

MACA

The Ultimate Superfood

Adaptogen
Hormonal Regulator
Adrenal Gland Support
Fertility Enhancer
Aphrodisiac
Energizer

Beth M. Ley, Ph.D.

Live Ultimate Publications
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Maca: The Ultimate Superfood

Foreword by Marc Wachter

For as long as I can remember I have had a great passion and interest in nutrition. I was always fascinated to learn about various health foods and "superfoods" and what effects they had on the body. I purchased every credible book and resource I could find to further my understanding of nutrition. It always made complete sense to me that "we are what we eat." So, for the past 20+ years I have been consuming what I believe to be the best superfoods and antioxidants available to improve my health, vitality and longevity. I'm firmly convinced that it has had a profound positive impact on my health, physical appearance and overall well being.

When my new bride and I decided we wanted to start a family, I went on a research assignment to find the healthiest foods and supplements to improve our fertility. I poured through books and articles and kept coming across information on this amazing superfood, Maca. I had heard of Maca before but had not paid much attention because I figured there are only so many superfoods or supplements one can consume. I purchased Maca powder and capsules and virtually every other means of Maca I could get my hands on to test out whether or not this product was as good as it claimed. Well almost immediately after taking it, I felt a great sense of energy and well being as well as a definite increase in my libido! I was hooked! I am also happy to report that my wife got pregnant the first month we tried and we are

expecting a baby girl in the spring. While I can't confirm our success was because of Maca alone, it certainly does reinforce the benefits of this amazing food.

I continued to study and learn more about this amazing superfood and was surprised that with all of its incredible benefits, it was not as well known as some of the other popular superfoods such as the acai berry. I went ahead and purchased a book on Maca written in 2004 by Dr. Beth Ley, a highly regarded nutritionist and health writer. I was thoroughly impressed with her research and knowledge on Maca.

Inspired by this magical Peruvian superfood, I embarked on a mission to learn everything I could about



Marc Wachter and Dr. Gloria Chacón de Popovici at her home in Lima, Peru

Maca. I immediately set off on a trip to Peru and hired a knowledgeable and well respected Peruvian liaison to introduce me to the most credible Maca sources in the country. The trip exceeded my highest expectations. I met with virtually every major Maca source in Peru, including Dr. Gloria Chacón de Popovici, the most respected Maca expert

in the world. In fact, Dr. Chacón is credited with the scientific discovery of Maca and its unique nutritional and medicinal properties over 40 years ago and even has a species of Maca named after her, lepidium peruvianum chacon.

In addition to learning so much about this amazing Peruvian gem and how proud the Peruvian people are of



Marc Wachter collaborating on Maca with Dr. Gloria Chacón De Popovici at her home in Lima, Peru.

this exceptional natural resource, I also discovered that Peru has many of the other finest superfoods the world has to offer such as cacao, camu camu berry, yacon, purple corn, sacha inchi, quinoa, Incan berries, and lucuma (look out in the future for more on these other amazing superfoods). I also learned that Peru has been called "a poor man's country sitting on a golden throne." After personally experiencing Peru, there is no doubt in my mind that Peru is a very special place filled with some of the world's most incredible natural resources. I also met some of the most wonderful people and fell in love with this magical country.



Dr. Gloria Chacón de Popovici's "wall of fame" of awards, recognition and credentials at her home in Lima, Peru.

Upon my return from Peru, I was more determined than ever to educate people on these nutritionally rich foods and the wonderful benefits they could receive if they began consuming them on a regular basis. I launched my company "Live Ultimate" and contacted Dr. Beth Ley, asking her if she would do me the honor of writing and co-publishing an updated and more comprehensive book on the wonderful benefits of Maca. Truly sharing the same passion as me, she graciously agreed.

I hope you find this book as fascinating and enlightening as I have and that you enjoy reading it as much as I have enjoyed researching and learning about Maca. Most importantly I hope that it helps you to "Live Ultimate"!

Best wishes,

*Marc Wachter
President
Live Ultimate
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www.UltimateMaca.com*

Introduction

Superfood of the Incas

The concept of superfoods is relatively new considering that the foods themselves are definitely NOT new. Superfood is a term sometimes used to describe food with high phytonutrient content that may provide superior health benefits as a result. For example, acai and blueberries are often considered superfoods because they contain significant amounts of antioxidants, anthocyanins, vitamins, manganese, trace minerals and dietary fiber.

The need for superfoods and their healing potential is especially prevalent today. Superfood supplements fill in the gaps in your normal daily diet. Most people do not get enough nutrition and antioxidants in their diet. This results in a weaker immune system which cannot resist disease. Our bodies cannot detoxify when our bodily systems are not working properly. As a result, we lack energy, stamina, sexual energy, feel depressed, get sick more often and are more prone to major diseases.

Processed and refined foods that make up a huge portion of today's diet, simply do not give the human body the correct nutrition or the amount of nutrition needed to get healthy and maintain a truly healthy body.

Even if you are taking the time to prepare all the right foods such as raw foods, whole grains, vegetables and fruits in sufficient quantities, on a daily basis, you can still benefit from supplementing superfoods into your diet.

Concentrated superfoods are an efficient way to get nutrition right into your system in a potent and convenient way. In the complicated, fast-paced, stressful modern lifestyles of today, high levels of effective convenient nutrition and antioxidants can make all the difference for the prevention of illness or diseases.

While it may be unfamiliar to many of you, Maca, the vegetable from the Andes mountains, is one of the world's greatest superfoods! Maca's reputation as a powerful superfood to enhance strength and stamina and as a libido-fertility food goes back more than 500 years. Native Peruvians have used Maca as food and medicine since before the Incas.

Maca's reputation has been passed on by word of mouth through generations who told of its use to increase fertility in humans and livestock; its ability to relieve

Maca is one of the most nutritious foods that we know of. For this reason it is often referred to as a 'superfood' and is used for its potent natural healing abilities, especially healing of the endocrine system.

frigidity in women and impotence in men; its adaptogenic virtues as a revitalizer of internal organs, a regulator of menstruation, and a reliever of menopausal symptoms. It is also recommended for malnutrition, memory loss, arthritis, respiratory ailments, and diabetes.

Maca has actually been around for at least 10,000 years. It's a radish-like root vegetable grown in the mineral rich volcanic soil of the Peruvian mountains, even as high as 12,000 feet where little else will grow. It has been used by the Inca people and their herds for thousands of years to combat stress and thrive in higher altitudes.

Maca grows in the harshest, most difficult farmlands in the world, where other crop plants grow scarcely. The mountainous volcanic soil is mineral rich, yielding a valuable nutrient-dense food source.

This amazing adaptogen, able to grow in the most adverse of climates, helps those who consume it overcome adverse situations.

Maca is an amazing adaptogen, which helps the body deal with whatever type of stress the body is confronted with. Scientists have identified Maca's active constituents and shown how they are responsible for its ability to help the body in so many different ways. Maca acts as an energizer, fertility enhancer, aphrodisiac, immunostimulant, anabolic and hormone balancer. (Valentová)

Today South American Maca is rapidly gaining

attention in North America and around the world for its success in supporting energy, stamina, libido and hormone balancing for men and women.

Maca is a root vegetable belonging to the same botanical family as cabbage, broccoli, cauliflower, radish and turnip. It looks a little like a large radish or beet. It actually tastes good and can be made into all sorts of blender drinks, and easily added to cookies, pancakes or breads.

In Peru, Maca blender drinks are perhaps among the most common way that Maca is consumed today. In any town you can find at least one place selling Maca blender drinks combining cooked Maca, honey, vanilla extract, and the Peruvian grain quinoa. The Peruvians will joke about it's sexual enhancement abilities, but it is no joke! Maca's reputation is actually backed by hard science.

Personally, I am excited to introduce Maca to you not only because of the benefits I have seen in my personal use, but also dozens and dozens of my patients who struggled with lack of energy, mild depression, loss of libido, and other effects of stress on the body, including adrenal fatigue. Maca is truly amazing!

This book reviews Maca's three major benefits as:

1. An adaptogen to support adrenal function, increase energy and stamina and reduce stress.
2. A hormonal regulator to support the endocrine system and balance hormones.
3. A sexual stimulant and fertility aid for men and women.

A Brief History

Archeological evidence shows that Maca was domesticated over 2,000 years ago. Primitive cultivation of Maca dates back to 1,600 years before Christ. It was most likely fully domesticated between 1200 and 100 B.C. by the Pumpush, fierce warrior tribes that migrated up from the jungles. It continued to be cultivated throughout the Andean highlands and was brought to greater perfection by the Yaro, who arrived between 1100 and 1470 A.D. They cultivated immense fields of Maca, highly desirable for its reported fertility and aphrodisiac properties.

After the Inca conquest of these tribes, they sent great quantities of Maca to Cusco as a tribute to their new rulers. Much of it was fed to troops to increase their vitality and fortitude.

The conquered Incas and their minions paid tribute to the Spanish in Maca and other goods. In 1549, it is listed

Native Peruvians have traditionally used Maca since before the time of the Incas for both nutritional and medicinal purposes.

in the records as the only goods sent as tribute to the colonial government, 15,000-18,000 pounds of it. Even though the Spanish officially despised native foods, they had two reasons to take a second look at Maca:

1. The stress of the high altitudes of the Andes made the Spaniards nearly infertile.
2. Maca had a long indigenous tradition of increasing fertility and fortitude.

Soon after the Spanish Conquest in South America, the Spanish found that their livestock were reproducing poorly due to the stress of the highlands. The Spanish were on the verge of being forced from the highlands because, in addition to their animals, the stress of the high altitude was creating health problems for themselves.

The local Indians recommended feeding the animals Maca. The results were so remarkable that Spanish chroniclers gave in-depth reports of Maca's benefits. In fact, among the first written records ever kept for the Andean region are passages about Maca.

Conquistadors Valued Maca More Than Gold

Historical records note that the natives eventually shared the Maca secret with the Conquistadors. Historians writing at the time note that the health benefits of Maca on both humans and livestock were so dramatic that the Conquistadors began demanding that they be paid with

Maca instead of gold. Colonial records from some 200 years ago indicate that payments of roughly nine tons of Maca were demanded from one Andean area alone for this purpose. (Johns, Quiros)

The Importance of Maca in the History of Peru

Maca was an integral part of the diet and commerce of the high Andes region. For the indigenous inhabitants of the Andes, the Incas, Maca was and still is, a vital and valuable commodity. Because so little grows in this region, Maca is often used for trading against other staple food like beans, rice, corn and sugar.

The Incas of Peru were sophisticated builders and cultivators of the land and may have been responsible for evidence of the cultivation of Maca found in archaeological sites.

Eventually, knowledge of Maca's special qualities died out, being preserved only in a few remote Peruvian communities. In the 1960's and later in the 1980s, German and North American scientists researching botanicals in Peru, rekindled interest in Maca, calling it 'the lost crop of the Andes.'

For all of Maca's amazing history, in the 1970's, 80's and 90's it was in danger of extinction. In 1979, the Peruvian Department of Agriculture found only about 70 acres of Maca under cultivation in the entire country!

Since the 1980's, Maca cultivation has been rising slowly. Maca's fertility enhancing properties were

supported clinically in 1961, when researchers led By Dr. Chacón discovered it increased the fertility of rats. (Chacón) More recently, human research has confirmed its notable fertility and adaptogenic effects. (Gonzales)

This energizing plant is also referred to as Peruvian ginseng (Rea, Johns), although Maca is not in the same family as ginseng. This is simply in reference to Maca's adaptogenic properties, which ginseng is well known for, and because their traditional uses are similar; to increase energy and stamina, and enhance both fertility and sex drive in men and women.

Maca: The Basics



Maca is a hearty vegetable which grows in the Andean plateaus of Peru. Maca grows high in the mountains at altitudes of 9 to 11,000 feet, and even as high as 14,500 feet above sea level, just below the glacial icecap. (Rea) The area where this particular species of Maca is found is a region of extreme weather conditions such as freezing, fierce winds and intensive sunlight. Maca has one of the highest frost tolerances among native cultivated species. No other food plant exists in the world which will grow at so high an altitude in such weather conditions and survive.

Herbalists have long recognized that hardy, resistant plants are especially valuable from a medicinal perspective when consumed. Another example well known for its health-promoting qualities is the Ginkgo Biloba tree which has survived the ice age and was the only plant known to have survived the atomic bomb on Hiroshima.

