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## HERBAL MEDICINE IN ERECTILE DYSFUNCTION: USE OF PERUVIAN MACA IN THE ALTERNATIVE TREATMENT OF ERECTILE DYSFUNCTION

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**Abstract:** With the growing rate of erectile dysfunction in the world, there is also a growing demand for functional and herbal foods related to the reversal of erectile dysfunction, among them Peruvian maca, which is gaining prominence for its possible action on sexual performance and energizing action. This sparked an interest in understanding the action of these foods and how they act in the face of the problem of sexual dysfunction, given that erectile dysfunction has become a public health issue, as well as being part of a possible prognosis of underlying pathologies, it directly affects the self-esteem and well-being of those affected by it. Within this context, this study asks how Peruvian maca influences the alternative treatment of erectile dysfunction. In order to answer this question, the general objective was to investigate the bioactive compounds and their contribution resulting from the application of Peruvian maca to improve erectile dysfunction, while the research methodology is a bibliographical review of integrative, descriptive niche literature with a qualitative approach, which includes publications in Portuguese, English and Spanish, published in the last 13 years.

**Keywords:** Erectile dysfunction, Peruvian maca, *Lepidium meyenii*, sexual well-being and herbal medicine

## INTRODUCTION

The use of the leaves and roots of certain plants for medicinal purposes has always been a practice widely used by our ancestors as a means of treating some pathology. In recent decades, this demand has intensified. The search for healthy and functional foods has coincided with a greater demand for scientific proof of food safety. Several plants can be considered phytotherapies, which have a wide range of properties associated with promoting health and well-being, preventing diseases and illnesses, and alternative treatments for some pathologies.

The World Health Organization (WHO) considers traditional medicine to be the set of practices and skills, based on empirical theories, coming from indigenous experiences of various cultures, commonly used in the maintenance of health, prevention and treatment of various pathologies, both physical and mental.

Functional foods are characterized by offering various health benefits, in addition to the nutritional value inherent in their chemical composition, and could potentially play a beneficial role in reducing the risk of chronic degenerative diseases.

Peruvian maca, *Lepidium meyenii*, is a plant native to Peru, specifically in the Andes region. Its root is consumed in countries such as Chile and Argentina, as it contains antioxidant compounds. It is seen as a medicine due to its aphrodisiac properties, attributed to a unique composition of macamides. Peruvian maca has been used for over 2,000 years to treat erectile dysfunction, mood swings, hormonal problems and infertility (DOS PASSOS, 2022). Since the 1990s, there has been a growing interest in maca products in many parts of the world. Father Cobo was the first to describe the name of maca and its properties in 1653. In the 18th century, Ruiz referred to the properties of maca to increase fertility and also to its stimulating effect (GONZALES, 2012). In 1961, the first scientific experiment was carried out to confirm maca's biological properties in the reproductive process (SILVA, 2010).

Erectile dysfunction can trigger problems in the psychosocial niche, affecting not only the man but also his partner's sexual satisfaction, significantly influencing well-being and quality of life. Erectile dysfunction is the persistent inability to achieve or maintain an erection sufficient for satisfactory sexual performance.

The reluctance to discuss this condition with a doctor and the cost of treatment has led to a great demand for alternative treatments, making herbal medicine an alternative for men who want to treat their sexual dysfunction. Because of their easy accessibility, herbal medicines have gained acceptance and credibility in the market, being sold without a prescription, which makes them easier to acquire.

Studies report that around 82% of the Brazilian population uses herbal products to treat various comorbidities, but the functionality of Peruvian maca is unknown to many Brazilians, as there are few studies on it in Brazil. In view of the large number of men who suffer from erectile dysfunction and the search for alternative treatments, this project aims to review the literature on the use of Peruvian maca in the alternative treatment of erectile dysfunction, solving problems related to dysfunction and providing knowledge about the effects of Peruvian maca in the treatment of erectile dysfunction. In this context, the problem of this study is: How does Peruvian Maca influence the treatment of erectile dysfunction?

Sexual performance is one of the key factors for a good quality of life, contributing to pleasure and full satisfaction, not only for the man, but also for his partner. However, when it sets in, erectile dysfunction can lead to problems such as anxiety and depression, since the partner feels unable to provide and feel pleasure. Data shows that erectile dysfunction has become a public health issue, as it is currently considered a vascular disease, as it has been associated with cardiovascular diseases because they have several characteristics in common. The high rate of development of erectile dysfunction and the great demand for alternative treatments has made Peruvian maca a great ally in the treatment of dysfunction.

The choice of this topic, which mentions the use of Peruvian Maca as an alternative treatment for erectile dysfunction, is motivated by the meticulousness of seeking scientific knowledge that proves, through the results of studies, the benefits of this root for the treatment of people suffering from erectile dysfunction erectile dysfunction, which is the subject of vigorous scientific research and debate among scholars and specialists about its effectiveness.

