hua, Church-Flower, *Lochnera rosea*, Magdalena, Myrtle, Periwinkle, Pervenche de Madagascar, Pervenche Rose, Ram-Goat Rose, Ratanjot, Red Periwinkle, Rose Amère, Vinca, *Vinca rosea*, *Vincapervinca* de Madagascar, and Old maid<sup>11</sup>.

#### *Scientific Names*

The scientific name for this plant is *Catharanthus roseus* and the original Latin name is *Vinca rosea*.

#### *Picture:*



#### *Description of common structure of the plant*

This plant usually grows six to eighteen inches wide and six to eighteen inches tall. It creates bushy foliage that is covered with blooms of flowers. The tubular flowers have five flattened petals. The flower can range in color from rosy-pink, red, or mauve. The flowers bloom from June to the first frost in the winter. Butterflies and moths are the only insects that are able to pollinate the flowers because the floral structure has adapted to long tongue insects. These plants are also able to grow in ranging altitudes<sup>8</sup>.

#### *Natural Habitat*

This plant is often found on sand and limestone soils in woodlands, forests, grasslands, and disturbed areas. The only place this flower naturally grows in on the island of Madagascar, but lately it is seen in gardens in the USA, especially in the St. Louis area. *Catharanthus* has now naturalized in almost all tropical and subtropical regions of the world. It is also now found on

every continent except Antarctica. It is used in gardens as an annual ground cover, bedding, edging, or containers. Some also are great houseplants<sup>8 12</sup>.

#### *Discovery of the Plant for a medicinal use:*

This plant has had a large use in Chinese medicine for many centuries. All parts of the plant were used to treat ailments in herbal medicine. Indian traditional medicine used the plant for the treatment of diabetes and insect stings, while Caribbean traditional medicine used the flowers for eyewash for infants, as well as the treatment of asthma and excess gas. Western medicine began researching the extracts of this plant in the 20<sup>th</sup> century. The alkaloids that are used in today's medicine are extracted from the whole dried plant<sup>9</sup>.

#### *How does it work?*

It is shown in some studies that this plant taken homeopathically may alter the immune system, increase the production of urine, and lower blood sugar. Vinblastine and vincristine are the two major chemicals that can be extracted out of this plant and they are used in chemotherapy. It takes a large quantity of the material to harvest these two alkaloids. Vincristine has been recognized with raising the childhood leukemia survival rate from less than 10% to over 90%. Both vinblastine and vincristine are bisindole alkaloids, dimers formed from the combination of two indole alkaloid monomers (catharanthine and vindoline). In fact, vincristine is only slightly different from vinblastine and can be created from the other. Scientists have not yet proven the mechanism of the action of reducing blood glucose levels.<sup>12</sup>

#### *Uses:*

The alkaloids found in *C. roseus* have been used to treat many different diseases, some of these diseases include leukemia, Hodgkin's disease, malignant lymphomas, neuroblastoma, Wilms tumor, Kaposi's sarcoma, mycosis fungoides, to improve cerebral blood flow, and high blood pressure<sup>7</sup>.

#### *Common Brand Names in the USA that use the plant as an ingredient*

There are several different pharmaceuticals that use *Catharanthus roseus* as an ingredient. Velban is used to treat Hodgkin's disease, which uses the alkaloid Vinblastine. Oncovin is used to stop mitosis in metaphase and is very effective in treating leukemia in children and lymphocytic leukemia, the alkaloid used for this is Vincristine sulphate. India is the third largest manufacturer for these alkaloids and they export them to most of Europe<sup>10</sup>. Some other less common drugs that are derived from the plant are Eldisine, Navelbine, Hydroserpan, and Lamuran. Large quantities of material are required for production of the anticancer alkaloids vincristine and vinblastine, because they cannot be manufactured synthetically<sup>12</sup>.

#### *Side Effects of the drug*

This plant is unsafe taken by mouth because of the poisonous chemicals called vinca alkaloids. Potential side effects for this drug include nausea, vomiting, hair loss, dizziness, bleeding, nerve problems, seizures, liver damage, low blood sugar, and death<sup>11</sup>.

#### *Toxicity:*



Large doses of the plant can cause hypotension. Animals consuming large amounts of this plant are said to experience hypotension, neurotoxicity, seizures, and even death. It is also said in folklore that the root of the plant is poison<sup>12</sup>.

#### **Part 4: Camptotheca- Tree of Life**

##### *Common Names:*

The common names for this tree are Xi Shu, Cancer Tree, Tree of Joy, Happy Tree, Dragon tree, Heaven wood tree, fine tree, and Tree of Life.

##### *Scientific Names*

The scientific names for this tree are *Camptotheca acuminata* or *Camptotheca lowryana*.