While Maca is a relative of the wild Mexican yam, it differs in that Maca contains no phytoestrogens or hormones as the yam does. Maca's hormonal balancing

effects in the body stem elsewhere as there are no hormones, or hormone precursors in Maca itself!

Maca contains NO HORMONES or hormone precursors. It does not raise hormone levels in the body, it simply balances them.

Maca has a low-growing, mat-like stem system. Its scalloped leaves lie close to the ground and it produces self-fertile small off-white flowers typical to the mustard family which it belongs to. The part used is the tuberous root which is up to 8 cm. in diameter and off-white, dark purple or reddish in color. Unlike many other tuberous



Maca root.

Photo by Jerome Black

plants, Maca is propagated by seed, and grown as an annual. Planting usually takes place April through July, depending on the weather. Harvest follows in 7-9 months.

Maca flourishes in this area in spite of its extreme temperatures and poor rocky soil. The high plateaus of Peru rate among the world's worst farmland. However, the mineral-rich soil located there is likely to account for Maca's high levels of trace minerals.

The native Peruvians of today still grow it traditionally without pesticides or chemicals. The healing qualities of Maca have long helped the local native population thrive in this oxygen-poor plateau where they live. Because of its high nutritional and medicinal value, Maca is an important staple in the diets of the people indigenous to the region.



Local farmers in Maca field.

Photo by Jerome Black

Nutritional Value

Maca is super-charged with over 60 micronutrients. It's 40% potassium and 10% calcium. It's high in phosphorus, magnesium, silica and zinc. Maca also contains vitamins A, B, C, D, E, B-12, B-1, B-2, B-3, 18 different amino acids and 20 fatty acids.

Although Maca contains no hormones, it contains important precursors and sterols proven to assist the human body in a number of ways, including boosting fertility, sex drive and mood. Maca's hormone balancing properties are known to boost libido, soothe menopausal symptoms (even support bone health), increase sperm cell production, improve fertility and eradicate symptoms of impotency.

The nutritional value of dried Maca root resembles cereal grains such as corn, rice and wheat. Maca is made up of approximately: (Quiros)

Carbohydrates (starches and sugars)	59%
Protein (amino acids)	10.2%
Fiber	8.5%
Lipids (fatty acids)	2.2%

Maca's rich nutritional content is one of the reasons it is so valuable as a conjunctive treatment for the malnourished, elderly and sick. Maca is easy-to-digest and its nutrients are easily assimilated, even for those with digestive problems.

Maca's high concentration of essential amino acids and its high fiber content make it an excellent food to ward off constipation and promote regularity.

Potassium and magnesium are crucial nutrients in regulating blood pressure.

Maca supplies an abundance of each.

Maca contains more than 4 times more potassium than a banana ! (per 100 grams)

Chemical analysis of the root conducted by the world's most recognized Maca researcher, Dr. Gloria Chacón de Popovici, a biologist in Lima, Peru, shows potassium to be the macronutrient in highest concentration. Mineral levels will vary because of the variances of mineral levels in the soils it is grown in. (Chacón,1998)

Potassium (1,600-2,000 mg./100 grams) is abundantly supplied in Maca. This ion influences cellular activi-

ty, permeability of the membranes, and regulation of the osmotic pressure, blood pressure and pH balance.

Calcium (350-500 mg./100 grams) is found in higher levels in Maca than milk (which is actually *not* a good source of absorbable calcium). Calcium is indispensable to the skeleton and teeth formation and of great importance in heart and nerve functioning.

Milk contains a lot of calcium but in a form that is most difficult for humans to absorb. As a result, the calcium passes right through your system and is excreted as waste.

Only in raw milk is the calcium easily absorbable. Raw milk, however, is very difficult to obtain, as most states have out-lawed the sale of raw milk.

The enzyme “phosphatase”, found in raw milk is what makes calcium easily absorbable. Unfortunately “phosphatase” is completely destroyed during the pasteurization process.

Thousands of blood tests have shown that those who drink 3 to 4 glasses of milk a day, have the lowest levels of blood calcium. This is bad news for those concerned with bone health and who thought milk was an easy solution to this problem.

Actually, the best source of calcium for humans is in the fruits and vegetables that you eat, like Maca!

Phosphorus (300-350 mg./100 grams) with calcium is responsible for numerous structural functions as well as ATP formation (cellular energy).

Other trace minerals found in Maca in significant quantities are Sulfur, Magnesium, Iron, Sodium, Chlorine, Silica, Iodine, Zinc, Manganese, Aluminum, Tin and Copper.

“Maca has a high nutritional value providing macro and micro nutrients, including traces of 31 different minerals, to support the cellular structures and functioning in the body. Maca can optimize function as it optimizes and balances on a cellular level.”

Dr. Gloria Chacón de Popovici, Biological Sciences,
Mayor de San Marcos National University, Lima, Peru

The trace amounts of 31 different minerals in Maca may be more significant than one may first realize. Our diets of today are frequently high in refined foods. Processing removes the majority of these important trace nutrients often resulting in subclinical deficiencies (causing numerous health problems). These mineral deficiencies may not be easily detected. While we may not even know

what function some of these minerals have in the body, that does not make them any less important to our health.

Maca also contains vitamins, fatty acids, sterols, and almost 60 different phytonutrients which are most likely responsible for many of Maca's benefits. These include alkaloids, tannins and saponins. (Quiros, Dini)

Maca Root Nutritional Info

(approximate per 100 gram serving)

Carbohydrates 62.6 grams

Fat 0.82 grams

Fiber 5.3 grams

Protein 17.9 grams

Protein Components (%)

Albumins & Globulins 74

Glutelins 15.3

Prolamins 10.6

True Protein 42.1

Vitamin & Minerals (mg %)

Ascorbic Acid 3.52

Boron 12

Calcium 490

Iron 80

Magnesium 70

Niacin 43

Phosphorous 320

Potassium 1600

Riboflavin 0.61

Sodium 20

Thiamine 0.42

Zinc 32

Amino Acids:

Alanine 63.1

Arginine 99.4

Asparatic Acid 91.7

Glutamic Acid 156

Glycine 68.3

HO-Proline 26

Hystidine 21.9

Isoleucine 47.4

Leucine 91

Lysine 54.5

Methionine 28

Phenylalanine 55.3

Proline 0.5

Sarcosine 0.7

Serine 50.4

Threonine 33.1

Tyrosine 30.6

Valine 79.3

A chemical analysis conducted in 1981 showed the presence of biologically active isothiocyanates, especially p-methoxybenzyl isothiocyanate, which may have aphrodisiac properties. (Johns) Some researchers feel that the libido/fertility effects of Maca are a result of the glucosinolates (Johns, Dini), while others feel it is because of the alkaloids in the vegetable. (Chacón)

Bioactive Compounds in Maca

Maca contains a number of biologically active compounds, any of which may be responsible for its numerous benefits. When dealing with natural substances which cannot be patented, funds for extensive research are hard to come by. This, and the fact that Peru is a very financially limited country, is why such little research is available.

Alkaloids are a large group of pharmacologically active substances found in plants. Many drugs are from plant-derived alkaloids, including digitalis, morphine, atropine and codeine. Nicotine also contains alkaloids.

The alkaloids identified in Maca include: Macaina 1, 2, 3 and 4 (Chacón), macamides and macaenes (Zheng).

Glucosinolates (a group of sulphur-containing glucosides) are powerful anti-cancer plant compounds giving cruciferous vegetables their reputation as cancer-fighters.

They are important because of their effects on enzymes and, particularly, antimutagenic and anticarcinogenic properties against a variety of classes of carcinogens (cancer-causing chemicals). They are considered highly protective agents against certain common types of cancer. (Johnson, Talalay, Lampe)

Glucosinolate metabolite examples include Indole-3-carbinol and isothiocyanates, which have been identified in Maca. Some researchers believe Maca's *p*-methoxybenzyl isothiocyanate, may have aphrodisiac properties. (Johns) Isothiocyanates are known to alter estrogen metabolism in a favorable direction. (Bradlow)

Sterols are a large subgroup of steroid-like compounds found in plants and animals. (For example, cholesterol is an animal sterol.) Maca contains several sterols; brassicasterol, ergosterol, ergostadienol, campesterol, sitosterol and stigmasterol. Plant sterols in the diet are known for their ability to reduce intestinal cholesterol absorption thereby helping to lower blood cholesterol profiles. (Fernandez)

Maca's aphrodisiac properties may stem from the *p*-methoxybenzyl isothiocyanate it contains.

“Glucosinolates and alkaloids are two biochemicals present in all plants in different concentrations. The alkaloids, Macaina 1, 2, 3 and 4 are responsible for the physiological effects we have seen such as increased sexual performance resulting from improved hormone balance.”

Dr. Gloria Chacón de Popovici, Biological Sciences,
Mayor de San Marcos National University, Lima, Peru

Maca's Health Benefits

In 1961, Dr. Gloria Chacón de Popovici published her studies when her research scientifically demonstrated increased fertility in animals using Maca. Her research continues today and she is probably considered the most knowledgeable person on the subject of Maca worldwide.

Dr. Chacón's work answered important scientific questions about the legitimacy of Maca's reputation. In addition to its rich supply of essential nutrients, chemical analysis shows the presence of biologically active aromatic phytochemicals which have unique aphrodisiac properties. Analysis of Maca properties indicates that the effects on fertility are a direct result of the glucosinolates found in Maca. Dr. Chacón discovered the four alkaloids present in Maca that are responsible for Maca's reputed positive effect on hormonal issues such as hot flashes, memory problems, fatigue, fertility problems, lack of libido, mood swings and male impotence, more than 40 years ago while a student at the University of San Marcos in Lima, Peru.

Her research showed that Maca increased fertility in rats, dogs, guinea pigs, rams, cows and finally, humans. Other researchers have also corroborated Maca's fertility-

enhancing effects. (Chacón, Gonzales)

Maca's actions on sexual function are better researched than its effects on energy, mood and memory, anemia and depression. Some researchers note that when the body is well-nourished and balanced (in homeostasis), overall health improves, libido rises and depression abates. Maca's nutrient value and adaptogenic properties could also explain some of these reported actions. Many medical professionals are conducting studies throughout the world, however little has been published in medical journals.

***Stress depletes the body's ability to
maintain balance (homeostasis).***

***This creates an increased susceptibility to
literally all health problems.***

Maca helps restore balance!

Adaptogen Properties

An adaptogen, by definition, is a substance (food or nutritive herb), which brings the body to a heightened state of resistance to disease through physiological and emotional health.

Plants known as adaptogens are known to: raise the non-specific resistance to disease, be capable of normalizing functions in the body even in disease states, be non-toxic and harmless to any organ of the body, and be safe for ingestion for long periods as a nutritive (for prevention).

Energy is depleted in the body during stressful situations, and this depletion becomes the limiting factor in performance and resistance to disease.

Psychoneuroimmunology examines the relationship that stress has with the immune system. The immune system is our defense system against illness and disease or any type of imbalance. It works closely with the endocrine system and the hypothalamus, located at the top of the brain stem.

An adaptogen (such as Maca) can help balance, strengthen and support any area of the body under compromise due to stress. Because of the sensitive nature of maintaining a balance of the sex hormones (regulated by the hypothalamus), any stress (physical or emotional) can effect related aspects to those hormones.

Stress has a negative effect on sex; creating loss of libido, frigidity, diminished fertility, sperm count and mobility, symptoms of menopause, andropause (male menopause), PMS, etc. (Steiner, Legros, Negro-Vilar, Herrenkohl)

Adaptogens support and help restore the adrenal glands (known as the stress glands) to normal. This helps

restore hormonal balance and therefore, energy, stamina, libido, sexual function, immune function, mental clarity, a sense of well-being, and the other negative effects that resulted from the stress in the body.

Maca's effect on fertility and libido is not a result of direct influence upon the gonads (sex organs), but rather indirectly, due to its beneficial effects on the hypothalamus.

Endocrine System Effects

The endocrine system is the complex system of organs and glands which produce hormones in the body. These chemicals run through the blood stream and body to communicate with the rest of the body to regulate and maintain homeostasis (balance) in the body through various feedback systems of the body's internal biochemical equilibrium in the face of changing external factors.

The master gland of the endocrine system, the hypothalamus, plays a central regulatory role in homeostasis.

