Ginseng

by Deanne Tenney

Woodland Publishing
Pleasant Grove, UT

© 1996
Woodland Publishing, Inc.
P.O. Box 160
Pleasant Grove, UT
84062

The information in this book is for educational purposes only iand is not recommended as a means of diagnosing or treating an illness. All matters concerning physical and mental health should be supervised by a health practitioner knowledgeable in treating that particular condition. Neither the publisher nor author directly or indirectly dispense medical advice, nor do they prescribe any remedies or assume any responsibility for those who choose to treat themselves.

CONTENTS

Ginseng 5
Ginseng Varieties . . . 6
History 9
The Ginseng Plant . . . 12
Cultivation and Export . . 13
Adaptogen Properties . . . 15
Research 17
Physical and Mental Stamina . 17
Stress 19
Cholesterol 20
Radiation 21
Hypoglycemic Activity . . 21
Alcoholism 22
Cancer 22
Reproductive System . . . 23
Traditional Uses 24
Chemical Composition and
Nutritional Value . . 26
Toxicity and Safety . . . 27
Conclusion 28
Endnotes 29

GINSENG

Asian or Korean *(Panax ginseng)*
American *(Panax quinquefolium)*
Siberian *(Eleutherococcus senticosus)*

Ginseng and ginseng products are increasing in popularity. They have been highly valued for thousands of years in many different cultures for their medicinal properties. Ginseng is probably the most highly regarded tonic and adaptogenic herb in the world. There are many different varieties of the ginseng plant grown throughout the world that are used for traditional medicine. All of the most common species of plants known as ginseng have similar reactions in the body. Ginseng is often used to maintain and support health as a tonic rather than treating a particular disease in the body.

Panax ginseng, also known as Asian, Korean or Chinese ginseng, is the type most often studied and the most abundant. The genus name for Asian ginseng is *Panax ginseng* from the Greek word meaning "all healing."

The Wild American variety, *Panax quinquefolium*, is

thought to have properties similar to the Asian plant. Most consider it to be less stimulating than the Asian root.

The Siberian ginseng, *Eleutherococcus senticosus*, grown in Russia originally and now throughout the world, is not considered to be "true ginseng," though scientists have reported common pharmacological features to the Panax. The compounds in the Siberian variety, eueutherosides, are not the same as the ginsenosides found in the American and Asian, but they do have similar chemical activity. The American, Asian and Siberian ginsengs are all considered to be superior adaptogens.[1]

Ginseng Varieties

This valued plant known as ginseng can be purchased in different forms. White ginseng is what the root is called before any processing occurs. White is the natural color of the root after it is harvested and washed. When dried, the root becomes a light brown color. When the ginseng root is processed using steam and heat, it becomes red. This procedure is done in order to preserve the plant and its constituents. The heat process is thought to help stimulate the active properties in ginseng and some herbalists believe that the red ginseng is more stimulating than the white.[2] There are a variety of

types as well as grades of ginseng and ginseng products. This is due in part to differences in age, source, part of the root used and the preparation. The old wild plants are the most desirable because of their nutritional content which is believed to increase with age.

The western world often treats the different ginseng varieties the same. But in traditional Chinese medicine, the various types are thought to possess distinct properties. They are each valued for their differences and used for divergent purposes.

The Asian variety of ginseng (Panax ginseng) grows principally in Korea, Japan and China. Centuries ago the ginseng plant grew wild and was abundant. But because of the claims of its healthy properties, it has been depleted in its natural state almost to the point of extinction. Now it is grown commercially for export and local medicinal use. The Asian ginseng is often exported to the western world. It is unfortunate but most of the ginseng grown now is cultivated using pesticides to promote mass production. The Asian plant has similar composition to the American variety with some variations. It contains ginsenosides, the active ingredients, between one and three percent. There are at least thirteen of these different triterpenoid saponins, referred to as ginsenosides. The Asian contains Rb1, Rb2, Rc, Re, and Rg1.[3]

The Wild American variety of ginseng is still found in

its natural state. This variety grows naturally and organically but is hard to find. There is an increasing amount of American ginseng being cultivated and grown for commercial use. Fertilizers and pesticides along with modern farming equipment aid in the production and high yield of this variety of ginseng. The American ginseng is thought to be less stimulating than the Asian variety. The American ginseng contains primarily the ginsenosides Rb1 and Re and does not contain Rb2, Rf and sometimes not Rg1.[4] Generally, the American ginseng is thought to possess more of a sedative effect than the Asian ginseng. Differences in the chemical structures of the ginseng roots makes the identification process between the varieties easier.