##### *Picture*



##### *Description of common structures of the plant*

The Camptotheca tree is a towering tree that grows almost 75 feet tall. The bark is thin and reddish-brown in color. There are few branches towards the top of the tree. The tree grows shiny leathery green leaves as well as small white flowers that have bowed heads. The tree can grow very easily from seeds. It is currently grown as an ornamental tree<sup>32</sup>.

##### *Natural habitat*

Although this tree is native to China and Tibet, it now grows in the United States as well as in other countries. All the Camptotheca's that exist in North America originated from just two germinated seeds from China. It thrives in warm and damp climate conditions. It can also grow in sunny positions and soil having rich humus content. The tree cannot bloom when it dries out<sup>32</sup>.

##### *Discovery of the plant for a medicinal use*

This plant was first used in traditional Chinese medicine for the treatment of the common cold, psoriasis, liver problems, and digestive issues. In China people have nicknamed the tree the happy tree because of its effectiveness with the common cold. By extracting the essence from the root, bark, and fruit it can be used to treat gastric cancer, esophageal cancer, rectal cancer, liver cancer, bladder cancer and other kinds of carcinoma<sup>31</sup>. Over time this plant has had significant effect on cancers.

#### *How does it work?*

Scientific research has discovered that there are cancer-fighting properties in the Camptotheca. The active ingredient in the plant is Camptothecin, which is a pentacyclic quinoline alkaloid. The stem bark, root bark, and seeds contain small amounts of Camptothecin, but the highest amount is found in the tender young leaves. Camptothecin can interrupt the nuclear DNA topoisomerase I enzyme and has the effect of halting the replication and transcription of cancer cells. The root or fruit of the Camptotheca can be grounded into a powder and taken once a day for psoriasis, liver and stomach ailments, and common colds<sup>31</sup>.

#### *Uses*

The extracts of tender are useful for brain tumors, liver cancer, cancer in the gastrointestinal tract, leukemia, gall bladder disease, ailments of the spleen, and other cancers. There is testing currently going for its use HIV and AIDS as well<sup>31</sup>.

#### *Common Brand Names in the USA that use the plant as an ingredient*

There are two main drugs that are derived from the Camptotheca. Both of these drugs contain the alkaloid camptothecin. Camptothecin is a cytotoxic quinolone alkaloid, which inhibits the DNA enzyme topoisomerase. The first drug's name is Topotecan and is also known as Hycamtin and Topotecan Hydrochloride. Topotecan is used to treat ovarian cancer, cervical cancer, and small cell lung cancer. Topotecan is a chemotherapy drug that works by blocking the action of an enzyme in cells called topoisomerase 1. Cells need this enzyme to keep their DNA in the correct configuration when going through mitosis. Obstructing this enzyme leads to breaks in the DNA, which leads to cell death. Because cancer cells divide more rapidly than normal cells, they are more likely than normal cells to be affected by Topotecan. Topotecan is either given by an infusion into a vein over 30 minutes or taken as capsules. The typical schedule is once a day for 3 to 5 days, which is usually repeated every 3 weeks. The second drug is known as Irinotecan. It can also be known as Camptosar, CPT-11, and irinotecan hydrochloride. This drug is a chemotherapy drug that is used to treat people with colon or rectal cancer. Irinotecan is given by an infusion into a vein over 90 minutes. It is usually given either once every 3 weeks, or weekly for 4 weeks followed by 2 weeks off<sup>33 34</sup>.

#### *Side Effects of the Drug*

There are some side effects from the drugs derived from the Camptotheca tree these include diarrhea, runny nose, increased saliva, excess tears, sweating, flushing, abdominal cramps, nausea, vomiting, dizziness, trouble with vision, sores in the mouth or on the lips, blood clots, lowered white blood cell counts, low blood platelet count, increased chance of infection, abdominal pain, loss of appetite, hair thinning and loss, and feeling weakness.

#### *Toxicity*

Although the tree itself is not poisonous in small quantities, the extract containing the chemotherapy drugs are highly toxic. These compounds are not water-soluble making it difficult to administer as a medicine. In fact, other anti-cancer drugs developed from camptothecin are not used any longer owing to their acute toxicity.

## Part 5: Poppy the Plant of Joy

### *Common Names*

Common names for poppy include the following: Amapola de California, Eschscholzia californica, Pavot d'Amérique, Pavot d'Or, Pavot de Californie, Poppy California, Yellow Poppy, White Poppy, Opium Poppy, Mawseed, Herb of Joy, Mohn, Klapper-Rosen, Mago, Magesamen, Weismagen, wilder Magen, Magensaph, Rosule, Adormidero, Hashas, Kheshkhash Abu Al Noum, O Fang, O Fu Jung, O P'ien, Tengkoh, Ya P'ien, and Yu Mi<sup>65</sup>.