This is what is so interesting about Dr. Chacón's findings. She states that Maca's effect on fertility and libido is

(GH), a powerful prosexual substance, and also stimulates the adrenals to produce sex hormones. (Dilman)

The function of the hypothalamus, like all parts of the brain, relies on neurotransmitters, which transmit electrical messages or impulses from one brain cell to another. The hypothalamus influences the production of sex-related hormones by the pituitary and adrenal glands. The brain's sex center is thought to be within the hypothalamus. The hypothalamic neurotransmitters most closely involved with the sex center are dopamine and norepinephrine, which encourage its sex-related functions, and serotonin, which inhibits them.

Because balance of the endocrine glands and the immune system are so interrelated, Maca often notably enhances the immune system, the reproductive system, as well as overall well-being.

Maca Promotes Homeostasis

Maca aids the body in maintaining homeostasis in adapting to stress. Stress, either mental or physical, affects the hypothalamus, causing the adrenal glands to increase the production of cortisol (the stress hormone). As we were not designed to function under long-term stress, continued high levels of cortisol have a detrimental effect upon our health. Cortisol has a negative effect on numerous areas in the body including digestion, glucose and fat metabolism (causing weight gain), sleep (interferes with deep sleep known as REM sleep), memory,

sexual function, and much more.

Dr. Chacón attributes Maca's balancing effect upon the hypothalamus, the master controller of the body, which then stimulates or balances the other endocrine glands, including the pituitary, adrenals, ovaries, testes, thyroid, and pancreas.

If you understand the concept of the importance of the endocrine system and the importance of maintaining hormonal balance in the body, then you will better understand how Maca can benefit us in so many ways.

***Maca... The ancient remedy for
problems of today!***

Maca and Stress: The Same Yesterday, Today and Tomorrow!

I find it fascinating that this amazing food of yesterday, can do the same for us today. Maca was the primary food for those living in an unfriendly climate and was specially designed to help relieve their stress (which was a result of that climate). Maca helps to restore balance in the body from any kind of stress, regardless of where it comes from.

The higher the elevation, the less oxygen is available

to breathe. At 12,000 feet, there is less than half the available oxygen to breathe compared to at sea level.

This reduced level of oxygen puts a tremendous stress upon the body affecting the respiratory system, heart rate, the blood, fluid balance and the tissues throughout the body. Altitude sickness is the term associated with the symptoms that can result if one is not acclimated to those lower oxygen levels.

Because Maca increases oxygen content in the blood it helps alleviate altitude sickness. According To David Wolfe, author of *Superfoods*, when Maca is used with coca tea, nearly all symptoms of altitude sickness can be alleviated in less than an hour. (Wolfe)

I share this information so you can see the significance of the effects of high altitudes where Maca grows, and how Maca helped the newcomers to Peru, such as the Conquistadors and their livestock, who experienced this stress. Today it is no different.

Stress is Stress

No matter what is causing the stress, whether it is physical, environmental or emotional, there are physiological consequences which result. Years ago, Maca first received its reputation by relieving the symptoms resulting from stress. Today, research shows Maca is helpful for humans and animals to adapt to other forms of stress.

Our stressors may be different today as we deal with toxins in our environment, excess intake of refined food

resulting in nutrient deficiencies, overloaded schedules, and too often misdirected focus upon circumstances which end up controlling our lives instead of us taking control of our circumstances, but the end result is the same; compromised health.

Maca also provides power-packed nutrition filling in the gaps left behind by today's processed and commercially grown foods. Donald Davis, a senior researcher at the University of Texas, performed research into the disappearing nutrients in food. He compared Agriculture Department figures on nutrient content for 43 common fruits and vegetables. Davis says historical data spanning 50 to 70 years show apparent declines of up to 40% or more in minerals, vitamins and proteins in foods. (Davies)

Fertility and Sexual Function

The fertility powers of Maca are prized by couples in the Peruvian highlands. Men and women who fail to conceive a child eat Maca on a regular basis until conception occurs.

According to Dr. Chacón, the actions of four alkaloids from Maca root may serve to increase animal fertility. The isothiocyanate p-methylbenzyl has been shown to increase fertility in humans.

Chacón suggests that Maca alkaloids act on the hypothalamus-pituitary axis and the adrenals. These areas of

the body produce hormones as well as energizing substances like adrenaline. The end result could be an increase in energy, vitality, and virility. There are numerous physicians' claims that Maca positively affects ovarian function in women, and erectile function in men.

Maca is recommended for sterility and other reproductive and sexual disorders. Chacón also demonstrated that Maca has very observable effects on fertility problems. In studies with rats, she found that animals given either Maca powder, or alkaloids isolated from Maca root, showed multiple egg follicle maturation in females, while males had significantly higher sperm production and motility rates than in control groups. The effects were measurable within 72 hours of dosing the animals. (Chacón)

Human Study Shows Maca Increases Libido and Sperm

The first known published human study on Maca's effect on fertility and libido in men was conducted by Dr. Gonzales, one of the world's Maca experts, through the Department of Physiological Sciences, University Peruana Cayetano Heredia, in Lima, Peru. The study involved healthy men (aged 21-56) who completed the 12 week trial with gelatinized Maca. Either 1,500 or 3,000 mg. (or placebo) was administered orally each day.

The study data showed that Maca: (Gonzales, *Andrologia* 2002)

- ❖ Increased sexual desire (libido) by 180%
- ❖ Increased number and mobility of sperm
- ❖ Increased DHEA levels in a majority of the men
- ❖ Decreased anxiety and stress
- ❖ Increased adrenal androgens (adrenaline)
- ❖ Promotes glucose utilization for energy rather than being processed into fat storage
- ❖ Produced a "general sense of well-being"
- ❖ Lowered blood pressure (diastolic)
- ❖ Balanced blood iron levels

Experiments with men as well as with animals show not only greater seminal volume by 20%, but also sperm quality, more than 184% increased spermatozoon, and more than 208% improved motility, leading to enhanced fertility. (Gonzales) Other studies also demonstrate broods increasing by 25 to 40% in dogs, cows, sheep and other animals. (Chacón)

In female animals, Maca consumption significantly increased Graaf follicles, and other favorable endometrium characteristics which indicate a higher fertility level.

Studies conducted at the Chinese Academy of

Preventive Medicine showed animals fed standardized Maca extract demonstrated increased energy, and exhibited a dramatic increase in sexual activity as compared with non Maca-fed animals. Not only did healthy animals respond well to Maca extract, but rodents with low testosterone demonstrated a significant increase in sexual activity, indicating a possibility that men with low testosterone or erectile dysfunction may experience improvement. In the studies, the greater the concentration of macamides and macaenes in the extract fed to the animals, the greater their strength, libido and sexual function. (Zheng)

Maca for Women

Maca has been used to help:

- ❖ Balance hormonal levels
- ❖ Increase libido (in women and men)
- ❖ Increase egg health
- ❖ Lower FSH levels
- ❖ Increase fertility
- ❖ To increase breast milk production after pregnancy

As a nourishing food for the endocrine system, aiding both the pituitary, adrenal, and thyroid glands (all involved in hormonal balance), Maca has the ability to affect key hormones in both women and men without containing hormones itself.

Maca is probably best known for its aphrodisiac effects for both men and women of all ages!

Maca helps to stimulate and nourish the pituitary gland, acting as a tonic for the hormone system. When the pituitary gland functions optimally, the entire endocrine system becomes balanced, because the pituitary gland controls the hormone output of the other three glands.

In women, Maca works by controlling estrogen in the body. Estrogen levels that are high or low at the wrong time can keep a woman from becoming pregnant or keep her from carrying to term. Excess estrogen levels also cause progesterone levels to become too low. Taking Maca may help to increase the progesterone levels, which are essential to carrying a healthy pregnancy.

Note: Estrogen in men produces erectile dysfunction, lack of libido, low sperm count, and lowered production of seminal fluid.

Because of all of the natural fertility support Maca provides (Ruiz-Luna), it is an excellent choice for anyone preparing or trying to become pregnant. It is a food, so it is healthy to take daily. But it can specifically help women who are experiencing poor egg health, endometriosis,

PCOS, recurrent miscarriages, preparing for IVF, or infertility due to stress.

Osteoporosis

Maca improved bone mass and restored the trabecular network in lumbar vertebrae in ovariectomized rats. Calcium, magnesium, and silica are useful in bone calcium loss in menopausal women and each are found in Maca. (Zhang)

Menopausal Difficulties

Maca may truly be a great blessing for mature women experiencing the unpleasanties commonly experienced in this time of life.

Maca (3.5 grams/day) given to post-menopausal women for 6 weeks in a double-blind study reduces psychological symptoms, including anxiety and depression, and sexual dysfunction (lack of libido and vaginal dryness). Results were independent of any changes in estrogenic and androgenic activity. (Brooks)

Maca and Prostate Cancer

Cruciferous vegetables such as watercress and broccoli have been studied extensively for their ability to prevent and fight prostate cancer. These contain phytochemicals

called isothiocyanates (ITCs) found to be highly effective in suppressing the growth of human prostate cancer cells, even at concentrations achieved through eating cruciferous vegetables such as watercress. (Xiao, Bommareddy)

Shivendra Singh, a professor of pharmacology and urology at the University of Pittsburgh School of Medicine, and researcher at the University of Pittsburgh Cancer Institute (UPCI), has received a \$1.7 million grant from the National Cancer Institute to study prostate cancer prevention by phytochemicals found in cruciferous plants. Maca, watercress and broccoli are in the same family, Maca and watercress being the most closely related.

While broccoli is a crucifer, the same family as Maca, watercress is even more closely related to Maca, both being in the genus *Lepidium*.

"Clearly, what we eat has an effect on the development of diseases such as cancer," said Dr. Singh, also co-leader of UPCI's cancer biochemoprevention program. "However, we know little about the mechanisms by which certain edible cruciferous plants help our bodies fight prostate cancer and other diseases. Our goal with this study is to better understand the function and relationship of substances that appear to be linked to inhibiting prostate cancer growth."

In his current study, Dr. Singh is hoping to further define the mechanisms by which ITC's induce cancer cell death, to provide insights into the key structural relationships between ITC's and cell processes and to identify

potential biomarkers that could be useful for future intervention trials involving ITC's.

"The knowledge we gain from this study will help guide us in formulating practical and effective nutritional strategies for the prevention and treatment of prostate cancer," said Dr. Singh.

Dr. Gonzales, professor and world-renowned Maca expert at the University of Peru, reported in *Andrologia in* 2008 and *Asian J Androl.* in 2007 that red Maca was beneficial against prostatic hyperplasia in adult mice. (Gonzales, 2008; 2007 and 2005) Similar results have been reported by other researchers. (Gasco, 2007)

You may wish to combine Maca with DIM to support prostate health. DIM (diindolymethane) is a cancer-fighting phytochemical, derived from cruciferous vegetables, such as broccoli, cabbage and brussels sprouts. DIM has some anti-androgenic properties, which may eventually mean that it may have some value in aiding with prostate and breast cancer. (Canene-Adams) The most research suggests that it may increase natural killer cells specifically for pancreatic and prostate cancer lines. (Frankel)

Cholesterol Lowering Effects

Maca is a rich source of sterols. Researchers consider plant sterols, isothiocyanates, and glucosinolates to be

Maca's active constituents. Sterols help reduce elevated cholesterol (Fernandez, Plat, Sudhop); this can positively affect erectile response if erection is compromised by artery-clogging fats.

Researchers in the Czech Republic found that Maca had excellent potential to ward off heart disease. They found it decreased the levels of very low density lipoproteins (VLDL); low density lipoproteins; total cholesterol; and the level of triacylglycerols in the plasma, VLDL, and liver in rats. They also found Maca improved glucose tolerance and lowered glucose levels in blood. (Vecera)

Immune System Effects

In Peruvian herbal medicine, Maca is also used as an immunostimulant, for anemia, tuberculosis, stomach cancer, as well as to enhance memory. (Gomez)

People also believe it improves physical and mental capacities, strengthens reproductive organs, and increases the strength of the immune system.

According to Dr. Hank Oswald, a European medical doctor who treats many thousands of patients at his clinics, Maca significantly strengthens immunity. He claims one can see the positive effects on the blood under the microscope. He feels Maca's nutritional elements support glands and energy-related systems.