Siberian ginseng, though not considered a "true ginseng," contains similar properties to the other varieties. It was discovered in Siberia but is now cultivated around the world. Some of the saponins found in this variety are not the same as the Asian and American. But is known to have the same tonic and stimulant effect as the "true ginseng."[5] It is believed to be less potent than either the American or Asian ginsengs. Research has documented may of its valuable adaptogenic capabilities.

HISTORY

Ginseng is one of the oldest and most beneficial herbs in the world. It is probably the most popular adaptogenic herb used in traditional medicine. Shen-Nung's Pharmacopoeia (A.D. 206-220) rated it the highest and most potent of herbs. People in northern China began using ginseng thousands of years ago. In fact, in 1904, it was suggested that all of the 400 million individuals who lived in China were familiar with and used ginseng to some degree.[6] It was used to restore the "yang" quality in the body to heal disorders such as tuberculosis, coughs, diabetes, diarrhea, indigestion, nausea, kidney problems, rheumatism, gout, infected sores, insomnia, leprosy, and impotence. It was often used, and is still today, as a tonic to rejuvenate the body after an illness or prolonged stress.

Early herbalists recognized the shape of ginseng as resembling a human figure. They felt this was a sign that the root was valuable for healing the entire body.[7] It is often referred to as the "man root" and is the subject of many legends and folk history. Proponents of the "Doctrine of Signatures" felt that because of the roots shape, it could heal any disorder in the body.[8] The Chinese were so enthralled with the ginseng root that they even fought wars over the land used for growing it.

The Native Americans also enjoyed the healing, tonic benefits of the American ginseng plant. It was valued by the natives long before the arrival of the Europeans. Many tribes knew well the therapeutic powers of ginseng. They used it to relieve nausea, indigestion, vomiting, stomach problems, bronchitis, earaches, bleeding, asthma, headaches and as an aphrodisiac. The Cherokees referred to ginseng as "The Plant of Life" and used it to help relieve female problems such as menstrual cramps and excessive bleeding. The Mohawks were familiar with the value of ginseng and used it to help relieve fevers accompanying illness.[9] The Seneca tribe was known to use ginseng to help elderly individuals prevent difficulties associated with the aging process.[10] The Native Americans saw nature as a friend and looked for healing agents within the plant kingdom. American ginseng was used and valued for its medicinal properties. Folklore and customs are now being investigated in this world of modern medicine to rediscover the natural approach in healing and health.

Father Jurtoux has been credited with discovering the American ginseng. He was a French priest transferred from China to Canada around 1709. He collected some of the root near Montreal because they resembled the Panax ginseng. He shipped some back to China where it had a favorable reception. The French soon began

employing some of the Native Americans to collect and then exported the American ginseng to China. Word of this fabulous and profitable ginseng spread to the United States. Soon the American ginseng was gathered and exported to China by Americans. Ginseng was a popular item in the early frontier days. It was used not only for trade but for consumption locally. George Washington mentioned ginseng in his personal journal, and famous frontiersmen such as Daniel Boone and Davy Crockett were known to have been involved in the exporting of ginseng.

THE GINSENG PLANT

The Asian ginseng grows to approximately two feet in height. It has five foliate leaves with small clusters of green-white flowers that are followed by bright red berries. The plant usually flowers during its fourth year of growth. The roots can grow up to 3-4 milliliters in diameter and to 10 centimeters in length. The older roots are the most valued. As the root ages, it takes on a two legged shape. The wild plant roots can grow much larger but are rare because of overzealous harvesting for commercial gain. It originally grew naturally in the wild damp fertile woodlands of northern China and Korea.

The American ginseng is found growing in shaded, wooded areas of the Northeast. Its natural habitat was under beech and maple trees, though those sources have been depleted and are now rare. The American ginseng plant grows from eight to fifteen inches. The plant consists of three large leaves and two small leaves originating from the same stem. It contains a cluster of yellow-green flowers, and red, edible berries follow. The root is usually two to three inches long and about an inch thick. The older roots take on a two-legged appearance.

