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ABSTRACTS FROM SOME SCIENTIFIC RESEARCH ON MACA

1. Research on toxicity and nutritive quality of maca

Absence of Acute Toxicity and Cytotoxicity *in-vitro* of *Lepídium meyenii.* Marcelo A, Okuhama N, Mairena T, Salazar M, Aguilar JL. **Draft Paper**

Acute toxicity was determined in the animal model of Lethal Doses 50. *Increasing amounts of Maca were orally administered to Swiss mice, which were observed for a* 3 *day-period A dose considered "ínnocuous" (Wlllíams' classificatíon) was determined* (16129 *mg/Kg). Cytotoxity in an in vitro assay was performed using RAW* 264.7 *macrophages in cell culture and the Trypan Blue vital colorant exclusion method was performed to evaluate viability. From low doses to* 800 *„ug/mL of the aqueous extract showed no changes in viability. Both evaluations show very good tolerance of in vitro and ín vívo assays for Maca.*

Acute Toxicity -Determination of Lethal Doses 50 for Lepidinolato@ 5,5L and 8,2L, Standardized Extracts of MACA (Lepidium meyenii). Capcha R, Marcelo A, Rojas P, Ramos A, Plaza A, Aguilar JL, **Draft Paper**

In this study the acute toxicity (DL50) of two extracts of Maca provided by Química Suiza were evaluated. The extracts were administered by oral via in Swiss mice by a period of 3 *days. The results show a DL50 greater of* 68 070 *mg/Kg, dose in which not death of mice were registered, nor either changes in the behavior, or some alteration in the internal organs. Therefore this study demonstrates the absence of acute toxicity of maca extracts in Swiss mice, dosed orally.*

Nutritional Evaluation of *Lepidium meyenii* (MACA) in Albino Mice and Its Descendant. Canales M, Aguilar JL, Prada A, Marcelo A, Huamán C, Carvajal L. **Arch. Latinoamer. Nutrición 2000;50:126-133**

This is a prospective controlled study of the nutritional evaluation of supplementation With Lepidium meyenii in mice in two consecutive descendants. The results show that Lepidium meyenii is a good nutritional food the mice supplemented with Maca show increase in serum levels of protein and albumin compared to control group. This study document nutritional properties of Maca.
Nutritional Evaluation of Lepidium meyenii *(MACA) in Albino Mice and their Descendant. Canales M, Aguilar JL, Huamán C, Prada A, Marcelo A, Carvajal L. ((P-15). Double-Blind Placebo Controlled Study of the Anti-Stress Effect of Lepidium meyenli (MACA) In Humans. Magán L, Linares B, Aguilar JL, Pasanaqui F. (P-23). The Maca (*Lepidium meyenii*) and their Anti-Stress Effect in an Animal Model in Mice. Tapia A, López C, Marcelo A, Canales M, Aguilar. JL. (P-24). Effects of Maca* (Lepidium meyenii) *as an Ergogenic Product in Normal Adults. Gayoso O, Gayzueta I, Canales M, Marcelo A, Rojas*

P, Aguilar JL. (P-26). ***Proceedings of the International Conference on Ethnomedicine and Drug . Discovery. Maryland, Nov 1999***

This are *4* abstracts presented at an International Conference demonstrating the benefits of Lepidium meyenii both in animal models and also in humans on the nutritional, energetic and anti-stress properties

> Chemícal-Bromatological study of Lepidium meyenii Walp (Maca) and Aiphanes deltoidea Burret (shica-shica). Baquerízo GL. **Bachelor Thesis of Medicine. Universidad Nacional Mayor de San Marcos. 1968**

This is a thesis of Medicine from student of the older University of Medicine in Peru, showing the characteristics of Lepidium meyenii referred the concentrations of proteins, lipids, carbohydrates and main minerals. It shows an excellent nutritional features for Maca superior to other known nutritional crops.

2. Research on anti-stress of maca

> The Maca *(Lepidium meyenii)* and its Anti-Stress Effect in an Animal Model in Mice. Tapia A, López C, Marcelo A, Canales M, Aguilar JL.**Acta Andina 1999-2000;8:31-37**

Maca has been traditionally mentioned as an anti-stress natural product. This study evaluate the effect of Lepidium meyenii in the control of stress compared to a control group, in an experimental induce stress in mice. The results show significant less score of stress in supplemented group compared to control. Also the supplemented group had more rapid normalization of stress than control group. This study shows the anti-stress effect of Maca in an animal model

> Anti-Stress Effect of two Extracts of Maca (Lepidium meyenii) Enriched in Glucosinolates in Mus musculus Strain BaLB/C. Capcha R, Marcelo A, Rojas P, Ramos A, Plaza A, Aguilar JL. **Draft Paper**

In this study a group of BaLB/C strain mice (Mus musculus) of 50-60 *days of age and* 20-30 *weigh were used to evaluate the anti-stress activity of an extract of* Lepidium meyenii. *The animals were dosed with Maca extracts enriched with glucosinolates* (8.2 *L and* 5.5 *L), which were inoculated via oral by needle for* 100 *days. Three groups of* 10 *mice each, were used.*
Stress was induced by electrical stimulation, which served to evaluate the development of neurotic features using the modified Lopez scale. The results showed that the extracts from maca enriched with glucosinolates have a significantly better anti-stress activity in comparison with the control group. (p<O.O5).