### *Scientific Names*

The scientific name for opium poppy is *Papaver Somniferum* or *Papaver rhoeas*<sup>65</sup>.

### *Picture*



### *Description of common structure of the plant*

The opium poppy is a robust annual herb that is usually three to fifteen inches tall. The plant is very smooth and glossy; it has a light bluish-greenish, and unlikely to be branched. The leaves are oblong with larger grooves alternating from smaller grooves and they range from 2 inches to 6 inches. The stem is 4 to 8 inches tall and is either smooth or slightly bristled. The flower bud is oblong and is fifteen to twenty five millimeters long. The flowers are large and eye-catching and range in color from white to pinkish or reddish, and occasionally pale violet. The petals are twice as large as the sepal<sup>56</sup>.

### *Natural Habitat*



Opium poppy can grow in many regions of the world because its original habitat of Asia has a temperate climate. Poppy is grown all across Europe, Turkey, India, Persia, and China. The flowers grow the best in weather of fifty-five degrees Fahrenheit. The flowers are often found in fields, clearings, stream banks, railroads, roadsides, and other disturbed sites ranging in elevation from sea level to 1300 meters<sup>57</sup>.

#### *Discovery of the plant for a medicinal use*

The first recorded use of poppy growth was in 3,400 B.C. when poppy was cultivated in lower Mesopotamia, which is now southwest Asia. The Sumerians named the plant Hul Gil, which translates to the joy plant. The Sumerians passed on the plant to the Assyrians, who passed it the Egyptians. As the plant spread, more people found out about the power of opium and the demand for it increased. Many countries then began to grow and process opium to expand its accessibility and to decrease the cost. The cultivation spread along the Silk Road, which ranged from the Mediterranean through Asia and to China. This drug caused the spark for the Opium Wars of the mid-1800's. Opium was used in ancient Greece and Roman culture as a powerful pain reliever. They also used the plant to stimulate sleep and give relief to the bowels. Morphine was extracted from the opium resin for the first time in 1803. Morphine is ten times more powerful than processed opium. Heroin was first synthesized in 1874 and was introduced for medical purposes in 1898. For years doctors were unaware of its addiction potential. In 1903 heroin abuse was at an all time high in the United States. All use of heroin was made illegal by federal law in 1924<sup>58</sup>.

#### *How does it work*

The poppy contains chemicals, which might have sedative effects. The drugs that are made from the poppy plant are known as opiates. Opioids works by attaching themselves to specific proteins that are known as opioid receptors. When the drug attaches to these receptors they block the transmission of pain messages to the brain. Opiates induce euphoria by affecting the brain regions that control pleasure. The users of these drugs report felling warm, drowsy, and happy. Opioids relieve stress by creating a relaxed detachment from pain, desires, and activity<sup>59</sup>.

#### *Uses*

The extracts from the poppy flower are mostly used to relax smooth muscle tone, which makes them useful in treating diarrhea and abdominal cramping. The extract is also used as a sedative analgesic and antitussive. Poppy seed oil is also used for chemotherapy delivery and to diagnose fistulae<sup>60</sup>. Poppy is also used to treat anxiety, insomnia, aches, bed-wetting, and diseases of the bladder and liver<sup>61</sup>.

#### *Common Brand Names in the USA that use that plant as an ingredient*

There are many different drugs that contain the active ingredient of poppy as their main ingredient including: Morphine, Codeine, OxyContin, Darvon, Vicodin, Fentanyl, Dilaudid, Demerol, and Lomotil<sup>59</sup>.

#### *Side Effects*

There are no known side effects for poppy seeds eaten directly. Side effects for the opioids derived from the poppy are constipation, drowsiness, potential addiction, and nausea and vomiting<sup>62</sup>. Side effects from short-term use of heroin include shallow breathing, uncontrollable

itching, and clouded mental function. Long-term effects from heroin include heart problems, liver disease, seizures, and infectious diseases spread by the needles<sup>63</sup>.

### *Toxicity*

Ingestion of any part of the poppy plant besides its seeds can result in sedation or a euphoric state. The plant is poisonous to cats and dogs. The alkaloids found in poppy flowers affect the central nervous system<sup>64</sup>.

## **Part 6: Cinchona Jesuit's Bark**

### *Common Names*

The Cinchona plant goes by many names including Bois aux Fièvres, Cinchona calisaya, Cinchona carabayensis, Cinchona ledgeriana, Cinchona officinalis, Cinchona pubescens, Cinchona succirubra, Chinarinde, Cinchonine, Écorce du Pérou, Écorce de Quina, Écorce de Quinquina Rouge, Fiebrerrinde, Jesuit's Bark, Kina-Kina, Peruvian Bark, Poudre des Jésuites, Quina, Quinine, Quino, Quinquina, Quinquina Gris, Quinquina Rouge, and Red Cinchona Bark<sup>48</sup>.