Benefits Chronic Fatigue

Maca can also help with chronic fatigue syndrome (CFS) and general fatigue brought on by aging and stress. It is recommended for people with CFS because it raises DHEA and cortisol levels, which are depressed due to the burden upon the adrenal glands from long-term stress. Most people with CFS have adrenal fatigue, and Maca can assist in rebuilding exhausted adrenal glands. This will take time according to the degree of exhaustion of the adrenals. In some cases, noticeable increases in energy occur within a couple of weeks. Maca is also recommended by doctors to increase vigor in the elderly.

Antioxidant

A number of researchers have found Maca protects cells from oxidative stress and is capable of scavenging free radicals, also making it an anti-aging food. (Valentová, Sandoval, Vecera)

Learning and Depression

In one mouse study, antidepressant activity was associated with red, yellow, and black ecotypes of Maca. Phytoestrogens, such as quercetin and anthocyanins, may be responsible for the antidepressant activity of Maca. (Rubio, 2006) Another study in mice showed that black Maca improved scopolamine-induced memory impairment; the mechanism of action may be associated with an effect on a monoamine neurotransmitter. (Rubio, 2007)

An Australian double-blind study with post-menopausal women taking Maca (3.5 g/day) resulted in improved mood, anxiety and depression. (Brooks)

Maca is Popular Among Athletes

Maca is often used to increase energy, stamina and endurance in athletes, promoting mental clarity. (Rea, Steinberg) It is used as an alternative to anabolic steroids by bodybuilders due to its richness in sterols. (Steinberg) Used in conjunction with anabolics, Maca may help reduce side effects including those of the testes due to its alkaloid balancing effects. (Johns, Gomez)

The head trainer of a major league U.S. baseball team reportedly ordered Maca for the entire team as part of their sports nutrition program after his own energy-enhancing personal experience using it. Men who work out have begun to use Maca to promote stamina, and personal fitness trainers are recommending it to their clients.

Hormone Balancing Effects

The benefits of Maca seem to be for individuals of all ages. The herb supports hormonal functioning in older and younger adults, and athletes have been reporting increased energy and stamina in their workouts. Teenagers have also benefited from its effects on hormone-balancing and acne.

Female Hormonal Imbalances

Women are turning to Maca for assistance during perimenopause, menopause, and post-menopause. Women with menstrual irregularities using Maca have experienced greater consistency, while women with hot flashes, mood swings and most associated peri-menopause and menopause symptoms have diminished dramatically using Maca.

Peri-menopausal women usually need smaller amounts of Maca (about 1,500 mg. daily), to help alleviate increased PMS and other symptoms of hormonal imbalance. Estrogen dominance is a common problem which Maca can help to correct. In addition, women who begin

using Maca during peri-menopause find that they have a much easier time when they enter menopause.

Menopausal women who suffer from hot flashes, mood swings, and other effects of rapidly dropping hormone levels, will find Maca to be a safe and drug free alternative to HRT. Initially women need higher doses, such as 1-2 tsp. powder or 6-12 capsules (500 mg.) daily. Usually this dosage can be reduced after a month or two. While no one product works for everyone, results are usually excellent, and most women will notice a definite relief within one week, with continued improvements during the next few weeks. In some cases, Maca will work where nothing else does.

Many women who have tried everything from prescription HRT to phytoestrogens without success, find that using Maca literally gives them back their life. Women who have been using any form of HRT will need to make a gradual transition from their hormonal program to using Maca. This transition may take a month or more.

Post-menopausal women do well on small to moderate doses of Maca (3,000 to 5,000 mg daily). Even if they have not been experiencing overt symptoms of hormone deficiency, using Maca can help to slow the aging process, keeping skin youthful and preventing vaginal dryness and atrophy. Maca can also be of benefit for bone health, because of its supportive mineral content. For this reason it is used in Peru and elsewhere to treat and prevent osteoporosis. Reportedly, but not yet clinically proven,

Maca users of at least one year have seen increased spinal bone density. (Smith)

A tremendous advantage Maca has over hormone balancing products such as pregnenolone or DHEA is Maca's LACK of risk of overdose.... because Maca contains no hormones!

Libido

Maca's ability to help restore sex drive for men and women is probably what it is best known for. It is often described as an aphrodisiac for both sexes, undoubtedly because of its beneficial effect on testosterone and other hormone levels. If one were to ask most Peruvians why they recommend Maca, most will frankly answer, "For the sex, of course!"

While Maca is often compared to the drug Viagra™, it actually works very differently in regards to its sexual effects. Viagra's effects are more circulatory, Maca's effects are more hormonal. As an energizer, Maca helps to create more vigor for sexual activity.

Maca also helps improve sexual activity and satisfaction

by increasing vaginal lubrication in women as well as increasing seminal volume (ejaculate) by 30% in men. (Gonzales)

In the prestigious medical journal *Urology* (April 2000), scientists tell of the experience of rats with erectile disorder who were fed Maca compared to controls. The Maca group had 400% more sexual activity than the controls. (Zheng)

Maca provides a means of normalizing our steroid hormones like testosterone, progesterone and estrogen. Therefore, it facilitates balance to the hormonal changes of aging. In men, it restores a healthy functional status in which they experience a more active libido. Lots of men and women who previously believed their sexual problems were psychological are now clearly going to look for something physiological to improve quality of life in the area of sexuality.

Aphrodisiac Testimony

We all hear rumors about various products like Maca. But using this Peruvian root myself, I personally experienced a significant improvement in erectile tissue response. I call it nature's answer to Viagra, What I see in Maca is a means of normalizing our hormones like testosterone, progesterone, and estrogen. Therefore it has the facility to forestall the hormonal changes of aging. It acts on men to restore them to a healthy functional status in which they experience a more active libido.

Garry Gordon, former president of the American College for the Advancement in Medicine. (Superfoods, David Wolfe, 2009)

The Safe Solution for Hormone Replacement Therapy

The desire for restored youth, slow-down or reversal of the aging process and health is widespread. In large part, the solution to these desires revolve around optimal and balanced amounts of hormones in the body. Most attempts at staving off the aging process involve some type of hormone replacement. Men and women are discovering the benefits of boosting hormone levels of testosterone, DHEA, estrogen, progesterone and human growth hormone.

Hormone replacement therapy (HRT) may have some benefits, but is not without side effects and risks. Maca, however, offers an entirely different and completely safe approach to hormones.

Maca is a tonic (strengtheners) and rejuvenator for the entire endocrine system, thereby encouraging the body to manufacture it's own natural hormones – and in the correct proportion to each other.

Taking any type of “external” hormones, and even natural phytohormones in foods or herbs, can cause the glands to become “lazy,” and therefore produce even less of what we need. Knowing how much to take of these phytoestrogens can be very tricky, and can vary greatly from one individual to the next.

In contrast, instead of promoting dependency on an outside source, Maca, instead, energizes and rejuvenates

from within. Maca's effects are specific to the endocrine glands, and therefore, it is equally beneficial for both sexes.

***Maca is the safe alternative
to HRT to help the body restore balance.***

Maca therapy is preferred over hormone replacement therapy because HRT actually ages the body by diminishing the hormone-producing capability of the glands. Whenever you (artificially) introduce a hormone into the body through a drug, herb or even a food containing phytohormones, it has an effect on the gland or glands which would naturally otherwise produce that hormone. Unlike soy products, black cohosh, licorice root, wild yam, and others containing hormone-like substances, Maca contains no plant hormones (such as phytoestrogens). Therefore, you need not worry about excess doses with Maca. It works on the root of the problem rather than just the symptoms of the problem.

Even more powerful a reason to choose Maca, is the fact that HRT is now officially deemed carcinogenic. Estrogen replacement therapy has joined the official U.S. government list of cancer-causing agents by the National Institute of Environmental Health Sciences, but as of December 2002 the list includes the entire class of steroidal estrogens. (NIH)

The long-term safety of estrogen replacement therapy has been the subject of debate for several years. New studies showed that hormone replacement therapy increases the risk of breast and uterine cancers. It also raises the risk of heart disease. Thank goodness for Maca!

What some of the researchers are saying about Maca:

*Gustavo Gonzalez of Peru's Cayetano Heredia University, who led what the scientists say is the world's first study into Maca's effect on humans, told a news conference the three-month trial involving 12 volunteer men pointed to an **180-200% lift in libido and up to a doubling of sperm production.***

"It's a miracle (product)," said Dr. Fernando Cabieses, a professor and authority on Maca. The plant, he said, was a nutritional gem for people of all ages.

"According to reports from the international medical community, the plant definitely has energy giving properties, boosts physical and sexual performance... Preliminary reports are promising," Julio Castro, dean of Peru's College of Doctors.

Reuters Health

Maca, Stress and the Adrenal Glands

Even though we already covered the endocrine system in general in an earlier chapter, because of the epidemic levels of people experiencing adrenal fatigue and adrenal exhaustion and the specific benefits Maca offers, I want to address this issue further.

The endocrine system is made up of seven major glands (pineal, pituitary, thyroid, thymus, adrenals, sexual glands) in the body and the hormones they secrete to keep us in emotional and physical balance and good health. Although it is not yet fully understood how Maca has such a positive effect on the endocrine system, studies show that this amazing root vegetable really does have a stabilizing/regulating effect.

Adrenal Health Benefits of Maca

The adrenals glands in particular seem to be effected profoundly by Maca and this provides several emotional/physical benefits for health. The adrenals are the glands that release stress hormones into our bodies. In excess,

this can lead to emotional stress, feelings of fear, erratic energy levels, predisposing the body to deposit fat to the abdomen area, elevated blood pressure and increased risk for heart disease.

These stress hormones have their time and place, like when we are being chased by predatory animals, but today they are often released daily as a reaction to our busy lives. This is really not good for our health. Taking Maca daily can help to regulate the adrenals so that they are releasing less stress hormones! The result can be a greater feeling of calm and peace while providing solid sustained energy levels throughout the day without the dips and peaks.

According to Dr. James Wilson, author of *“Adrenal Fatigue: The 21st Century Stress Syndrome”*, adrenal fatigue affects an estimated 80% of people living in industrialized countries, yet it has been largely ignored and misunderstood by the medical community. Stress and long term stress has become the new epidemic: adrenal fatigue.

Adrenal fatigue can affect anyone who experiences frequent, persistent or severe mental, emotional or physical stress. It can also be an important contributing factor in health conditions ranging from allergies to obesity.

Can you relate to any of the following:

- ❖ Recently experienced long term stress or a major stress in your life (illness, job, finances, death, children, chronic pain etc.)?

- ❖ After this stress, feel as though you just cannot seem to get yourself together, or at least back to where you used to be?
- ❖ Usually tired when you wake up, no matter if you slept 7, 8 or even 9 hours?
- ❖ Need coffee, colas, salty or sweet snacks to keep going?
- ❖ Tired, but "too wired" to fall asleep at night?
- ❖ Find it difficult to relax or to get exercise?
- ❖ Feel run down and stressed?
- ❖ Experience frequent illness and take a long time to get well?

If you are experiencing more than half of these symptoms, then you, like many other Americans may be experiencing symptoms of Adrenal Fatigue.

Adrenal fatigue is not a new condition. People have been experiencing this condition for years. Although there is increasing physician awareness, many are not familiar with adrenal fatigue as a distinct syndrome. Because of this lack of knowledge, patients suffer because they are not properly diagnosed or treated. Misdiagnosis leads to mistreatment which can make the problem even worse.

Adrenal fatigue is a condition in which the adrenal glands function at a sub-optimal level when patients are at rest, under stress, or in response to consistent, intermittent, or sporadic demands.

The adrenal glands are two small glands that sit over the kidneys and are responsible for secreting over 50 different hormones—including epinephrine, cortisol (known as the “stress” hormone), progesterone, DHEA, pregnenolone, estrogen and testosterone.

The onset of adrenal fatigue often occurs because of financial pressures, infections, emotional stress, smoking, drugs, poor eating habits, sugar and white flour products, unemployment and several other stressors. After experiencing many of these events over a long period of time, the adrenal glands tend to produce less cortisol, the body's master stress hormone.

Cortisol's main role in the body is to enable us to handle stress and maintain our immune systems. The adrenal gland's struggle to meet the high demands of cortisol production eventually leads to adrenal fatigue.

Patients with adrenal fatigue have a distinct energy pattern. They are usually very fatigued in the morning, not really waking up until 10 AM, and will not usually feel fully awake until after a noon meal. In the afternoon, they experience a lull in their cortisol and as a result, they feel low or fatigued, generally around 2-4 PM. Patients generally begin to feel better after 6 PM; however, they are usually tired after 9 and in bed by 11 PM. These patients find that they work best late at night or early in the morning.