The Siberian variety is found in Russia, China, Korea and Japan. It is not a “true ginseng” but does contain

similar adaptogenic properties. It grows in high elevations, up to 2500 feet, and in forest areas in lower elevations. Thorns cover the stems and its flowers are yellow (female) and violet (male). The flowers are followed by black berries. The roots of the Siberian ginseng are really underground stems.[11]

The age of the root is thought to be essential. The older roots are thought to contain more healing properties and are highly valued and sought after. Folklore suggests that the very old roots glow in the dark, revealing an inner light.[12]

Cultivation and Export

Ginseng is difficult to cultivate and requires a large capital investment. The plants need shade to thrive and are often grown among forest shade trees or under artificial shade. The Asian countries are not able to keep up with the demand for ginseng because of its popularity. The soil has been cultivated for so many years that some believe the nutrients have been depleted. This has increased the value of the American ginseng.

The American variety is found growing wild in cool wooded areas with rich soil in the eastern United States. Ginseng is grown commercially in Wisconsin, Michigan and even as far south as northern Florida, Alabama,

Louisiana and Oklahoma. Most of the commercial ginseng is grown in Marathon County, Wisconsin and cultivated under artificial shade. Marathon County seems like an ideal place for ginseng to grow as many serious athletes and marathon runners use ginseng to enhance their overall performance. In fact, many Olympic athletes take ginseng routinely. The soil in this area is well-drained acidic soil beneficial for growing ginseng. It is grown using fertilizers, pesticides and other chemicals to ensure adequate production and cultivation. Organically grown plants are available but may be hard to find. Wild ginseng grows in isolated patches in some areas of the country but most sources have been depleted. Some ginseng farmers in Wisconsin have been growing the plants for 90 years. Ninety-five percent of the American grown ginseng is sold to foreign markets, with most of it going to Hong Kong and then into China, Korea and Japan. About 45,000 kg. of the dried ginseng root and about the same amount of the wild root is exported annually.[13] The American variety sells for about twice as much as the Asian variety because it is thought to be of a higher quality. The Americans import a large quantity of the Asian and Siberian ginseng, which seems ironic. Wild ginseng of any variety is not as common now, because it has been foraged in its wild state and huge quantities exported for large profits. A special license is now

required to dig the wild roots.

Adaptogen Properties

Research on the Panax ginseng was first done to determine the adaptogen properties. Siberian ginseng does possess adaptogenic qualities, but its action is thought to be milder than Asian ginseng. The American ginseng has not been well studied or documented as to its adaptogenic properties, but it is known to have adaptogenic activity. Each of the ginseng varieties are thought to work as a general tonic on the body, increase energy and increase mental and physical abilities.

Ginseng has often been referred to as an adaptogenic herb. When taken for extended periods of time, it helps the body adapt to stress and brings the body into balance. It helps normalize and adjust the body's restoring and regulating natural immune response.[14] The word *adaptogen* is derived from the Greek work *adapto*, to adjust, and the suffix *gen*, producing. It helps to produce adjustments as needed in the body. This function is done without side effects or harm to the body.[15] Ginseng, as an adaptogen, has been used to help normalize blood pressure whether high or low. It helps to increase or slow output to restore equilibrium. Adaptogens help to modify the effects of environmental and internal stresses

from different forms such as chemical pollutants, radiation, weather, temperature changes, poor diet, exercise and emotional stress. It is used for many ailments in the body and even thought of as a universal cure-all.

RESEARCH

Many studies have been done to determine the effectiveness of ginseng in a variety of countries. Incomplete results have occurred in some instances. Long-term studies are most often recommended because ginsengs properties may not be seen in immediate experiments but are more effective when taken in small doses over a period of time. There have been enough credible studies done to now determine that high quality ginseng plants do contain active constituents known to be beneficial. Research has shown that the roots are effective against bronchitis and heart disease.[16] Ginseng has been found to reduce blood cholesterol, build the immune system, improve brain function and memory, increase physical stamina, stimulate the function of the endocrine glands and strengthen disorders of the central nervous system.