### *Scientific Names*

The scientific name is Cinchona Officinalis and Cinchona pubescens.

### *Picture*



### *Description of the common structure of the plant*

Cinchona grows into a size that resembles a large shrub to a small tree. They grow about fifteen to forty five feet in height with evergreen vegetation. The leaves that grow on the tree are opposite and rounded and four to fifteen inches long. The flowers vary from white to pink to red. The fruit is a small capsule that contains lots of seeds. The bark of the tree is what houses the medicinal properties. The bark of the tree is stripped dried and powdered for medicinal use<sup>49</sup>.

### *Natural Habitat*

The tree is native to South America and was introduced to Sri Lanka and Java in the nineteenth century. The tree is most native to the Andes Mountains located in Ecuador and is often found 900 to 12,000 feet above sea level. The tree can grow in many different habitats including

agricultural areas, along coastlines, natural forests as well as planted forests, grasslands, disturbed areas, and among shrubberies. The tree grows the best in areas that are disturbed and that have had recent fires. Since the native area of the tree is very inhospitable for the average human to live, the tree was planted other places. Today the tree is considered invasive in many places where it was grown and there has been an overgrowth of the tree in recent years<sup>50</sup>.

#### *Discovery of the Plant for a medicinal use*

The first European that was healed by the bark of the cinchona tree was believed to be the Countess of Chinchon. She has contracted an attack of fever while visiting Peru in 1630. This is also where the tree gets its name. It is also said that the bark first entered Europe for use by missionaries who were returning from South America. The use of cinchona was the first treatment of its kind in Europe for treating fevers besides primitive methods, for example, bloodletting and amputation. Robert Taylor is credited for the elaboration and spread of cinchona bark therapy. The treatment was taken as a powder until the 1850's when quinine was extracted from the bark. Today, even though it is found that there are side effects, it is still known as a very effective way to treat some people with malaria<sup>51</sup>.

#### *How does it work?*

The bark works by stimulating saliva and stomach gastric juice secretion. The active ingredient that is found in it is known as quinine. Quinine is a chemical used to treat malaria<sup>48</sup>. Quinine works by killing the parasites passed into your body from the bites of infected mosquitoes. Quinine attaches itself to the DNA of the parasite. This blocks the parasite from reproducing. Once the parasite can no longer copy itself, the body can catch up, fight off the original infection, and recover<sup>53</sup>.

#### *Uses*

Cinchona is used to treat malaria, hemorrhoids, varicose veins, colds, leg cramps, influenza, malaria, fever, cancer, mouth and throat diseases, enlarged spleen, muscle cramps, loss of appetite, and stomach discomforts<sup>48</sup>.

#### *Common Brand Names in the USA that use the Plant as an ingredient*

One common brand name that contains the cinchona's active ingredient quinine is Qualaquin. Quinine and Cinchona bark is also sold in the homeopathic form. Many doctors believe that Qualaquin also helps people who suffer from leg cramps. This is an inadvisable method according to the FDA. In fact, in 2006 alone there were 38 reports of serious adverse effects from this medication when it was reported that 55% of the people were using it for leg cramps<sup>54</sup>.

#### *Side Effects of the Drug*

Cinchona bark appears to be safe when taken in appropriate doses. When it is taken in large amounts occasionally an overdose can occur. Symptoms of an overdose include ringing of the ears, headache, nausea, diarrhea, bleeding, allergic reactions (hives and a fever), and vision disturbances<sup>48</sup>. Qualaquin side effects include serious, life-threatening bleeding problems, kidney injury, unusual bleeding, bruising, bleeding gums, severe nose bleeds, dark urine, black tarry or bloody stools, and unusual purple, brown, or red spots on the skin<sup>55</sup>.

### *Toxicity*

The cinchona tree has no parts of it that are poisonous. As stated above consuming too much of the bark or too much of the active ingredient quinine can cause toxic effects<sup>55</sup>.

## **Part 7: Podophyllum the Umbrella Plant**

### *Common Names:*

There are many different names that this plant is called including: American Mandrake, Citron Sauvage, Citronnier, Devil's Apple, Duck's Foot, Ground Lemon, Himalayan Mayapple, Hog Apple, Indian Apple, Indian Podophyllum, Ipécacuanha de la Caroline, Mandrake, Mayapple, Pa Giao Lian, Pied de Canard, Podófilo, Podophyllin, Podophyll Pelati Rhizoma/Resina, Podophylle, Podophylle en Bouclier, Podophylle à Feuilles Peltées, Podophylle Indien, Podophylle Pelté, Podophyllum emodi, Podophyllum hexandrum, Podophyllum peltatum, Pomme de Mai, Raccoon Berry, Sinopodophyllum emodi, Umbrella Plant, Vegetable Calomel, Vegetable Mercury, Wild Lemon, Wild Mandrake<sup>13</sup>.