Some key signs and symptoms of adrenal fatigue include salt cravings, increased blood sugar under stress, increased PMS, peri-menopausal, or menopausal symptoms under stress, mild depression, lack of energy,

decreased ability to handle stress, muscle weakness, absent mindedness, decreased sex drive, mild constipation alternating with diarrhea, as well as many others.

The following will greatly benefit those experiencing adrenal fatigue:

- ❖ A diet that combines unrefined carbohydrates (whole grains) with easy to digest protein (fish, eggs, plain yogurt and some poultry or bison) and oils (nuts and seeds) at most meals—olive, walnut, fiber, and flax.
- ❖ Eat regular meals, chew food well, and eat by 10 AM and again for lunch. Patients should avoid trans fats (hydrogenated oils), caffeine, milk chocolate, processed carbohydrates (including sugar) and junk foods.
- ❖ Diets should have a heavy emphasis on vegetables.
- ❖ Use sea salt (which contains trace minerals) instead of sodium chloride.
- ❖ Do not follow the USDA's Food Guide Pyramid, which is too high in carbohydrates and too low in protein.
- ❖ Avoid or limit coffee and caffeine as much as possible.
- ❖ Supplement Maca (5,000 mg or more daily).
- ❖ In addition, the following are suggested:
 - Vitamin C (3,000-4,000 mg/day)
 - Vitamin B complex
 - Niacin (125-150 mg/day)

B-6 (150 mg/day)

B-5 (1200-1500 mg/day)

Magnesium (400-800 mg/day)

Trace minerals such in the form of coral calcium

High quality fish oil (4,000 mg/day) preferably one high in DHA.

- ❖ Additional herbal remedies include Licorice, Ashwagandha, Siberian Ginseng, and Korean Ginseng. *Note:* Licorice may elevate blood pressure in persons with a history of hypertension, renal failure, or who currently use digitalis preparations such as digoxin.
- ❖ Under the supervision of a healthcare provider, hormone supplementation with DHEA (primarily for men) or Pregnenolone (for men or women) may also offer some benefits. (Although these may be needed at all if taking the proper dose of Maca!)

Saliva cortisol measurement may be helpful to monitor improvements in adrenal function.

Improves Stress, Blood Pressure, Sleep

One of the most dramatic and noticeable benefits of Maca is a reduction in stress. As a powerful adaptogen, Maca, with its natural compounds has the ability to balance and normalize the body's entire system. (Lopez-

Fando) For example, Maca can raise low blood pressure and lower high blood pressure. Maca has a balancing effect on the hormones, and therefore, can positively effect any system in the body which is out of balance.

Many factors cause insomnia or sleep problems, some nutritional, but most are related to stress. Maca can positively affect virtually all of them. Maca may provide raw materials needed for the body to produce serotonin, which creates relaxation. As an adaptogen, it may also help lower cortisol (the stress hormone) which interferes with normal serotonin production. Normalizing cortisol will help normalize levels of serotonin (one of your "happy" sleep and relax hormones).

“Maca has demonstrated numerous health benefits in experimentation. Most profoundly, I have seen excellent results using Maca on anemic children due to malnutrition, and also its ability to induce heat in female dogs which were infertile and never in heat previous to using Maca. Only small amounts of Maca were required for this effect and a relatively short period of time.”

Dr. Gloria Chacón de Popovici

Safety & Side Effects

Maca is a tremendously beneficial herb used for thousands of years, consumed everyday as food and medicine by native Peruvians for a wide spectrum of applications.

According to Chinese medicine, Maca is considered to be a “warming herb” (known to produce heat in the body like garlic, ginger and cayenne) and therefore, should be used with caution by those with high blood pressure. However, this has not been tested scientifically. As I noted earlier, Maca may actually be beneficial for high blood pressure due to its high potassium and magnesium content and its adaptogen effects.

Toxicity studies conducted in at Product Safety Labs of East Brunswick, N.J., showed absolutely no toxicity, and no adverse pharmacological affects of Maca.

There is no evidence of adverse reactions to Maca. Maca has been reported to have a low degree of acute oral toxicity in animals and low cellular toxicity in vitro. (Valerio)

Based on its long history of use as a medicinal supplement and as a food, Maca appears to be very safe.

The following are structure/function statements permitted under Section 6 of DSHEA (Dietary Supplemental Health and Education Act) for Maca:

- ❖ Increases energy, stamina, and mental clarity
- ❖ Supports the thyroid
- ❖ Supports normal sexual function
- ❖ Promotes hormone balance

How To Use Maca

In ancient times, Maca was cooked whole in pits in the ground, layered with coals of charred earth and roots. This was called "huatia." Or they made "atunca" by boiling, mashing, and rolling it into balls and cooking it in clay pots lined with straw.

The root tastes and has an aroma similar to butter-scotch when it is roasted like a potato. This can be prepared into jam, broth, puddings and juices. Maca's butter-scotch-like character is the basis of unique products ranging from liqueur to baked goods. It is an excellent ingredient in both sweet and savory recipes.

The root can be consumed fresh or dried. Fresh roots are considered a treat and are baked or roasted in ashes much like sweet potatoes.

Dried Maca roots can be stored for up to seven years. Dried roots can be boiled in water or milk to make a porridge. In addition, they are often made into a popular sweet, fragrant, fermented drink called Maca chicha.

Maca powder is also available. It can be mixed with water or any hot or cold beverage. For those who enjoy drinking coffee, Maca combined with cocoa (cacao) powder,

is an excellent addition.

Try mixing Maca powder with apple juice, cranberry or pineapple juice in a blender for a few seconds. Add it to fruit or veggie smoothies. This is probably the most common way to consume Maca in order to get the optimal benefits without swallowing handfuls of pills every day.

Its malty, nutty, butter-scotch flavor also works well when added to many foods such as cereal (hot or cold), salads, salad dressing, soup or yogurt.

Maca powder can also be added as a dry ingredient to baked goods such as muffins or bread.

Because Maca is a food, it can be used in greater quantities than other medicinal herbs. The amounts taken daily can also vary according to the variety of ways you are consuming your Maca and according to the change in your daily activities.

Maca is a warming food, and therefore is better suited for use in cooler weather and colder climate. Therefore, you may choose to cut back on your Maca intake in the warm summer months and increase it in the winter months.

Supplemental Maca Dosages

Today the most popular use for Maca on the international market is as a dietary supplement available over the counter. The Maca is dried, powdered and then sold as

capsules, tablets or powder. Tea can also be made from crushed Maca.

As a traditional remedy use 3-10 grams (3,000 - 10,000 mgs.) of powdered root, tablets or capsules daily. Powder can be stirred into water for hot and cold beverages or juice, smoothies, or sprinkled over food twice daily.

Remember, Maca is a food. Less than 3,000 mg. of Maca daily, may not produce the results that Maca is famous for.

Personally, in working with patients, I have seen better results with higher dosages, over 10,000 mg daily in many cases.

Maca Extracts Eliminate The Need to Take Handfuls of Pills Everyday!

Recently, concentrated Maca extracts have become available in usually 10:1 or 3:1 strengths. This provides an excellent convenience advantage. For example, instead of taking five Maca (500 mg) capsules am and pm, by purchasing a 10:1 strength extract, one only needs to take 1 capsule per day (instead of 10), which I know is much more appealing to my patients. Not everyone likes to make smoothies every single day, in fact, probably most people do not!

Incorporating Maca Into Your Daily Diet

- ❖ Maca has been traditionally used in baked foodstuffs for centuries; try adding a few spoonfuls to any favorite recipe.
- ❖ Add 1-2 Tbsp of Maca to smoothies; Maca pairs especially well with other superfoods.
- ❖ Cocoa (cacao) is a perfect pairing with Maca.

Following are some of my personal favorite recipes incorporating powdered Maca as well as some contributed by others.

Dr. Beth's Green "Detox" Smoothie

Handful of fresh spinach
Sprig of fresh mint leaves (just the leaves)
1/2 cup cilantro leaves or parsley
1/2 avocado
1/3 cup plain Greek yogurt
1/3 cup water - add more if it is too thick
1/4 cup lime juice
1 tablespoon freshly ground flax seeds
1-2 tablespoons Ultimate Maca powder
A few ice cubes
Add Stevia to level of sweetness desired

Blend until smooth and enjoy!

Nut Smoothie

1/4 cup raw almonds - pre-ground in coffee or spice grinder
(unless you are using a Vitamix)

1-2 tablespoons almond butter

1/3 cup plain Greek Yogurt

1/3 cup water, coconut water or coconut milk - add more if
it is too thick

1 tablespoon freshly ground flax seeds

1-2 tablespoons Ultimate Maca powder

2 tablespoons cacao powder

Add stevia to level of sweetness desired

A few ice cubes

Blend until smooth and enjoy!

Berry, Berry Smoothie

1 cup blueberries, raspberries, strawberries or other berries
(fresh or frozen)

1/3 cup plain Greek Yogurt

1/3 cup water or unsweetened cranberry juice - add more
if it is too thick

1 tablespoon freshly ground flax seeds

1-2 tablespoons Ultimate Maca powder

Add stevia to level of sweetness desired

A few ice cubes

Blend until smooth and enjoy!

Orange Dream Smoothie

1 orange - peeling removed (adding some grated peel is also recommended!)
1/3 cup plain Greek yogurt
1/2 cup orange juice, coconut water or coconut milk (add more if it is too thick)
1/4 teaspoon vanilla extract or 1/4 of vanilla bean scraped
1 tablespoon freshly ground flax seeds
1-2 tablespoons Ultimate Maca powder
Add stevia to level of sweetness desired
A few ice cubes

Blend until smooth and enjoy.

Ultimate MacaBerry Smoothie

1/2 cup fresh or frozen strawberries
1/2 cup fresh or frozen raspberries
1 banana
1 and 1/2 cups coconut water
1 heaping tablespoon yacon powder
1 heaping tablespoon lucuma powder
1 heaping tablespoon Ultimate Maca powder
1 tablespoon vanilla extract
1 tablespoon of agave or a sweetener
1 heaping tablespoon cacao powder or nibs

Blend until smooth and enjoy!

Ultimate Banana-Maca Smoothie

- 2 heaping tablespoons of Ultimate Maca powder
- 8 oz almond (or any other nut) milk
- 2 bananas
- 1 teaspoon cinnamon

Blend until smooth and enjoy

Fast and Simple Ultimate Maca Drink

- 2 cups fresh coconut water (or use any fresh squeezed fruit juice as an alternative)
- 1 tablespoon Ultimate Maca powder

Blend and enjoy!

Ultimate Maca Superfood Smoothie

- 1 tbsp Supergreens powder of your choice
- 1/2 to 1 cup coconut water
- 1 ripe banana
- 1-2 tablespoon Ultimate Maca powder
- 1 tablespoon coconut butter
- 1 tablespoon honey (or other sweetener of your choice)

Blend all ingredients until smooth

Ultimate Mocha Maca

- 1 and 1/2 cups of almond (or any other nut) milk
- 2 tablespoon cacao powder
- 1 teaspoon espresso powder
- 1 tablespoon Ultimate Maca powder
- 1 heaping tablespoon honey or other sweetener of your choice

Blend and Enjoy!

Incan Warrior Hot Chocolate

- 2 tablespoon cacao powder
- 1-2 tablespoon Ultimate Maca powder
- 8 oz. organic milk, coconut milk, or nut milk of choice
- 8 oz. brewed yerba mate tea
- Sweetener of choice (raw sugar, maple syrup or stevia)

Mix all ingredients in a blender, then transfer to a small pot. Gently heat until warm, but do not boil. Pour and blast-off!

Dr. Beth's Energy Balls

- 1 cup raw almonds (5 ounces)
- 1/8 teaspoon sea salt
- 1/4 vanilla bean, split and seeds scraped (or 1/4 teaspoon of vanilla extract)

- 1 cup soft Medjool dates, pitted (4 1/2 ounces)
- 1/4 cup dried cranberries or cherries
- 2 tablespoons ground flax seeds
- 3 tablespoons Ultimate Maca powder
- 1 tablespoon water
- 1/4 cup shredded unsweetened coconut (optional)

In a food processor, pulse the almonds with the salt and vanilla seeds until very finely ground. Add the dates, flax, Maca, cranberries or cherries, water and process until the mixture holds together. Add a few drops more water if it does not stick together. Roll into 1-inch balls. Roll the balls in the coconut until coated (optional).