Physical and Mental Stamina

A study down in the late 1950s and early 1960s by

Brekhman and Dardymov in Russia involved an experiment with Soviet soldiers. They were studying the pharmacology and reactions of different varieties of East Asian ginseng. Some were given an extract of Asian ginseng and others a placebo before running a 3-kilometer race. Those given the ginseng ran faster with less fatigue than those given the placebo.[17] Other tests performed by Brekhman involved gauging reading capacity after taking ginseng. It was noted that not only was the work and reading ability improved, but the effects continued for up to six weeks after the treatment.[18]

Another study giving radio operators either an Asian ginseng extract or placebo. The group given the ginseng performed better with fewer mistakes. The ginseng helped to increase stamina and mental function.[19]

A study involving rats followed the results when they were put in extremely cold water and forced to swim for a long period of time. The rats given the Asian ginseng were able to swim longer than the control group which indicated anti-fatigue activity. It is also important to note that ginseng increased the recovery rate of the exposed rats. The process was initiated in order to see if the point of exhaustion could be increased with the addition of ginseng. The results were favorable.[20]

Ginseng seems to be able to help slow glycogen utilization in the muscles when exercising. Fatigue accom-

panying prolonged exercise is due in part to the depletion of glycogen and lactic acid build-up. Fatty acids are used as the energy source when there is enough oxygen available to reach the muscles reserving the glycogen stores to increase the body's performance and reduce fatigue.[21] Athletes may benefit from using ginseng to help improve and prolong their performance and abilities under stress during training and competition. Serious athletes throughout the world use ginseng regularly. Some Olympic athletes take ginseng daily to increase and enhance their physical performance.

Siberian ginseng has been found to help improve mental abilities in geriatric patients.[22] This may be of benefit to all individuals as they age especially those prone to senility and Alzheimer's patients. It is also thought to help an aging heart and brain tissue under stress and sustained work.[23]

Siberian ginseng has also been found to help increase energy and performance. Japanese medical researchers studied the extract of Eleuthero ginseng to determine anti-fatigue activity. The results showed increased physical performance and ability after taking the ginseng.[24]

Stress

Researchers became interested in studying the

Siberian ginseng after finding beneficial activity in the Panax ginseng. It was first found to contain adaptogenic properties. One study conducted during the 1960s in the former Soviet Union consisted of 2,100 adults, some normal and some considered to be under high stress. No adverse side effects were found and the results were positive with improvement in the stressed individuals.[25]

Stress is a condition that causes a disturbance in the body, whether it is from a physical or mental source. Asian ginseng helps to modify the effects of environmental and internal stresses from different forms such as chemical pollutants, toxins, radiation, weather, temperature changes, poor diet, physical trauma, exercise and emotional stress. Because of its adaptogenic properties, ginseng is able to adjust and balance the body functions when under stress.[26] Ginseng can help to balance the hypothalamic-pituitary-adrenal axis by normalizing the metabolic systems in the body when stress occurs.[27]

Cholesterol

A study in *The American Journal of Chinese Medicine* reported that Asian ginseng seemed to help moderate the effects of a high-cholesterol diet in both rats and humans. It was found to reduce total serum cholesterol, triglycerides and fatty-acid levels as well as raise the

HDL (good) cholesterol levels in the blood.[28] This is encouraging because of the positive effect of reducing blood cholesterol levels in the prevention of cardiovascular disease. High cholesterol (LDL) and triglyceride levels are a major factor in the development of atherosclerosis. Ginseng may be a supporting factor in the protection of atherosclerosis.

Radiation

Another study found that rats exposed to radiation damage lived twice as long when given ginseng. Their blood showed less damage due to the radiation.[29] Ginseng has been found to actually prevent the cells from radiation damage.[30] When damage does occur from radiation exposure, it is thought that ginseng speeds the healing process. Radiation exposure is considered by some natural health advocates to be one of the most dangerous stress agents to the immune system.

Hypoglycemic Activity

Hypoglycemic activity has been reported from studies conducted on Asian ginseng, which may be beneficial for diabetics.[31] It is interesting to note that ginseng increases serum cortisol levels in nondiabetics, yet it reduces serum cortisol levels in diabetics. This is benefi-

cial for diabetics. It is also another example of the adaptogenic properties of ginseng and it is important to note the necessity of using the whole plant rather than only a portion. The ginsenosides, responsible for much of ginsengs effects, do not contain hypoglycemic activity. The constituents responsible include glycans, adenosine, a carboxylic acid, a peptide and DPG-3-2.[32]

Alcoholism

American ginseng is recommended for use in treating alcoholism. The tonic effect helps the body when under stress as in the case of alcoholics with a physical addiction. The American variety is cooling, which is thought to be more effective and useful for this condition.[33] It may also help to prevent alcohol intoxication.[34]

Cancer

Even with many advances in the medical field, cancer rates continue to rise. One study found that ginseng may help reduce the risk of cancer. Researchers studied 905 pairs of cases and controls admitted to the Korea Cancer Center Hospital in Seoul. They were compared according to age, sex and date of admission. Individuals who consumed ginseng regularly had significantly lower risk for developing cancer. The extract and powder seemed to

possess the most beneficial effects. The more ginseng consumed, the better the preventive effects.[35]