### *Scientific Names:*

The scientific name for this plant is *Podophyllum peltatum*<sup>14</sup>.

### *Picture:*



### *Description of common structure of the plant:*

The plant starts as a single stem and grows twelve to eighteen inches tall and sprouts one to two deeply divided umbrella-like pale green leaves. It is one of the first plants to emerge in early spring. At first the leaf is folded around the stalk and then slowly opens like an umbrella<sup>19</sup>. If a plant has only one leaf it will not flower. If a plant has two leaves a small 6-9 petal white flower blooms in early spring. The flowers are eye-catching, but the leaves often hide them. The flower creates an edible green fruit called a may apple. This fruit turns gold when ripe and is used to make preserves and jellies<sup>14</sup>. The flavor of the fruit is bland and looks like an overripe melon.

Long-tongued bees, for example, bumblebees pollinate the flowers<sup>18</sup>. It is one of the first plants to emerge in early spring.

#### *Natural Habitat*

The natural habitat for this plant presently is the eastern half of the United States and Canada ending with the western border of Texas, Oklahoma, Kansas, and Nebraska<sup>17</sup>. This plant prefers light sunlight to light shade and moist to slightly dry conditions. It is found mostly in deciduous woodlands, open woodlands, small woodland openings, and open woodlands<sup>18</sup>.

#### *Discovery of the Plant for a Medicinal use:*

The early Americans used podophyllum resin as a cleansing and anthelmintic as a healing method for snakebites as well as for poison. In the 1864 version of the British Pharmacopeia Podophyllum was a common ingredient in many medicines including Carter's Little Liver Pills. This plant also has anticancer activity. In 1942, a study was published that demonstrated the effectiveness of a 25% topical application of podophyllum in mineral oil for the short-term treatment of condylomas<sup>20</sup>.

#### *How does it Work:*

The main reason for all the medicinal properties of this plant is due to the resin of the plant, which contains sixteen known active compounds. Some of these compounds are podophyllotoxin, picropodophyllin, podophyllic acid, alpha and beta peltains, and quercetin. About three to six percent of the dry weight of podophyllum is comprised of the two flavonoids quercetin and kampherol. Unfortunately, the demand for podophyllotoxin for the use of semisynthetic derivatives is much greater than the available supply. This species is currently listed as an endangered species because of this. Although scientists are able to synthetically make this compound in labs, it is a very expensive process and is not reasonable in today's economy. Podophyllotoxin and alpha peltatin in the leaves are inversely proportional which may indicate that one day we will be able to use genetics to grow more of certain compounds. These chemicals ultimately help us medicinally by stopping cell duplication and new growth in tissues undergoing rapid cell division. Podophyllotoxin binds to tubulin and blocks cell division in metaphase. This plant is also highly lipid soluble, which is why it is so easily dissolved through the skin and GI tract<sup>20</sup>.

#### *Uses:*

In today's day this plant is used to help cure genital warts, plantar warts, HIV-related leukoplakia, rheumatoid arthritis, uterine cancer, jaundice, liver ailments, fever, syphilis, hearing loss, laxative, abortions, and gynecologic infections<sup>13 16</sup>.

#### *Common Brand Names in the USA that use the plant as an ingredient:*

There are several drugs for many different uses that contain podophyllum resin, For the treatment of HPV brand names include the following: Podocon-25, Podocon, Podofin, and Pododerm. For the treatment of warts the drug is marketed under the name Condylox<sup>16</sup>.

#### *Side Effects of the drug*

This plant is extremely unsafe to take by mouth. If taken by mouth it will cause nausea, vomiting, dizziness, headache, spasms, fever, visual changes, hallucinations, low blood pressure,



bone marrow problems, and kidney problems. It can take up to 13 hours for the poisonous effect to happen. In order to safely take the drug it must be absorbed through the skin<sup>13</sup>.

*Toxicity:*

This plant is poisonous to humans and livestock. The root is the most toxic part of the plant. Even just touching the root can cause dermatitis or other skin issues in humans. Livestock poisoning occurs mainly in the spring, although the plant is seldom eaten in large amounts by livestock. The toxic principles include the bitter sticky substance and podophyllin. Podophyllin is a mixture of 16 or more physiological active compounds. These are split into two groups being the lignans and flavonols. These are extracted with alcohol and then precipitated in water<sup>21</sup>.