Ultimate Maca Malt Balls

- 1/4 cup Ultimate Maca powder
- 1/4 cup almond butter
- 1 cup pitted dates
- 1 teaspoon vanilla extract
- 1/4 teaspoon sea salt
- 1/4 cup chopped almonds
- 1 tablespoon cacao powder

Soak the dates for 10 minutes in water to soften. Drain liquid, and place in a food processor to blend into a sticky puree. Add the remaining ingredients, and process until a dough has formed - dough should stick together when rolled into a small ball. If dough is too sticky, add

more chopped almonds; if too dry, add a touch of water, 1 teaspoon at a time.

Roll the dough into 1" balls, and refrigerate until ready to enjoy. Makes about 2 1/2 dozen.

Ultimate Cinnamon Maca Bars

1/2 cup soaked almonds
1/2 cup soaked cashews
1 cup Ultimate Maca powder
A dash of sea salt
2 dates, pitted
1/8 cup Manuka (or any other) honey
1 cup shredded coconut
1/4 cup coconut oil
2 tablespoon cinnamon
1 teaspoon ginger
1 pinch cayenne

Combine all ingredients and blend in a blender until a dough ball forms. Flatten into a small pan and freeze for 10 minutes. Remove from the freezer and cut into squares. Enjoy!

Power Breakfast Cereal

1/2 cup steel cut oats

1 and 1/2 cup water

1 apple, cored and chopped into small pieces

1-2 tablespoons of raisins

1 teaspoon cinnamon

Bring to boil and cook on low heat for about 20 minutes until oats are done.

Add before serving:

2 tablespoons almond pieces

2 tablespoons Ultimate Maca Powder

Sweetener of choice; honey, maple syrup or stevia

Makes 2-3 servings

Whole Grain Pancakes with Wild Berries and Maca

3 eggs (separate out whites and beat until fluffy)

3/4 cup water

1/2 cup plain Greek yogurt

1/8 cup real maple syrup

1 teaspoon vanilla extract

1 cup whole grain flour (I usually use a combination of wheat, barley and a little rye or buckwheat)

1/8 cup Ultimate Maca powder

1 tablespoon baking powder

1/2 teaspoon cinnamon
1/2 teaspoon sea salt
1 cup wild blueberries

Whisk the egg yolks in a medium-size bowl. Stir in the yogurt, water, and vanilla. Add the flour, Maca powder, and salt and stir until combined. Gently fold in egg whites and berries.

Cook pancakes on hot non-stick grill (no Teflon please!) for about 2 minutes, until the tops are bubbly and the edges are dry. Turn the pancakes over and cook for about 1 more minute, until the bottoms are golden brown. Serve immediately with warm maple syrup.

Variations:

- Swap cranberries, goji berries or other fruits for the wild blue berries.

Pumpkin Pie

(or Souffle' if you want to skip the crust)

1 1/2 cups cooked pureed pumpkin (can also use butter-nut squash or sweet potatoes)
8 oz. cream cheese or kefir cheese (room temp)
3 eggs (separate out whites and beat until fluffy, set aside)
1/4 cup maple syrup
1/2 teaspoon liquid stevia

1 teaspoon cinnamon
1/2 teaspoon nutmeg
1/4 teaspoon cloves
1/2 teaspoon ginger
3 tablespoons Ultimate Maca powder

Combine all ingredients except egg whites. Gently fold them in when everything else is mixed together.

Pour into graham pie crust, almond pie crust (recipe below) or individual ramekin dishes.

Bake at preheated oven 400° for 10 minutes, reduce oven to 325° and bake for 30 more minutes. Turn off oven and leave in there for 15 or 20 more minutes. Chill before serving.

Top with whipped topping (sweeten with stevia) and drizzle top with maple syrup.

Almond Maple Pie Crust

1 1/4 cup raw almonds, soaked in water for 8-12 hours
6-8 teaspoons real maple syrup

Drain water off of soaked almonds and dry well. Dry in oven at 100 degrees for a few hours if you have time. Place almonds in food processor and chop until they are very fine. Slowly add maple syrup, just enough to hold them together. Sprinkle into an 8 or 9 inch pie crust and gently press into the bottom and up the sides. Serves 6

How To Select Your Maca

The availability of Maca in supplement form is rapidly growing. It can be found in:

Capsules (dried powdered Maca root)

Powder (dried Maca root)

Maca extract (concentrated dried powdered root)

Roasted Maca granules (used to make a coffee-like beverage... with no caffeine, of course... hot or cold)

Superfood formulas containing Maca

Bars chocolate combined with Maca and energy bars containing Maca.

Liquid alcohol-based Maca concentrates

Red, Black and Yellow varieties



Maca comes in a variety of colors.

Photo by Jerome Black

- ❖ Look for authentic Maca root, not the stem, leaves, etc, as some unscrupulous producers will use the entire plant even though only the root has medicinal properties.
- ❖ Maca extracts are a very convenient way to get an optimal dosage of Maca daily without having to go to the trouble of making smoothies, adding it to your food or taking handfuls of pills every day. You should be able to find concentrations of 3:1 or 10:1
- ❖ Buy only pure Maca from reputable companies that have knowledge and expertise in Maca. Beware of companies that cut their Maca root powder with rice flour, maltodextrin or other cheap fillers and excipients.
- ❖ Look for Maca that is grown organically and processed following organic standards for highest quality.

Red, Black or Yellow?

There are actually three color variations of Maca: red (purple), black and yellow (golden), but the color is only on the skin and the inside of all three is white. The skin is very thin so when the whole root is crushed into a powder, the color is greatly diluted. Most of the Maca you will find (unless specifically identified) is a combination of all three and results in a rich tan or butterscotch color.

Red Maca Powder is produced from red and purple Maca bulbs. This specific Maca variety is extremely warming (energizing/yang) to the body. It's the spiciest of all Maca varieties and is ideal for anyone living in colder climates. Red Maca may help increase intensity during workouts and other activities.

Specifically, Dr. Gonzales had shown that red Maca (but not yellow or black) reduced prostate size in rats. (Gonzales, *Reprod Biol Endocrinol*. 2005)

Research shows specifically black Maca improves memory (Rubio, 2006) and sperm production in mice. (Yucra) Another study showed both yellow and black Maca increased sperm production in rats. (Gasco)

Lepidium Peruvianum or Lepidium Meyenii?

You may see two different species names given to Maca, *Lepidium peruvianum* and *Lepidium meyenii*, but botanically speaking, both are correct and they are essentially the same plant. Do not be confused by reports that indicate a difference between the two. They are so similar that the differences seem to be irrelevant when it comes to benefits. All plant species will have slight composition variations due to time, variations in climate, soil characteristics, fertilizer, etc.

Lepidium peruvianum Chacón, is actually an honorary name given to Maca after the Peruvian researcher, Dr.

Gloria Chacón de Popovici, because of the extensive research she has conducted on it for over 40 years, identifying the alkaloids responsible for the fertility and other beneficial effects Maca is known for.

The name of the species, peruvianum, is now commonly applied to 'Maca' by almost all contemporary botanists, and is found to be more suitable because the origins of Maca are indicated to be specific to the Peruvian highlands.



Marc Wachter in sterile gear on a tour of the Peruvian Maca facility

Authentic true Maca is farmed at high elevation in the clean air, pure water, mineral rich volcanic soil and is exposed to the harsh climate conditions typical of the Peruvian highlands. The tougher the environment, the more resistant the plant and greater its medicinal efficacy.



Marc Wachter and the latest shipment of dried Maca root at a factory in Peru

Commonly Asked Q's & A's

Q: What is Maca used for?

Dr. Beth: Maca promotes healthy male and female sexual functioning, supports energy, and promotes healthy estrogen and progesterone levels in women.

Q: Is Maca considered safe?

Dr. Beth: Maca is considered very safe by the natives of Peru who have used it for thousands of years. Native Peruvians consume Maca as part of their regular diet, and have a very low rate of breast, uterine and prostate cancer as compared to the U.S. population.

Q: What is the suggested intake?

Dr. Beth: Maca is a food. Its designation as an herbal food imparting specific health benefits is true, but primarily Maca is eaten as a food by very poor people living in a harsh environment where there is little else. Recommended total daily dosages usually range from

3,000-10,000 mgs. of pure organic, premium quality Maca, and can be divided into 2 or 3 dosages.

Q: Are there any side effects or interactions?

Dr. Beth: In toxicity studies conducted in the U.S., Maca showed absolutely no toxicity and no adverse pharmacological effects. In animal studies, the more Maca animals consumed, the stronger and more sexually active they became. Some women may experience slight breast tenderness at high doses. This is an indication to cut back on dosage intake. There are no other known side effects.

One of my friends who was experimenting with Maca asked me recently if I had ever taken it and if there were any side effects to taking Maca. I told her, "yes." She asked, "what happened?" I told her that I had to stop taking it. She asked me why. I told her "I was single." She had a good laugh. I am married now, so this is no longer a problem.

Q: Should Maca be taken daily?

Dr. Beth: Maca as a superfood can be used over long period of time with no harmful adverse effects. Maca is not replacing hormones so it is fine to start and to stop at any time without stressing the body. I have read that some authorities advise not to use it continuously, but to alternate periods of taking the supplement

with periods of rest from the herb to maximize the body's response. However, personally, I do not see the need for this as in Peru, it is eaten by many as a food almost daily.

Q: I heard one should not take Maca all the time.... giving the body a break every week or month, taking a day or two or week off?

Dr. Beth: To me, this doesn't make a lot of sense. Keep in mind that Maca is a food. A food that has been eaten almost every day in the Andes Mountains for centuries.

Q: Can one take too much Maca?

Dr. Beth: It is possible if you are not accustomed to eating or using Maca. It is important to follow instructions of the manufacturer. Though some studies have shown that taking higher levels of Maca can increase beneficial results, keep in mind that taking a product in excessive dosages does not necessarily mean it will work faster or more effectively.

If you are going to start taking Maca, it is a good idea to start with a low to moderate dose, rather than a high dose. If you are prone to experiencing unpleasant hormonal difficulties (skin breakouts, PMS, etc.) and do take significantly more than the recommended dosage on the bottle it is possible that you could experience some temporary unpleasant effects as your body is adjusting. If you are hormonally sensitive, simply start low and

after a week or so, you feel you need more, slowly up the dosage.

Q: How long does it take to feel results?

Dr. Beth: This will vary greatly person to person depending upon what your intended use is. For adrenal fatigue, taking the proper dosage (5,000-10,000 mg daily), one should start to feel a difference in 1 to 3 weeks. For someone in adrenal exhaustion, it may take a little longer, and required dosages may be even higher. For someone who is fairly healthy, looking for an energy boost, they may feel its effects in an hour.

Q: Can I take Maca as a preventative or only to treat health problems?

Dr. Beth: Maca can (and should) be used preventively to help maintain the health of the body as a revitalizer, energizer, restorative, and great physical and intellectual stabilizer. It also is reported to improve memory and concentration, reduce stress and fatigue, reinforce the immune system, improve the quality of sex life, etc.

Q: Which is better, powder or capsules?

Dr. Beth: They are both excellent choices. This is primarily a matter of personal choice. Many people use capsules for the convenience and increased potency factors. Others prefer the powder for the additional nutri-

tional benefits of the fiber, etc., and to avoid the intake of the capsules, some of which may be made of gelatin. Many companies do offer veggie caps to eliminate this concern.

I suggest using them both, you may choose to add Maca powder to your morning smoothie and take the capsules in the evening and/or when you are traveling.

Q: What about Maca extracts?

Dr. Beth: These are concentrated extracts usually available in 3:1 or 10:1 strengths. This means a standardized 500 mg capsules of Maca in a 10:1 strength is equivalent to 5,000 mg of powder or the same as taking 10 capsules of 500 mg regular Maca.

This is a great convenience and hopefully more people will take the needed dosages to get the optimal benefits Maca is famous for.

In my patients who I recommend Maca to, one of the primary disadvantages was that many people didn't like to take so many capsules everyday. Many also got discouraged with their results if I told them to take 8 to 10 capsules a day but they were only taking 1 or 2.

If you are taking the full 10,000 mg or just two 500 mg (10:1) extract daily... you WILL get results!

Q: Can one take Maca during pregnancy?

Dr. Beth: As a safety precaution, most manufacturers state that their supplemental products (including Maca)

should not be taken during pregnancy. However, acute toxicity studies and cytotoxicity evaluations have demonstrated absence of any evidence of potential toxicity of Maca. No serious side effects have been reported in hundreds or thousands of people using Maca as a supplement.