Reproductive System

There has been a lot of interest in the reported aphrodisiac effects of ginseng. It is often marketed as a sexual stimulant. Yet the results of most studies have been inconclusive. Asian ginseng seemed to increase the sperm count in rabbits as well as the egg laying of hens in some studies. A Korean study found the mating behavior of rats to increase with ginseng consumption.[36] Hormonal secretions are thought to be stimulated by ginseng which may be one reason for its use as an aphrodisiac.[37] Ginseng has also been found to influence the growth of the testes and testosterone levels.[38]

Studies on Siberian ginseng have found its tonic effect to help with sexual function. It was found to increase the sperm count in animals.[39] Ginseng has been used for thousands of years to strengthen the male reproductive system. Clinical studies and historical use seems to support the claims of ginseng use for the reproductive system. It is highly recommended alone or in combinations for male and female health. However, it is generally not recommended that women take it over long periods of time.

TRADITIONAL USES

Folk tales and myths surround the ginseng plant in all its varieties. It was thought to be the ultimate herb for strength, vigor and a long life. The Asian ginseng used throughout China was thought of as the ultimate cure-all. It has been highly esteemed and used for thousands of years.

Ginseng is stimulating on the entire body to help overcome stress, increase longevity, fatigue, weakness, mental fatigue, improve brain cell function, and benefit the heart and circulation. It is also used to normalize blood pressure, reduce cholesterol levels, and to prevent artherioslcerosis. It is used to help protect the body against radiation and as an antidote to drugs and toxic chemicals. Ginseng is often given alone or in combination with other herbs to restore balance in the body.

Folk medicine recommends ginseng for many ailments such as amnesia, cancer, atherosclerosis, asthma, diabetes, coughs, heart, fear, fever, epilepsy, hypertension, malaria, impotence, insomnia, longevity, swelling, sores and vertigo. It is probably safe to say that ginseng

is one of the most popular and most prescribed natural remedies for just about anything.

Ginseng has been used to rejuvenate the body and maintain health. It is used to promote regeneration at times of stress on the body. It also helps when the body has undergone illness or surgery. It is also thought to help increase longevity and keep the body looking young with less signs of aging. It is not only promoted for physical longevity but also for mental function.

Ginseng is often used to help strengthen the male reproductive systems. It is thought to be especially healing on the prostate gland. It is also used as an aphrodisiac. Ginseng is also thought to produce some testosterone in women, and for this reason, is not recommended for long periods of time. Panax ginseng is thought to increase male hormone production.

CHEMICAL COMPOSITION AND NUTRITIONAL VALUE

There are at least thirteen known triterpenoid saponins, referred to as ginsenosides in the different ginseng plants. These are thought to be the most important active constituents.[40] Many other components, thought to be minor, have also been isolated. The composition of each plant varies greatly according to the age, location, species and curing method.[41] Some of the plants tend toward stimulating and warming, referred to as *yang* in Chinese traditional medicine, while others are relaxing and cooling, referred to as *yin*. The Asian variety has more of a stimulating effect because of its concentration of ginsenosides. The American is thought of as being more cooling and acting as a general body tonic. Many people throughout Asia actually prefer the American variety because of its cooling effect.[42]

Ginseng contains vitamin A, which is necessary for a

healthy immune system, essential for mucous membranes, healthy eyes and skin, and to prevent and heal colds, flu, and fevers. It also contains vitamin E, which is essential for a healthy heart and circulatory system. B-complex vitamins, thiamin, riboflavin, B12, and niacin are important for maintaining healthy nerves, skin, hair, eyes, liver and muscle tone in the gastrointestinal tract. Ginseng also has calcium, iron, phosphorus, sodium, silicon, potassium, manganese, magnesium, and sulphur.

Toxicity and Safety

Side effects and toxicity related to ginseng use are rare. The FDA categorizes ginseng for use as a tea as "generally recognized as safe." Some reports of toxicity have not been recognized by reputable herbalists because of poor observations and data.[43] Many of the reported toxic effects do not even cite the particular species of ginseng. Most reputable studies report low risk and an absence of side effects even after prolonged or excessive use.[44]

It is always important to buy ginseng and other natural health care products from reputable companies who test their products for purity. Quality control measures are a high priority with many companies. The ginseng market has been full of abusers who may mix cornstarch or other ingredients with the ginseng and sell it as a pure

product at the full price. Some ginseng products have been sold which do not contain any ginseng. Reputable companies follow strict guidelines to avoid such problems.

