BOLETIN LATINOAMERICANO Y DEL CARIBE DE PLANTAS MEDICINALES Y AROMATICAS

Desde el Río Grande a la Patagonia
Incluyendo el Caribe de habla española, inglesa y francesa

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INDICE

OBJETIVOS DEL BOLETÍN

Estimular a los grupos de trabajo existentes en Latinoamérica, sean investigadores, productores, funcionarios o simplemente interesados en las plantas medicinales y aromáticas, poniendo a su disposición este Boletín para la difusión y la divulgación de sus investigaciones y de las actividades que en general desarrollen en torno a plantas.

Ser una herramienta de difusión para la Sociedad Latinoamericana de Fitoquímica principalmente y de otras sociedades y agrupaciones que se sientan representados por este Boletín.

Constituir un nexo entre los profesionales de habla hispana, francesa, portuguesa e inglesa de la región, relacionados con el tema central del Boletín.

NOTAS DEL EDITOR

Deseo iniciar el saludo de Mayo, agradeciendo a todos quienes nos han apoyado y dado su fuerza para llevar adelante este PROYECTO. Este mes cumplimos un año editando BLACPMA; esperamos cumplir muchos mas. Deseo agradecer a quienes nos han confiado sus investigaciones, desde Brasil, India, Sudáfrica, Italia, Inglaterra, Cuba, Chile, Argentina y otros países que día a día nos llegan para ser evaluados. Es así que ya tenemos el próximo número listo ya no con dos artículos sino que tres:
Nº 1 “Anti-inflammatory effect of ternatin, a flavonoid from Egletes viscosa Less., in the rat model of colitis induced by acetic acid” de V.S. N. Rao y colaboradores de **Brasil**.
Nº 2 “La influencia aborigen en la medicina popular cubana”, de Alicia Rodríguez de **Cuba**.
Nº 3 “Glomus mosseae enhances the growth of two tropical medicinal plants-Withania somnífera and Spilanthes calva” de M.K. Rai y colaboradores, de **India**.

Por otro lado me llena de gozo, anunciar que el día 30 de Mayo a mas tardar comenzará a funcionar nuestra propia página WEB: www.blacpma.cl En este sentido invito a Laboratorios de cualquier lugar del mundo o empresas relacionadas para que nos hagan llegar sus aportes tanto económicos como tambien de propaganda para este importante sitio.

Además como una forma de sentirnos representados hemos elaborado un logo que va en las cartas oficiales de BLACPMA. La construyó, Carlos Calvo, estudiante de Química y Farmacia de la Pontificia Universidad Católica de Santiago (Chile) con aportes propios, y de ambos editores.

También, deseo agradecer al Dr. Jorge Alonso, su valioso artículo que ha sido ampliamente felicitado por investigadores de muchos lugares del mundo y del mismo modo al Dr. Patrick Moyna quien escribió la editorial del número anterior a lo cual a modo de ejemplo el Dr. Arnaldo Bandoni ha dicho: “Excelente la nota de Moyna, con claros horizontes de humanismo y evidentes limitaciones sociales: una de las tantas paradojas americanas”.

Por último, este será el último número en el cual aparecerá el Dr. Lionel Germossen Robineau como co-editor, él ha renunciado a este cargo debido a su gran trabajo en TRAMIL como así mismo en la Universidad donde trabaja. Nos ha prometido que seguirá participando pero tambien nos ha sugerido a su sucesora, la cual será una destacada profesional. Gracias Lionel por tu incondicional apoyo.

EDITORIAL[1]

La producción de medicamentos requiere de una exigente política de calidad que permita la seguridad y eficacia de los mismos. Para garantizar esto, se requiere desarrollar e implantar un sistema de gestión de la calidad que integre las Buenas Practicas de Fabricación y el resto de las acciones asociadas al aseguramiento y control de la calidad.

Aunque los productos naturales, en especial los fitofarmaceuticos, no están ajenos a esto, la falta de reglamentos para la producción, el registro sanitario y el control de la calidad en muchos casos, impide el desarrollo de esta industria, con la consecuente limitación de la competitividad y por ende la afectación económica. Por lo que se hace necesario, trabajar toda la comunidad científica, con vista a establecer las mismas con el objetivo de al igual que los medicamentos de origen sintéticos, garantizar la eficacia y la seguridad de los productos naturales.

El control de la calidad contempla lo referente al muestreo, las especificaciones y los ensayos, como también a los procedimientos de organización, documentación y liberación que aseguren que los ensayos necesarios y pertinentes realmente se efectúen, garantizándose así, que no se permita el uso de materias primas, excipientes y materiales de envase que no cumplan con los requisitos establecidos en las diferentes monografías, normas ramales y técnicas de control.