Remember Maca is a food commonly consumed daily in South America. If you feel comfortable eating soy, flax or other foods containing phytoestrogens during your pregnancy, why would you be concerned about Maca, which contains no phytoestrogens?

Q: How does Maca compare to other menopausal herbs like black cohosh or other women's formulas?

Dr. Beth: Maca provides the ingredients to support menopausal health. The herb works through the hypothalamus and pituitary to help insure balanced and healthy hormone levels in the body. Many men and women taking Maca notice the difference within a week! Maca helps promote sexual functioning, insures vaginal lubrication, and, in general, brings about all the benefits of healthy, balanced hormone levels in the body.

Black cohosh, licorice root, and soy products all contain weak plant estrogens. Increasing estrogen in an estrogen dominant society will not improve the situation and may even make it worse. Many women do not feel improvement when taking these herbs or the effect is not lasting. Licorice may increase blood pressure in sensitive individuals.

For these reasons Maca is a better choice.

Q: Can Maca be taken with other non-prescription hormonal-type supplements?

Dr. Beth: Many people have used Maca combined with DHEA, pregnenolone, black cohosh, wild yam, nettle root, passion flower, etc. and have not experienced any negative reactions. Some people may desire to reduce their intake of the other supplements as less may be required for the desired effect.

Q: Is Maca high in calories ?

Dr. Beth: Not really, one teaspoon of Maca powder contains approximately 10.83 calories. Sugar contains 16 calories per teaspoon.

Q: Can Maca help prevent heart disease?

Dr. Beth: Yes. Sterols and unsaturated fatty acids in Maca can help prevent cardiovascular disease by helping to remove and control LDL (the "bad" cholesterol), so your chances of developing atherosclerosis is reduced.

It also helps lower blood pressure and other negative effects of stress which are directly tied to heart disease.

Q: Should we be concerned about depleting the Maca supply in South America, an exhaustible natural resource?

Dr. Beth: No, Maca is not an exhaustible natural resource. But yes, there are some companies that are irresponsibly using chemical fertilizers, damaging the soil and environment. I strongly encourage you to select organically grown Maca.

In addition, Peru is a third world country so try to purchase Maca from companies who practice fair trade procedures with local Peruvian growers and support traditional farming.

Q: Should I keep my Maca powder in the refrigerator?

Dr. Beth: The powder may be kept in a sealed dry container for several months without refrigeration. If you wish to keep it in the refrigerator, you may do so, as it will stay fresh even longer that way. Powders are typically good for up to two years.

Q: How can Maca be so good for so many different aspects of health?

Dr. Beth: It is largely because stress is responsible for so many different health problems. Because of Maca's tremendous ability to help the body overcome the negative effects of stress that so many areas of health can

benefit. Medicine practitioners, nutritionist and herbalists recommend Maca for:

- ❖ Treating menopausal symptoms, such as hot flashes, vaginal dryness and depression, as an alternative to HRT.
- ❖ Stimulating and regulating the endocrine system, including the adrenals, thyroid, ovaries and testes.
- ❖ Strengthen and revitalize the adrenal glands in adrenal fatigue and exhaustion due to long term stress (acting as an adaptogen).
- ❖ Regulating and normalizing menstrual cycles.
- ❖ Stimulating fertility in both men and women.
- ❖ Stimulating the immune system.
- ❖ Increasing energy, stamina and endurance, reducing chronic fatigue.
- ❖ Enhancing libido, treating impotence.
- ❖ Revitalizing seniors, mentally and physically.

References

- Awad AB, Fink CS, Williams H, Kim U.; In vitro and in vivo (SCID mice) effects of phytosterols on the growth and dissemination of human prostate cancer PC-3 cells. *Eur J Cancer Prev.* 2001 Dec;10(6):507-13.
- Awad AB, Williams H, Fink CS.; Phytosterols reduce in vitro metastatic ability of MDA-MB-231 human breast cancer cells. *Nutr Cancer.* 2001;40(2):157-64.
- Balick MJ, Lee R.; Maca: from traditional food crop to energy and libido stimulant. *Altern Ther Health Med.* 2002 Mar-Apr;8(2):96-8.
- Bogani, P., et al. "Lepidium meyenii (Maca) does not exert direct androgenic activities." *J. Ethnopharmacol.* 2006 Apr; 10 4(3): 415-7.
- Bommareddy A, Hahm ER, Xiao D, Powolny AA, Fisher AL, Jiang Y, Singh SV. Atg5 regulates phenethyl isothiocyanate-induced autophagic and apoptotic cell death in human prostate cancer cells. *Cancer Res.* 2009 Apr 15;69(8):3704-12. Epub 2009 Mar 31.
- Bradlow HL, Sepkovic DW. Diet and breast cancer. *Ann N Y Acad Sci.* 2002 Jun;963:247-67.
- Brako L, Zarucchi JL.; Catalogue of the Flowering Plants and Gymnosperms of Peru. St Louis: Missouri Botanical Garden; 1993. 229.
- Brooks NA, Wilcox G, Walker KZ, Ashton JF, Cox MB, Stojanovska L. Beneficial effects of *Lepidium meyenii* (Maca) on psychological symptoms and measures of sexual dysfunction in post-menopausal women are not related to estrogen or androgen content. *Menopause.* 2008 Nov-Dec;15(6):1157-62.
- Buffum, J.; Pharmacosexology: The Effects of Drugs on Sexual Dunction, a review of J. of Pschoactive Drugs. 1982. 14(1-2): 5-43.
- Bustos-Obregon, E., et al. "Lepidium meyenii (Maca) reduces spermatogenic damage induced by a single dose of malathion in mice." *Asian J. Androl.* 2005 Mar; 7(1): 71-6.
- Canales M, Aguilar J, Prada A, Marcelo A, Huaman C, Carbajal L.; Nutritional evaluation of *Lepidium meyenii* (Maca) in albino mice and their descendants. *Arch Latinoam Nutr* 2000 Jun;50(2):126-33.

- Canene-Adams K, Lindshield B, Wang S, Jeffery E, Clinton S, Erdman J. Combinations of Tomato and Broccoli Enhance Antitumor Activity in Dunning R3327-H Prostate Adenocarcinomas. *Cancer Res* 2007; 67:(2).
- Chacón, G., La Maca (*Lepidium peruvianum*) Chacón sp. Nov. Y su habitat. *Revista Peruana de Biología* 1990; 3: 171-272.
- Chacón, G.; Estudio fitoquímico de *Lepidium meyenii*. Dissertation, Univ., Nac. Mayo de San Marcos, Peru.
- Chacón, G., Maca (*Lepidium peruvianum* Chacón) Millenarian Peruvian Food with Highly Nutritional Properties. Lima, Peru 2001.
- Chung F, Rubio J, Gonzales C, Gasco M, Gonzales GF. Dose-response effects of *Lepidium meyenii* (Maca) aqueous extract on testicular function and weight of different organs in adult rats. *J Ethnopharmacol*. 2005 Apr 8;98(1-2):143-7.
- Cicero AF, Bandieri E, Arletti R.; *Lepidium meyenii* Walp improves sexual behaviour in male rats independently from its action on spontaneous locomotor activity. *J Ethnopharmacol* 2001; 75: 225-9.
- Cicero AF, Piacente S, Plaza A, Sala E, Arletti R, Pizza C.; Hexanic Maca extract improves rat sexual performance more effectively than methanolic and chloroformic Maca extracts. *Andrologia* 2002 Jun;34(3):177-9.
- Craig WJ.; Health-promoting properties of common herbs. *Am J Clin Nutr*. 1999 Sep;70(3 Suppl):491S-499S. Review.
- Davis, Donald R: "Trade-Offs in Agriculture and Nutrition, Trends in 43 Garden Crops USDA Data, 1950-1999" *Food Technology*, March 2005, Vol. 59, No. 3.
- Dilman V.; Dean W.; *The Neuroendocrine Theory of Aging and Degenerative Disease*. Petaluma, CA Smart Publications. 1992.
- Dini, A., et.al., Chemical composition of *Lepidium meyenii*, *Food Chemistry* 1994: 49: 347-349.
- Dini I , Tenore GC , Dini A . Glucosinolates from maca (*Lepidium meyenii*) . *Biochem Syst Ecol* . 2002;30(11):1087-1090.
- Dording CM, Fisher L, Papakostas G, Farabaugh A, Sonawalla S, Fava M, Mischoulon D. A double-blind, randomized, pilot dose-finding study of

maca root (*L. meyenii*) for the management of SSRI-induced sexual dysfunction. *CNS Neurosci Ther.* 2008 Fall;14(3):182-91.

Eddouks M, Maghrani M, Zeggwagh NA, et al. Study of the hypoglycemic activity of *Lepidium sativum* L. aqueous extract in normal and diabetic rats. *J Ethnopharmacol.* 2005;97:391-395.

Fernandez C, Suarez Y, Ferruelo AJ; Inhibition of cholesterol biosynthesis by Delta22-unsaturated phytosterols via competitive inhibition of sterol Delta24-reductase in mammalian cells. *Biochem J.* 2002 Aug 15;366(Pt 1):109-19.

Frankel TL, Burns W, Riley J, Morgan RA, Davis JL, Hanada K, Quezado M, Rosenberg SA, Royal RE. Identification and characterization of a tumor infiltrating CD56(+)/CD16 (-) NK cell subset with specificity for pancreatic and prostate cancer cell lines. *Cancer Immunol Immunother.* 2010 Dec;59(12):1757-69.

Ganzera M, Zhao J, Muhammad I, Khan IA. Chemical profiling and standardization of *Lepidium meyenii* (Maca) by reversed phase high performance liquid chromatography. *Chem Pharm Bull (Tokyo)* 2002 Jul;50(7):988-91.

Gasco M, Aguilar J, Gonzales GF. Effect of chronic treatment with three varieties of *Lepidium meyenii* (Maca) on reproductive parameters and DNA quantification in adult male rats. *Andrologia.* 2007 Aug;39(4):151-8.

Gasco M, Villegas L, Yucra S, Rubio J, Gonzales GF. Dose-response effect of Red Maca (*Lepidium meyenii*) on benign prostatic hyperplasia induced by testosterone enanthate. *Phytomedicine.* 2007 Aug;14(7-8):460-4.

Gomez, A., "Maca, Es alternativa Nutricional para el año 2000." Informe Ojo con su Salud No. 58 August 15, 1997, Lima Peru

Gonzales GF, Cordova A, Gonzales C, Chung A; *Lepidium meyenii* (Maca) improved semen parameters in adult men. *Asian J Androl* 2001 Dec;3(4):301-3.

Gonzales C, Cárdenas-Valencia I, Leiva-Revilla J, Anza-Ramirez C, Rubio J, Gonzales GF. Effects of different varieties of Maca (*Lepidium meyenii*) on bone structure in ovariectomized rats. *Forsch Komplementmed.* 2010;17(3):137-43. Epub 2010 Jun 16.

Gonzales-Castañeda C, Gonzales GF. Hypocotyls of *Lepidium meyenii* (maca), a plant of the Peruvian highlands, prevent ultraviolet A-, B-, and C-induced skin damage in rats. *Photodermatol Photoimmunol Photomed*. 2008 Feb;24(1):24-31.

Gonzales GF, Cordova A, Vega K, et al. Effect of *Lepidium meyenii* (Maca) on sexual desire and its absent relationship with serum testosterone levels in adult healthy men. *Andrologia* . 2002;34:367.

Gonzales GF, Cordova A, Vega K, et al. Effect of *Lepidium meyenii* (Maca), a root with aphrodisiac and fertility-enhancing properties, on serum reproductive hormone levels in adult healthy men. *J Endocrinol*. 2003;176:163-168.

Gonzales GF, Gasco M, Malheiros-Pereira A, Gonzales-Castañeda C. Antagonistic effect of *Lepidium meyenii* (red maca) on prostatic hyperplasia in adult mice. *Andrologia*. 2008 Jun;40(3):179-85.

Gonzales GF, Miranda S, Nieto J, Fernández G, Yucra S, Rubio J, Yi P, Gasco M. Red maca (*Lepidium meyenii*) reduced prostate size in rats. *Reprod Biol Endocrinol*. 2005 Jan 20;3:5.