**Part 8: Saw Palmetto**

*Common Names*

The most common name for this plant is saw palmetto, other common names include the following: American Dwarf Palm Tree, Baies du Chou Palmiste, Baies du Palmier Scie, Cabbage Palm, Chou Palmiste, Ju-Zhong, Palma Enana Americana, Palmier de Floride, Palmier Nain, Palmier Nain Américain, Palmier Scie, Sabal, Sabal Fructus, and Sabal serrulata.

*Scientific Names*

The scientific name for this plant is *Serenoa repens*.

*Picture*



*Description of common structure of the plant*

This plant is the most common palm in the United States. It grows in a shrub or bush form that is usually in between two to seven feet. The shrub grows horizontally with branches on their stems. It also can grow in a tree form that grows anywhere from twenty to twenty-five feet. In tree form the peak towers above snarled branches. The stems run parallel to the soil and eventually are able to form shoots ten to fifteen feet. There are two types of palms that are easily recognizable. The first one which is much more common is yellowish green, the second one that is less common is a blue-green color. This plant is very easily recognized by its multiple palm fronds that grow from its horizontal stems. These fronds start growing slightly below ground level. The palm fronds are evergreen and fan shaped and they measure about three feet in length. The plant got its

common name from the sharp spines of the petioles. The flowers are white and grow from the leaves. The fruit is yellow-green when it is not yet ripe and eventually turns blackish blue as it ripens. The fruit is fleshy and shaped in an ellipsoid form<sup>35</sup>. This plant serves its place in gardens as an ornamental plant in gardens, especially the bluish green form. They are often used to line gardens, in clumps in front of larger palms, underneath large palms, and as foundation plantings. This plant is very sharp so it is advised that it gets planted away from where children play<sup>36</sup>.

#### *Natural Habitat*

Both of the types of palms grow in a narrow belt across Florida's east coast from St. John's to Dade Counties. They are occasionally seen more inland in Polk and Highlands counties. This plant is also found in coastal plains from South Carolina to southeastern Louisiana. Saw Palmetto must stay in an average annual temperature between 36 degrees Celsius to 97 degrees Celsius. This plant grows best in dry well-drained soils and not swampy soils<sup>35</sup>.

#### *Discovery of the Plant for a Medicinal Use*

The regions first inhabitants saw the Saw Palmetto as a nuisance. They did not realize the benefits of the plant until they noticed that the animals would go out of their way to eat the berries off the palm. The settlers then purposefully started feeding their livestock the berries and noticed that the animals who they fed the berries were much healthier than the animals they did not feed the berries. This is when the settlers decided to try how it would work on humans. In 1879 Dr. Reed published a study on the plant, the doctors found the fruit to be a nutritive tonic, a useful diuretic, and a slight sedative. The doctors recommended using the berries to treat wasting diseases and to help increase flesh growth. The Native Americans in the area had some more advanced uses for the tree. For example they used the bush to treat dysentery, stomachaches, indigestion, respiratory infections, snakebites, bug bites, enlarge breasts, and increase sexual desire. Modern research has shown that it reduces the size of a prostate swollen with age<sup>37</sup>.

#### *How does it work?*

Its action seems to be based on the fact it increases available testosterone significantly. Although the prostate appears to shrink, it really decreases the size of the inner lining that puts pressure on the tubes that carry urine.

#### *Uses*

The berries of the saw palmetto are used as a treatment for benign prostatic hyperplasia or enlarged prostate gland. They are also used as a diuretic to tone the bladder, improve urinary flow, and decrease urinary frequency. It is said that it may also help prevent against prostate cancer. The berries are also an appreciated source of food for wildlife in the southeastern region<sup>36</sup>.

#### *Common Brand Names in the USA that use the plant as an ingredient*

There are no FDA regulated products that contain saw palmetto. There are a variety of homeopathic remedies that contain the plant.

#### *Side Effects of the drug*

The side effects from this plant are relatively mild. Some of the most common side effects are dizziness, headache, vomiting, constipation, and diarrhea. Some of the less common side effects include liver or pancreas problems. It is also said that saw palmetto can cause blood clotting and should not be taken near a scheduled surgery<sup>38</sup>.

#### *Toxicity*

There is little to no toxicity with the use of saw palmetto.

### **Part 9: Black Cohosh the Rattlesnake Root**

#### *Common Names:*

Common names of this plant include the following: Actaea macrotyis, Actaea racemosa, Actée à Grappes, Actée à Grappes Noires, Actée Noire, Aristolochiaceae Noire, Baie d'actée, Black Cohosh, Baneberry, Black Aristolochiaceae, Black Snakeroot, Bugbane, Bugwort, Cimicaire à Grappes, Cimicifuga, Cimicifuga Racemosa, Cimicifuge, Cohosh Negro, Cohosh Noir, Cytise, Herbe aux Punaises, Macrotys, Phytoestrogen, Phytoestrogène, Racine de Serpent, Racine de Squaw, Racine Noire de Serpents, Rattle Root, Rattle Top, Rattlesnake Root, Rattleweed, Rhizoma Cimicifugae, Sheng Ma, Snakeroot, and Squaw Root<sup>39</sup>.