In view of this, this study is of great relevance in terms of understanding the potential of Peruvian maca and its effects in the treatment of erectile dysfunction, opening up a new door of possibilities for those who seek to solve their dysfunction through herbal medicine. It is also of great academic and scientific relevance, as it updates information on the subject by means of a bibliographical review, thus helping to reduce the use of drugs and benefiting people who suffer from erectile dysfunction.

The general objective was to identify how Peruvian maca can help treat erectile dysfunction. And the specific objectives were to demonstrate the efficacy of Peruvian maca in erectile dysfunction, to learn about the compounds responsible for Peruvian maca's action on sexual problems and to point out the methods of using Peruvian maca.

## **DEVELOPMENT**

### **METHODOLOGY**

This is an integrative, descriptive literature review with a qualitative approach. The data used was obtained from the following sources: Google Scholar and *Scientific Electronic Library Online* (SCIELO), which provide scientific digital platforms with literature review articles and research addressing the topic in question. Articles published between 2010 and 2023 were included, in Portuguese, English and

Spanish, which were analyzed and presented in text form, when the exclusion criteria were incomplete information that was not related to the proposed objective. The key words used in the research were: erectile dysfunction, Peruvian maca, *Lepidium meyenii*, sexual well-being and herbal medicine.

## RESULTS AND DISCUSSION

Herbal medicines and dietary supplements are an affordable alternative used by many men in an attempt to treat their sexual dysfunction. As public awareness of sexual health conditions increases, the demand for dietary supplements to treat these problems tends to rise (ZANPROGNA, 2021). Some causes responsible for erectile dysfunction can be cited, such as alcoholism, drugs, obesity, hyperprolactinemia, side effects of medication, low testosterone levels, psychological problems and diseases such as diabetes (DOMINGOS; DE SOUZA BRITTO, 2013). Sexual stimulation causes the release of nitric oxide, causing vascular relaxation and swelling of the corpora cavernosa, which results in relaxation of the smooth muscle with dilation of the arterioles, thus causing increased blood flow, causing erection (ALVEZ; QUEIROZ; MEDEIROS, 2012).

According to the World Health Organization (WHO), sexual health is “a state of physical, mental and social well-being in relation to sexuality, requiring a positive and respectful approach to sexuality, sexual relations and the possibility of having pleasure and safe sexual experiences.” (DE ABREU RODRIGUES, 2020, p. 21).

Peruvian maca is a food with high nutritional value, which is why it is traditionally used in folk medicine due to its biological activities. Its roots are used in juices and soups and for the production of flour, which is used in the preparation of processed foods, being marketed and exported as a supplement, in the form

of capsules, flour and freeze-dried (VITORIO, 2021). Scientific evidence shows effects on sexual behavior, fertility, mood, memory, osteoporosis, metabolism and the treatment of some tumors (GONZALES, 2012).

Rich in protein, potassium, calcium, magnesium, phosphorus, copper, zinc, some B vitamins (riboflavin and niacin) and vitamin C. It is also known as a phytoestrogen because it helps prevent chronic degenerative diseases such as breast, colon and prostate cancer. It has a similar chemical structure to estrogen. And due to the fact that it is rich in amino acids such as tryptophan, which is a strong precursor of the hormone serotonin, when there is an increase in concentration levels in the body, there is an increase in sexual desire (RODRIGUES, 2022). Maca has also been used as a portion of foods that promote human health, promoting resistance builder and fertility promoter. Significant improvements in oxidative stress have been observed after maca intake, which may be related to the levels of saponins, alkaloids, steroid hormones and polyphenolic compounds in maca (DO AMARAL; SOUZA, 2020).

Peruvian maca is rich in secondary metabolites and has significant antioxidant capacity, which is related to the beneficial effects on health associated with its consumption as food and for therapeutic purposes. Secondary metabolites have diverse structures and functions and are generally grouped into classes such as alkaloids, phenolic compounds (flavonoids, phenolic acids, tannins, lignans), coumarins, quinones, terpenes and steroids (DOS SANTOS, 2021).

Black maca is the rarest of all the colors, accounting for around 15% of the annual harvest. Studies have shown that it is the most effective form for men, especially for muscle gain, endurance, mental focus and libido. Research has shown that the biological activities of Peruvian maca include improved fertility and sexual performance. In a study of eight

trained, experienced and healthy cyclists, the aim was to investigate the effect of supplementing with Peruvian maca extract for 14 days on endurance performance and sexual desire. Administration of Peruvian maca significantly improved the self-rated sexual desire score compared to the baseline test, and compared to the placebo trial after supplementation (TEIXEIRA; VALE, 2021).