Gonzales GF, Ruiz A, Gonzales C, Villegas L, Cordova A.; Effect of *Lepidium meyenii* (Maca) roots on spermatogenesis of male rats. *Asian J Androl* 2001 Sep;3(3):231-3.

Gonzales GF, Vasquez V, Rodriguez D, Maldonado C, Mormontoy J, Portella J, Pajuelo M, Villegas L, Gasco M. Effect of two different extracts of red maca in male rats with testosterone-induced prostatic hyperplasia. *Asian J Androl*. 2007 Mar;9(2):245-51.

Gonzales, GF., et al. "Effect of *Lepidium meyenii* (Maca) on spermatogenesis in male rats acutely exposed to high altitude (4340 m)." *J. Endocrinol*. 2004; 180(1): 87-95.

Gonzales GF. Functional structure and ultra structure of seminal vesicles. *Arch Androl* 1988; 22: 1-13.

Gonzales, GF., et al. "Effect of Black maca (*Lepidium meyenii*) on one spermatogenic cycle in rats." *Andrologia*. 2006 Oct; 38(5): 166-72

Gonzales, G. F., et al. "Red maca (*Lepidium meyenii*) reduced prostate size in rats." *Reprod. Biol. Endocrinol*. 2005; 3(1): 5.

Gonzales, CF, et al. "Effect of short-term and long-term treatments with three ecotypes of *Lepidium meyenii* (MACA) on spermatogenesis in rats." *J. Ethnopharmacol.* 2006 Feb 20; 103(3): 448-54

Gonzales CF, Rubio J, Gasco M, Nieto J, Yucra S, Gonzales GF. Effect of short-term and long-term treatments with three ecotypes of *Lepidium meyenii* (MACA) on spermatogenesis in rats. *J Ethnopharmacol.* 2006 Feb 20;103(3):448-54. Epub 2005 Sep 19.

Gonzales, GF., et al. "*Lepidium meyenii* (maca) improved semen parameters in adult men." *Asian J. Androl.* 2001; 3(4): 301–3.

Gonzales, GF., et al. "Effect of *Lepidium meyenii* (maca) roots on spermatogenesis of male rats." *Asian J. Androl.* 2001; 3(3): 231–33.

Gonzales GF. A test for bioandrogenicity in men attending an infertility service. *Arch Androl* 1988; 21: 135-42.

Gutendorf B, Westendorf J.; Comparison of an array of in vitro assays for the assessment of the estrogenic potential of natural and synthetic estrogens, phytoestrogens and xenoestrogens. *Toxicology.* 2001 Sep 14;166(1-2):79-89.

Hernandez M; Intestinal absorption of cholesterol is mediated by a saturable, inhibitable transporter. *Biochim Biophys Acta.* 2000 Jul 19;1486(2-3):232-42.

Herrenkohl LR. Prenatal stress disrupts reproductive behavior and physiology in offspring. *Ann N Y Acad Sci* 1986;474:120-8.

Inoue M, Wu CZ, Dou DQ; Lipoprotein lipase activation by red ginseng saponins in hyperlipidemia model animals. *Phytomedicine.* 1999 Oct;6(4):257-65.

Johns, T; The anu and the Maca. *Journal of Ethnobiology*, 1981. 1:208-212.

Johnson IT. Glucosinolates: bioavailability and importance to health. *Int J Vitam Nutr Res.* 2002 Jan;72(1):26-31. Review.

Komesaroff PA, Black CV, Cable V, Sudhir K.; Effects of wild yam extract on menopausal symptoms, lipids and sex hormones in healthy menopausal women. *Climacteric.* 2001 Jun;4(2):144-50.

King, Steven. "Ancient Buried Treasure of the Andes," Garden,

November/December 1986.

Lampe JW, Peterson S. Brassica, biotransformation and cancer risk: genetic polymorphisms alter the preventive effects of cruciferous vegetables. *J Nutr.* 2002 Oct;132(10):2991-4.

Legros JJ.; Towards a consensus regarding androgen substitution therapy for andropause] *Rev Med Liege.* 2000 May;55(5):449-53.

Leon, J.: The "Maca" (*Lepidium Meyenii*) a little known food plant of Peru. *Economic Botany.* 1964: 18:122-127.

Li JH, Awad AB, Fink CS, Wu YW, Trevisan M, Muti P.; Measurement variability of plasma beta-sitosterol and campesterol, two new biomarkers for cancer prevention. *Eur J Cancer Prev.* 2001 Jun;10(3):245-9.

Lopez-Fando A, Gomez-Serranillos MP, Iglesias I, et al. *Lepidium peruvianum* chacon restores homeostasis impaired by restraint stress. *Phytother Res.* 2004;18:471-474.

Martinez Caballero S, Carricajo Fernandez C, Perez-Fernandez R, et al. Effect of an integral suspension of *Lepidium latifolium* on prostate hyperplasia in rats. *Fitoterapia.* 2004;75:187-191.

Matsuura H.; Saponins in garlic as modifiers of the risk of cardiovascular disease. *J Nutr.* 2001 Mar;131(3s):1000S-5S. Review.

Muhammad I, Zhao J, Dunbar DC, Khan IA. Constituents of *Lepidium meyenii* 'maca'. *Phytochemistry* 2002 Jan;59(1):105-10.

Negro-Vilar A.; Stress and other environmental factors affecting fertility in men and women: overview. *Environ Health Perspect* 1993 Jul;101 Suppl 2:59-64.

NIH, 10th Report on Carcinogens, Estrogens, Steroidal. Dec. 2002

Oakenfull D.; Soy protein, saponins and plasma cholesterol. *J Nutr* 2001 Nov;131(11):2971-2.

Oshima M, Gu Y, Tsukada S, et al. Effects of *Lepidium meyenii* Walp and *Jatropha macrantha* on blood levels of estradiol-17 beta, progesterone, testosterone and the rate of embryo implantation in mice. *J Vet Med Sci.* 2003;65:1145-1146.

Plat J, Mensink RP.; Increased intestinal ABCA1 expression contributes to the decrease in cholesterol absorption after plant stanol consumption. *FASEB J.* 2002 Aug;16(10):1248-53.

Quiros, C. et al., "Physiological Studies and Determination of Chromosome Number in Maca, *Lepidium Meyenii*." *Economic Botany* 1996; 50(2); 216-223.

Rea, J. Raíces andinas: Maca. in Bermejo, H. and Leon, J.E., eds., *Cultivos marginados, otra perspectiva de 1492.* 1992.

Rubio, J, Caldas M, Dávila S, Gasco M, Gonzales GF; Effect of three different cultivars of *Lepidium meyenii* (Maca) on learning and depression in ovariectomized mice. *BMC Complement Altern Med.* 2006; 6: 23.

Rubio J, Dang H, Gong M, Liu X, Chen SL, Gonzales GF. Aqueous and hydroalcoholic extracts of Black Maca (*Lepidium meyenii*) improve scopolamine-induced memory impairment in mice. *Food Chem Toxicol.* 2007 Oct;45(10):1882-90.

Ruiz-Luna AC, Salazar S, Aspajo NJ, Rubio J, Gasco M, Gonzales GF. *Lepidium meyenii* (Maca) increases litter size in normal adult female mice. *Reprod Biol Endocrinol.* 2005 May 3;3:16.

Sandoval M , Okuhama NN , Angeles FM , et al. Antioxidant activity of the cruciferous vegetable maca (*Lepidium meyenii*). *Food Chem.* 2002;79(2):207-213.

Sodersten P; et al.; Inhibition of sexual behavior in lactating rats. *J Endocrinology* 1983, 99(2): 189-97.

Steinberg, P., *Phil Steinberg's Cat's Claw News*, 1995.Vol. 1, Issue 2, July/August.

Steiner M.; Female-specific mood disorders. *Clin Obstet Gynecol* 1992 Sep;35(3):599-611.

Stone M, Ibarra A, Roller M, Zangara A, Stevenson E. A pilot investigation into the effect of maca supplementation on physical activity and sexual desire in sportsmen. *J Ethnopharmacol.* 2009 Dec 10;126(3):574-6. Epub 2009 Sep 23.

Sudhop T, Lutjohann D, Kodal A, Igel M, Tribble DL, Shah S, Perevozskaya I, von Bergmann K. Inhibition of intestinal cholesterol absorption by ezetimibe in humans. *Department of Clinical*

Pharmacology, University of Bonn, Germany. *Circulation* 2002 Oct 8;106(15):1943-8.

Talalay P, Fahey JW. Phytochemicals from cruciferous plants protect against cancer by modulating carcinogen metabolism. *J Nutr.* 2001 Nov;131(11 Suppl):3027S-33S. Review.

Tellez MR, Khan IA, Kobaisy M, Schrader KK, Dayan FE, Osbrink W.; Composition of the essential oil of *Lepidium meyenii* (Walp). *Phytochemistry* 2002 Sep;61(2):149-55.

Ulloa N, Nervi F.; Mechanism and kinetic characteristics of the uncoupling by plant steroids of biliary cholesterol from bile salt output. *Biochim Biophys Acta.* 1985 Nov 14;837(2):181-9.

Valentová K , Buckiová D , Kren V , Peknicová J , Ulrichová J , Simánek V . The in vitro biological activity of *Lepidium meyenii* extracts. *Cell Biol Toxicol.* 2006;22(2):91-99.

Valentov- K, Ulrichov- J. *Smallanthus sonchifolius* and *Lepidium meyenii* - prospective Andean crops for the prevention of chronic diseases. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.* 2003 Dec;147(2):119-30.

Valerio LG Jr, Gonzales GF. Toxicological aspects of the South American herbs cat's claw (*Uncaria tomentosa*) and maca (*Lepidium meyenii*): a critical synopsis. *Toxicol Rev .* 2005;24(1):11-35.

Vecera R, Orolin J, Skottová N, et al. The influence of maca (*Lepidium meyenii*) on antioxidant status, lipid and glucose metabolism in rat . *Plant Foods Hum Nutr.* 2007;62(2):59-63.

Wang Z, Yang J, Wang G, Bian L. Influence of *Lepidium meyenii* walp on lipid and bone mass in ovariectomized rats] *Wei Sheng Yan Jiu.* 2009 Jul;38(4):420-2, 425. *Forsch Komplementmed.* 2010;17(3):137-43.

Weizman R.; et al.; Sexual dysfunction associated with hyperprolactinemia in males and females undergoing hemodialysis. *Pschosom Med.* 1983. 45(3): 259-69.

Wolfe, D.; *Superfoods*, North Atlantic Books, Berkeley, CA, 2009.

World Health Organization. WHO laboratory manual for the examination of human semen and sperm cervical mucus interaction. 4th ed.

Cambridge: Cambridge University Press; 1999, 1-10.

Xiao D, Powolny AA, Moura MB, Kelley EE, Bommareddy A, Kim SH, Hahm ER, Normolle D, Van Houten B, Singh SV. Phenethyl isothiocyanate inhibits oxidative phosphorylation to trigger reactive oxygen species-mediated death of human prostate cancer cells. *J Biol Chem*. 2010 Aug 20;285(34):26558-69. Epub 2010 Jun 22.

Xiao D, Singh SV. Phenethyl isothiocyanate inhibits angiogenesis in vitro and ex vivo. *Cancer Res*. 2007 Mar 1;67(5):2239-46.

Yucra S, Gasco M, Rubio J, Nieto J, Gonzales GF. Effect of different fractions from hydroalcoholic extract of Black Maca (*Lepidium meyenii*) on testicular function in adult male rats. *Fertil Steril*. 2008 May;89(5 Suppl):1461-7. Epub 2007 Jul 31.

Zenico T, Cicero AF, Valmorri L, Mercuriali M, Bercovich E. Subjective effects of *Lepidium meyenii* (Maca) extract on well-being and sexual performances in patients with mild erectile dysfunction: a randomized, double-blind clinical trial. *Andrologia*. 2009 Apr;41(2):95-9.

Zhao J , Muhammad I, et al, New alkaloids from maca (*Lepidium meyenii*). *J Agric Food Chem*. 2005;53 (3);690-693

Zhang Y , Yu L , Ao M , Jin W . Effect of ethanol extract of *Lepidium meyenii* Walp. on osteoporosis in ovariectomized rat . *J Ethnopharmacol* . 2006;105(1-2):274-279.

Zheng BL, He K, Kim CH, et al. Effect of lipidic extract from *Lepidium meyenii* on sexual behavior in mice and rats. *Urology* 2000; 55: 598-602.



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