#### *Scientific Names*

The scientific name for this plant is *Actaea racemosa* and *Cimicifuga racemosa*<sup>39</sup>.

#### *Picture*



#### *Description of common structures of the plant*



The Black Cohosh is a perennial herb with a small erect stem; it can reach a height of when in flower. This plant is in the same family as buttercups (*Ranunculus*). The leaves are deeply toothed with a glossy dark green look. The flowers of the black cohosh are white and fluffy and can reach up to two feet tall. The fruit is oval shaped with seeds arranged into two rows. The flower is known for its bittersweet smell<sup>41</sup>.

#### *Natural habitat*

This plant is native to North America. It grows freely in shady woods in Canada and in the United States. The center of distribution seems to be the Ohio Valley, but the plant grows from Alabama as its southern border to Canada as its northern border. Although the plant might seem abundant in the wild, it has declined due to habitat loss and over-harvesting<sup>41</sup>.

#### *Discovery of the plant for a medicinal use*

This plant was used in Native American medicine for the treatment of malaise, gynecological disorders, kidney disorders, malaria, rheumatism, colds, coughs, constipation, hives, backaches, the induction of lactation, and sore throats. The Native American translation to the word cohosh is “rough”, this refers to the texture of the root. In the 1800’s in the United States, it was used as a home remedy for rheumatism, fevers, diuretic, and to induce menstruation<sup>42</sup>.

#### *How does it work?*

It is not known completely how the black cohosh works. There are some studies that prove that black cohosh shows estrogenic activity, while other studies that disprove this theory. One compound that has been studied in the black cohosh is fukinolic acid. Fukinolic acid is shown to have estrogenic activity *in-vitro*. Some other active compounds in the plant include triterpene glycosides which include actein and cimicifugoside, the resins cimicifugin, and caffeic and isoferulic acids<sup>40</sup>. Some of these compounds work on the immune system and have effects in the body’s defense against diseases. Others help the body to reduce inflammation, or affect the brain and nerves. For example, they work similarly to serotonin. In some parts of the body black cohosh can increase estrogen while in other parts it can decrease estrogen<sup>39</sup>.

#### *Uses*

There are several uses for the herb black cohosh that are used in practice today. It is said that black cohosh is effective for relief from some menopausal symptoms, for example, hot flashes. Some women take black cohosh for hot flashes that are related to breast cancer treatments. There are also some people who use black cohosh for the induction of labor, to heal weak bones, acne, anxiety, bug bites, cough, fever, mole remover, painful menstruation, premenstrual syndrome, rheumatism, snakebite, sore throat, and wart removal<sup>39</sup>.

#### *Common Brand Names in the USA that use that plant as an ingredient*

There are no prescription drugs that contain black cohosh. Black Cohosh is regulated by the FDA and although not all uses for the herb are certified it is predicted that it will be used more often in the treatment of menopause, breast cancer, and menstruation in coming years<sup>40</sup>. In the natural health aisle one might find Black Cohosh in pills, extracts, or teas. Some examples are Nature’s Way Black Cohosh Root, Black Cohosh by Nature’s Answer, and Enzymatic Therapy Black Cohosh tablets.

#### *Side Effects*

There are some potential side effects from the use of this herb. The first is its effect on the liver, which can aggravate the function of a damaged liver. Symptoms of a liver disorder include abdominal pain, dark urine, or jaundice. There have been a couple rare cases in which the patient reports hepatitis or liver failure. Some other side effects include stomach discomfort, headache, or rash<sup>39</sup>.

#### *Toxicity*

While the plant is edible, constant use can lead to liver toxicity. Hepatotoxicity can develop into acute hepatitis. Many of these studies have been criticized for not being controlled or reproducible. In some cases supplements containing black cohosh must have a warning label attached<sup>41</sup>.

### **Part 10: Flax the Plant with a Thousand Uses**

#### *Common Names*

Common names for flaxseed include the following: Alasi, Aliviraaii, Brown Flaxseed, Brown-Seeded Flax, Common Flax, Echter Lein, Flachs, Flachssamen, Flax, Flax Hull, Flax Lignans, Flax Meal, Flax Seed, Gemeiner Flachs, Golden Flax, Graine de Lin, Kattan, Keten, Leinsamen, Lignanes de Lin, Lignans, Lin, Lin Commun, Lin Oléagineux, Lin Textile, Linaza, Lini Semen, Linho, Lino, Lino Comune, Lino Mazzese, Lino Usuale, Linseed, Linseed Flax, Lint Bells, Linum, Linum crepitans, Linum humile, Linum usitatissimum, Malsag, Phytoestrogen, Phyto-&coeligstrogène, Saatlein, Ta Ma, Tisii, and Winterlien<sup>43</sup>.