CONCLUSION

Ginseng is one of the oldest and most well-known herbs used in traditional medicine throughout the world. It has been used on a daily basis by many individuals for thousands of years. It is a popular herb by itself and often included in cosmetics, teas, and as a flavoring. Scientific research has supported the beneficial influence of ginseng on the body. It is valued for its adaptogen capabilities and is promoted as an anti-stress herb. It is recommended as a safe and beneficial supplement for many ailments.

ENDNOTES

[1]Steven R. Schechter, N.D., *Let's Live.* July, 1994, 60.

[2]Ibid., 58.

[3]Michael T. Murray, N.D., *The Healing Power of Herbs,* (Rocklin, CA: Prima Publishing, 1995), 266.

[4]Ibid., 266.

[5]Varro E. Tyler, Ph.D.., *The Honest Herbal*, (New York: Pharmaceutical Products Press, 1993), 156.

[6]Rob McCaleb, *Better Nutrition*, "Ginseng, Mental Booster," July, 1993, 48.

[7]Claire Kowalchik and William H. Hylton, Editors, *Rodale's Illustrated Encyclopedia of Herbs*, (Emmaus, Pennsylvania: Rodale Press, 1987), 226.

[8]"Ginseng," *The Lawrence Review of Natural Products.* Sept. 1990, 1.

[9]Ben Charles Harris, *Ginseng, What it is...What it can do for you,* (New Cannan, Connecticut: Keats Publishing, Inc., 1978), 6.

[10]Steven Foster, *Asian Ginseng*. Botanical Series No. 303, 1991, 4.

[11]Harris, 18-19.

[12]Jack Ritchason, *The Little Herb Encyclopedia*., (Pleasant Grove, UT: Woodland Publishing, Inc., 1994), 102.

[13]Ibid., 1.

[14]Louise Tenney, *The Encyclopedia of Natural Remedies*, (Pleasant Grove, UT: Woodland Publishing, Inc., 1995), 25.

[15]James F. Balch, MD.. and Phyllis A. Balch, C.N.C., *Prescription For Nutritional Healing*, (Avery Publishing Group Inc.: Garden City Park, New York, 1990), 337.

[16]James Duke, *Handbook of Medicinal Herbs.* (Boca Raton, Florida: CRC Press, Inc. 1985), 174.

[17]Murray, 268.

[18]Arnold and Connie Krochmal, *Garden Magazine*, Sept.-Oct., 1978.

[19]Foster, 5.

[20]Ibid., 5.

[21]Murray, 268.

[22]Daniel B. Mowrey, Ph.D., *The Scientific Validation of Herbs*, (New Canaan, Connecticut: Keats Publishing, Inc., 1986), 192.

[23]Ibid., 103.

[24]Janet Zand, OMD, L.Ac. *Herbal Medicine* (Internet), "Siberian Ginseng." (Health World, 1996).

[25]Foster, 5.

[26]Simon Y. Mills, *The Essential Book of Herbal Medicine*, (London: Penguin Books, 1993), 531.

[27]Michael T. Murray, N.D., *Male Sexual Vitality*, (Rocklin, CA: Prima Publishing, 1991), 127.

[28]*Rodale's Illustrated Encyclopedia of Herbs.* 228.

[29]Ibid., 228.

[30]*Readers Digest Family Guide to Natural Medicine*, (Pleasantville, New York: The Reader's Digest Association, Inc., 1993), 310.

[31]Foster, 6.

[32]Murray, 270.

[33]Paul Pitchford, *Healing With Whole Foods*, (Berkeley, California: North Atlantic Books, 1993), 393.

[34]Daniel B. Mowrey, Ph.D., *Herbal Tonic Therapies.*, (New Cannan,

Connecticut: Keats Publishing, Inc., 1993), 48.

[35]Murray, 275.

[36]*Rodale's Illustrated Encyclopedia of Herbs*, 229.

[37]Harris, 25.

[38]Murray, *Male Sexual Vitality*., 126.

[39]Mowrey, 152.

[40]Ibid., 266.

[41]*The Lawrence Review*, 1.

[42]Schechter, 60.

[43]Mowrey, *Herbal Tonic Therapies*., 49.

[44]Tyler, 155.