Among the mechanisms of action and pharmacological functions of Peruvian Maca, the degradation of reactive oxygen substances stands out, generating protection for spermatozoa, as well as their DNA, being related to the reduction of infertility damage, an effect generated by the presence of polyphenols and isothiocyanates in this plant. The literature describes its effect on the hormonal balance between estrogenic metabolites and the modulation of estrogen and androgen receptors. Highly recommended for its phytochemicals with antioxidant potential, it also contains L-arginine, a precursor of nitric oxide (NO) produced in the endothelium, which is responsible for peripheral vasodilation, thus allowing an increase in penile erection (ZANPROGNA, 2021).

A study on the chemical composition and regional oxidation found the fatty acid profiles in maca to be high in fatty acids, including mainly linolenic, oleic and linoleic acids (DA CRUZ; DA PAIXÃO; SILVA, 2021).

According to a clinical study, with no comparison with placebo, the consumption of 3.0g/day of Maca improved sexual function tests in 5 patients induced by the use of serotonin receptor inhibitors (SSRIs). The same result was not observed when consuming doses of less than 1.5g/day. It is believed that the food has an action on the hypothalamus and its adrenal glands, which gives it stimulating effects on sexual desire (LIBERATO; SANDES; GÓES).

Lifestyle can have a beneficial or detrimental effect on the functioning of the body. The asso-

ciation of inadequate nutritional factors has an impact on sexual and reproductive health in men and women. One factor that can interfere is obesity and is associated with lower serum levels of testosterone and luteinizing hormone (LH), high rates of oligospermia or azoospermia, and decreased ejaculate volume, sperm concentration and total sperm count. Studies have shown that in males Maca increases sexual desire, libido, sperm synthesis and improves mild erectile dysfunction, while also showing that Maca reduces psychological symptoms, including anxiety and depression (DA CRUZ, DA PAIXÃO, SILVA, 2021). Testosterone increases sexual desire in both sexes and promotes erection in men. Reduced serum testosterone levels are associated with lower sexual desire and erectile dysfunction. In a clinical study without comparison with placebo, patients with sexual dysfunction induced by the use of serotonin reuptake inhibitors (SSRIs) who consumed 3.0 g/day of maca had an improvement in sexual function tests, which did not occur with the 1.5 g/daily dose of maca. The administration of gelatinized maca to nine healthy men for 4 months, in doses of 1.5 g or 3.0 g, shows an increase in semen volume, sperm count and motility (36). After 4 months of treatment, the number of motile sperm increased from  $87.72 \pm 19.87$  million (mean  $\pm$  standard error of average) to  $183.16 \pm 47.84$  million ( $p < 0.05$ ) (36) (GONZALES, 2014).

## CONCLUSION

The research into the influence of Peruvian maca in the treatment of erectile dysfunction achieved its objectives, since it demonstrated the compounds present in maca and their effects on erectile dysfunction. We can observe the presence of linoleic acid which directly influences the regulation of hormones, arginine which significantly improves blood circulation and consequently the irrigation of penile vessels.

It has also been observed to significantly improve the main pathologies responsible for erectile dysfunction, as it acts by improving metabolic functions due to its potent amount of B-complex vitamins and vitamin C, which can help process carbohydrates, fats and proteins, thus contributing to weight reduction.

Peruvian Maca also influences the treatment of psychological niche problems due to the presence of phenolic compounds, precursors of dopamine, as well as acting in the modulation of estrogenic and androgenic receptors, which are highly indicated for having phytochemicals with antioxidant potential, It also contains L-arginine, a precursor of nitric oxide (NO) produced in the endothelium, which is responsible for peripheral vasodilation, thus allowing an increase in penile erection, and consequently improving sexual dysfunction.

The data also shows that Peruvian Maca is effective, but only in mild dysfunctions, through clinical studies, where the administration of 3mg/day of Peruvian Maca has been

shown to be effective in the treatment of mild erectile dysfunction, while doses lower than this do not show the same result.

With regard to data accessibility, there was a great lack of information, given that studies on Peruvian Maca in Brazil are quite scarce and not very in-depth, so there was a need to translate articles from other languages, such as English and Spanish, generating limited information on Peruvian Maca.

For future research, it is recommended that this be done in a practical way, through field research, using clinical case evaluations of people who use Peruvian Maca, using questionnaires and interviews, providing quantitative data on the effects of using Peruvian Maca, thus obtaining data with more in-depth and plausible results of reliability. This will make it possible to ratify the data found in the study in question, expanding and diversifying knowledge regarding the treatment of erectile dysfunction, contributing to a better quality of life and the physical and mental well-being of people with this condition.

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