#### *Scientific Names*

The scientific names for flaxseed are *Linum usitatissimum*, *Linum perenne*, and *Linum lewisii*<sup>43</sup>.

#### *Picture*



#### *Description of common structure of the plant*

Flax plants have many thin, small, alternate, simple leaves that lack stalks. The flowers are grown in racemes or cymes. The sepals, petals, and stamens grow in fives and the fruit is a capsule. The flax is a short-lived, semi-evergreen perennial forb. Occasionally it appears to have a woody base. The flowers range in color from yellow to blue to red and can potentially be toxic to

livestock. The flowers only stay in bloom for six weeks. The flax species are renowned for their erosion control as well as aesthetic value. Although they are not considered a weed or a pest flax does take to the soil very easily and has the potential to spread into touching areas. The seeds of the plant are harvested in late July till mid August. The seed is mature when the capsule is dry and the seed is dry and the seed is hard and dark in color<sup>46</sup>.

### *Natural Habitat*

Blue flax is indigenous to Eurasia and has been successfully planted in the United States. Flax can be found from Alaska to California and east to Minnesota. The flowers often grow in mixed grass, sagebrush, shadscale, piñon-juniper, mountain brush, and aspen communities as well as in openings in coniferous forests. Flax grows and survives best on well-drained soils. Flax also has great toleration to cold winters and droughts. They also can thrive in weakly basic or weakly acidic soils. These plants are even fire resistant<sup>46</sup>.

### *Discovery of the Plant for a medicinal use*

In many historical ancient documents flax is described often by its strong connection with linen fibers. For example, linen is described in The Iliad, as well as in the Bible, as well as by the physician Hippocrates in some of his works. It is documented that the king in 8<sup>th</sup> century France viewed flax very highly and ordered his people to consume flax to maintain good health and to prevent disease. In 1986 Nature's Distributors Inc. introduced flaxseed oil in the United States. The company used research from Johanna Budwig who discovered in the 1950's that flaxseed plays an important role in the function of all the body's processes from normalizing blood pressure to boosting the immune system<sup>44</sup>.

### *How does it work?*

The shell of the flaxseed is an excellent source of fiber and omega-3's. If flaxseed is taken before a meal the person who ingests the flaxseed will feel less hungry because the flaxseed fiber makes people feel full. Scientists believe that this fiber binds with cholesterol in the intestines and prevents the cholesterol from being absorbed. Flaxseed also makes platelets less sticky. These effects that flaxseed has ultimately lowers a person's risk of atherosclerosis. Flaxseed is also used as a supplement to treat some cancers, for example breast cancer. This works because the chemical lignans that are found within the flaxseed act similar to estrogen. These chemicals are so close that lignans compete with estrogen in some reactions. For this reason, natural estrogen becomes less powerful in the body. It is thought that this reaction can help slow down the progress of some types of cancers that need estrogen to grow. Flaxseed is also thought to improve kidney function by decreasing the thickness of blood, reducing cholesterol levels, and reducing swelling<sup>45</sup>.

### *Uses*

There are many different uses for flaxseed and flaxseed oil. One of the best uses of the plant is to lower cholesterol in people who have high cholesterol. It is also useful in lowering hemoglobin A1C, improving kidney function, breast pain, constipation, prostate cancer, menopausal symptoms, obesity, cardiovascular disease, cancer of the colon or rectum, diverticulitis, irritable bowel syndrome, upset stomach, bladder inflammation, lung cancer, breast cancer, skin irritation, and attention deficit-hyperactivity disorder (ADHD)<sup>45</sup>.

### *Common Brand Names in the USA that use the plant as an ingredient*

Flax is sold in grocery stores, pharmacies, and natural food stores in one of two forms. The first is ground flaxseed, which is used homeopathically for hormone therapy treatments. The second is Flaxseed oil, which is used for the lowering of bad cholesterol<sup>45</sup>.

#### *Side Effects of the drug*

Possible side effects for flaxseed or flaxseed oil are diarrhea, gas, and nausea. Another possible effect is the improper absorption of prescription medication; doctors recommend that you wait two hours to take flaxseed oil after taking a prescription. Flaxseed also has the chance to interfere with x-rays<sup>47</sup>.

#### *Toxicity*

Raw or unripe flaxseeds are said to be poisonous and should not be eaten unless cooked into food<sup>43</sup>.

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