Esto es importante, pues como señalo el Dr Alonso en su articulo publicado en el número anterior de este boletín[2], el 80% del territorio habitado por el hombre carece de farmacias, por lo que los accesos a la medicina del primer mundo no esta al alcance de la gran mayoría de la humanidad. Debemos agregar además, que esta medicina solamente se esta desarrollando para curar los males de ese primer mundo, por lo que el acceso a las mismas esta cada vez más distantes para la gran población que habita en nuestros países.

Se calcula que en los próximos años solamente el 10% de la población mundial podrá disfrutar de esta medicina, por lo que el resto de la población se vera

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[1] Jorge E. Rodríguez Chanfrau, Director de Investigación y Desarrollo. Centro de Investigación y Desarrollo de Medicamentos. Ciudad de la Habana. Cuba.

[2] Jorge Ruben Alonso, “Bosques y selvas tropicales como fuentes de medicamentos”, BLACPMA 2 (2): 16 – 21 (2003).

precisada a utilizar la medicina tradicional y los fitofarmacos. De ahí la gran responsabilidad que recae sobre todos los que de una forma u otra trabajamos en este campo, de garantizar un producto con la calidad requerida y la eficacia probada.

En nuestro país, desde hace algunos años se establecieron diferentes normativas que controlan el proceso de control de la calidad en nuestra industria de fitofármacos. En estos documentos se regulan de manera general aspectos tales como:

- Especificaciones del método de producción
- Requisitos organolépticos
- Requisitos físicos, químicos y fisicoquímicos
- Envase, etiquetado, embalaje y marcación
- Transportación, manipulación, almacenamiento y conservación

En cada uno de estos aspectos, se establecen de manera rigurosa todos los aspectos necesarios para garantizar una calidad adecuada de los productos y que son de obligatorio cumplimento por los laboratorios fabricantes. Por otro lado, el Centro Estatal para el Control de Medicamentos (CECMED), ha trabajado en los últimos años, en la elaboración y presentación de las regulaciones para el registro de medicamentos naturales.

Nuestro objetivo no es contraponer los medicamentos de síntesis a los fitofármacos, sino demostrar que los productos naturales son una alternativa valida para muchas afecciones, siendo una solución accesible a la gran mayoría de nuestros pueblos por su bajo costo (ideales para la atención primaria) y su uso tradicional, por lo que el lograr desarrollar fitofármacos y extractos naturales con calidad y efectividad terapéutica para la atención primaria y la comercialización es nuestra función más importante en la actualidad y en eso debemos todos trabajar.

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ARTICULOS

INSTRUCTIONS TO AUTORS

THE LATIN AMERICAN AND CARIBBEAN BULLETIN OF MEDICINAL AND AROMATIC PLANTS, it is a bimonthly scientific publication directed to diverse professionals and technicians linked to the field of the medicinal and aromatic plants. will be accept papers related with the Bulletin areas, they are agronomy, anthropology and etnobotanic, industrial applications, botany, quality and normalization, ecology and biodiversity, economy and market, pharmacology, phytochemistry, legislation, information and diffusion of events, courses, prizes, regulations, news, market questions, reports, bibliography, or any other material type that is important to publish.

The Bulletin publishes articles on original research, review, and short communications, written in Spanish, English, Portuguese or French language. The maximum extension will be of 5 pages for the revisions and original research and of 3 pages for short communications. The announcements, news and others won't exceed a sheet. In all the cases the charts should be included.

Articles should be presented in Microsoft Word processor (version 3.1 or superior, with letter arial number 12) and they will be sent by electronic mail to the following address: pulpito@entelchile.net or by air mail in disquette of 3.5 inches to: José Luis Martínez, Editor, PO Box 70036, Santiago 7, Chile. Once it is received, they will be sent to two referee, who decide their approval or refusal.

The works will be divided in Title, Introduction, Materials and Methods, Results, Discussion Conclusions and references. In anyone of the modalities in which the manuscript are presented, in the first page will be appear: title (in English), authors´ names, institutional affiliations, correspondent main author's address and electronic mail. Will also appear a summary in Spanish (Traduction by Editor) and English of 100 words or less.

The bibliographical references will be numbered according to order of appearance in the text and they will be identified with Arabic number. Citations will owe being of published documents of relevance; the not published documents or personal citations will be included inside the text among parenthesis.

Examples of references

For Journals articles:

Kostennikova ZA. (1983). UV spectrophotometric quantitative determination of flavonoids in Calendula tincture. Farmatsiya 33 (6): 83 - 86.

Soto H, Rovirosa J, San Martin A., Argandoña V. (1994). Metabolitos secundarios de Dictyota crenulata. Bol. Soc. Chil. Quím.39 (3): 173 -178.

For Books
Durand E, Miranda M, Cuellar A. (1986). Manual de prácticas de laboratorio de Farmacognosia. Ed. Pueblo y Educación, La Habana, Cuba 130 pp.