3. Energy and stamina research

Antihypoglycemic Effect of Maca in Fasted and Insulin-induced hypoglycemic Mice. Miura T , Hayashi M, Naito Y, Suzuki I. J **Traditional Med *1999i16:93-96***

The antihypoglycemic effect of Lepidium meyenii was investigated in fasted and insulin-induced hypoglycemic mice. The results indicated the anti-hypoglycemic effect of Lepidium meyenii may promote glyconeogenesls. This findings may be useful for the treatment of energy supply on hypoglycemic conditions.

Vigor-Inducing Effect of Maca *(Lepidium meyenii* Walp), an Andean Hypocotyl, in Mice. Salas CA. **Draft Paper**

In this study a group of mice supplemented with Lepidium meyenii were compared to control group to evaluate the stamina effect. The results show a significant increase of energetic performance in oxygen consumption, and also an Increase of resistance on swimming time. these results show the vigor-inducing effect of maca..

Evaluation of the Stamina Activity of two Extracts from *Lepidium meyenii* (MACA) in Albino Mice. Rojas P, Macarlupu JL Capcha R, Plaza A, Aguilar JL. **Draft Paper**

In this study two standardized extracts of Lepidium meyenii with a known concentration of glucosinolates were evaluated by the stamina effect in mice using the oxygen consumption (the VO2 max) in rest and after activity. The results show a significant increase of energetic performance of mice supplemented with glucosinolate-enriched extracts compared to control group no supplemented. This study increase the amount of evidence about the energetic capability of Maca in animal models.

Effect of Lepidium meyenii (MACA) on physical-energetic performance in humans. Gayoso O, Aguilar JL, Goyzueta I, Rojas P, Marcelo A, Timoteo 0, Carvajal L. **Draft Paper.**

In this prospective double blind placebo controlled study it is demonstrated that exists an improvement in the physical yield of healthy adults supplemented with Lepidium meyenii (MACA) on a 29 daily dose, which is significantly superior to the yield of the placebo group. An increase in the distance range in the six-minute walking test (SMW7J in people from maca group ($p < 0.05$) was demonstrated. No modifications in weight or biochemical nutritional parameters were detected, then this stamina property is independent of nutritional features of Maca. No side effects were reported associated to ingestion of Maca.

4. Libido enhancing and sexual performance

Effect of a Lipidic Extract from *Lepidium meyenii* on Sexual Behavior in Mice and Rats. Zheng BL, He K, Hyungchan C, et al. **Urology 2000;55:598-602**

This study evaluate the effect of a purified lipidic extract of Lepidium meyenii (MACA) in the sexual behavior of mice and rats. Number of complete intromissions and mating were quantifies in mice and latent period of erection (LPE) in rats with erectile dysfunction were used as a parameters of evaluations. Extract demonstrated a significant enhance of sexual function of the mice and rats, evidenced by an increase in the number of complete intromissions and a decrease in the LPE.

Study of the strogeníc Property of *Lepidium meyenii* Walp (MACA) ín Rats. Lama G, Quíspe G, Ramos D, Ferreyra C, Casas H, Apumayta U. **Proceedings of the** II **Congreso Nacional de Ciencias Farmacéuticas** y **Bioquímicas. Lima, Perú. Oct 1994**

This is an abstract report presented in 8 *Peruvian Congress of Pharmacy. this is a short report referred to pro-estrogenic effects of the administration of an hexanic extract of Lepidium meyenii. This increase weight of ovaries were the main feature to consider pro-estrogenic effect showed by treated group.*

5. Hormonal and fertility research

Protector Effect of *Lepidium meyenii* Walp "MACA' in the Testicular Function of Mice Treated with Oral Imidazol. Valdivia M. **Draft Paper. 1997**

This is an unpublished report of results of a biological study in mice focusing about the protective effect of Lepidium meyenii on the testicular production of spermatozoids. In this study the production of spermatozoids is damage for an overdose use of imidazolic compound and they observe that the group of mice supplemented with Maca had better recovery of spermatozoid production in comparison with control group. This results shows cytoprotectíve effect on sperm cell line or increase of recovery capacity provide by Maca supplement.

Isolation of Proteins of *Lepidium meyeni* Walpers (MACA). Carhuayo RA, Saravía EA, Castro MR, Apumayta UP. (PS1). Separation of Active Principles of Hexanic Extract of *Lepidium meyenii iWalp* (MACA). Apumayta UP, Cuba P. (PS4). **Proceedings of the** I **Congreso de Investigación. Perú.**

This are two very short preliminary report abstract presented in a Peruvian Congress. 771e concentration of primary metabolites are reported in first abstract, while the second abstract report the use of an hexanic extract of Maca in post-menopausal women. The serum levels of luteinizant hormone (frequently increased in post-menopausal women) decrease from 117,189 *mUI/lmL previous supplementation to* 32,03 *mUI/lmL after treatment.*

Utilízación de Diferentes Niveles de Maca en la Fertilidad de Cobayos. Alvarez C. **Resumen de Tesis de Ingeniero Zootecnista. 1996**

This is a biological study in guinea pigs focusing the utilization of different amounts of supplementation with Lepidium meyenii to evaluate the number and characteristics of offspring. Results show an Increase in number of descendent In a direct relationship to amount of supplementation of Maca. 771e quality of offspring is also improved by the supplementation with Maca.

Effects of Peruvian Maca on Hormonal function. Walker M. **Trends in Nutritional Sciences 1999**

This is an internet information about uncertified information of pro-hormonal properties of Lepidium meyenii (Maca). 7ñís report of not documented data of some professional experiences with the use of Maca are reported; Unfortunately this report does not provide scientific references of the information referred.