For Chapter in Books:
López de Almeida JM. (2000). Formulación farmacéutica de productos fitoterapéuticos, pp 113-124. En Sharapin, N: Fundamentos de tecnología de productos fitoterapéuticos. Ed. CAB y CYTED, Bogotá, Colombia.

According to Ramón and Cajal: the people that wants to write a scientific article, should have three requirements: 1) to have something to say; 2) to say it; and, 3) not to say nothing else that that. (taken of Bol. Soc. Chil. Quím.).

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MACA *Lepidium meyenii*

ANTONIO BIANCHI[3]

Articulo recibido: 18 de Enero de 2003
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A MORE COMPLETE FOOD THAN ROYAL JELLY

"This plant grows in the harshest
and coldest areas of the sierra,
where no other plant for man's
sustenance can be grown"
Father Bernabè Cobo 1653

Who has ever seen the puna? An enormous and infinite cold desert. No trees, no flowers, only small clumps of dried grasses. A blue cold that takes your breath away, some puddles of stagnant water, an inert silence. At night, when the temperature falls well below zero, the twinkling of the stars is transformed into a cascade of light "Puna brava, Puna dura", say the Peruvians. A desert of absolute cold surrounded by snow-covered peaks, a few huts with stone walls and thatched roofs and a gelid cold that penetrates right into your bones. The sun is there, immobile and distant at the same time, indifferent and sluggish in an absence of heat. It is in this hostile and distant environment that the small potato of the Andes grows, the secret of the ancient Inca, the Maca. Scientists call it *Lepidium meyenii*: actually not all of them, but the majority now agree that this is the real scientific name.

HISTORY

Its cultivation was once very common in many parts of the Perù and Bolivia plateau: the area of Huancavelica, Ayacucho and the department of Puno still have place-names such as "Macapata", "Macapampa" or "Macachacra" (1). Today it grows only in a few parts corresponding to the ecological regions of Suni y Puna, on the shores of Lake Chinchapoya, in the department of Junin and Pasco, at an altitude of between 3700 and 4450 metres above sea-level. In total, less than 50 hectares are devoted today to the cultivation of this foodstuff (2). How has such a drastic reduction in the area of cultivation come about?

From prehistoric remains it is now confirmed that the first inhabitants of the Peruvian plateau knew the Maca: between 4000 and 1200 BC an agriculture based on the domestication of the "papa shillinco" of the Maca and of the Oca" was born. But it was the birth of the Cusco and the Inca civilization that fully exploited this tuber The Inca soldiers were fed with rations of Maca to increase their strength and physical performances in extenuating marches and fierce combats. Some writers (3) have even gone so far as to hypothesize that the ascent of this civilization could in some way be related to a diet based on this foodstuff.

The reason for the impressive restriction of the area of growth of Maca is mainly due to the progressive depletion of the soils (4). Maca, a foodstuff that is very rich in nutrients, is believed to progressively exhaust the soil. Therefore a system of cultivation by rotation is necessary, with a period of fallow for the soils of 5-10 years, but even with this system, with the passing of the years, the number of areas that can be cultivated progressively decreases. After centuries, Maca only grows now in a relatively small area of the Perù and this is despite research by the Instituto Nacional de Investigacion Agraria y Agroindustrial (INIAA) which has repeatedly tried to extend these cultivations.(5).

BOTANY

The first description of the maca was the merit of Dr.G. Walpers in 1843 who used a specimen from the department of Puno and coined the term *Lepidium meyenii* Walp. This description remained

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unquestioned until 1989 when Gloria Chacon proposed the distinction between *Lepidium meyenii* and *Lepidium peruvianum* Chacon, stating that only the latter is the legitimate maca (6). The work of this author was based on a cultivated specimen from the city of Cerro de Pasco, department of Pasco. In fact, this distinction has not had any particular follow-up today and all Authors today speak exclusively of the *Lepidium meyenii* as the only maca existing in nature, considering the term *Lepidium peruvianum* a synonym. From the botanical point of view, the maca corresponds to:

DIVISION	ANGIOSPERMAE
CLASS	DICOTYLEDONEAE
SUBCLASS	ARCHICHLAMYDEAE
ORDER	PAPAVERALES
FAMILY	BRASSICACEAE
GENUS	*Lepidium*
SPECIES	*Lepidium meyenii*
COMMON NAME	MACA

Reference (3)

The Brassicaceae family consists of over 2500 species and over 350 genera, including very important vegetables such as broccoli and cauliflower. The term Lepidium derives from the Greek “Lepidion”, which literally means “small scale”, the name given by Dioscorides to small fruit of this genus. This is a cosmopolitan genus which includes about 130 species in the world: in Peru alone there are 15 species (7).

The maca appears essentially in the vegetative phase as a small rosette of leaves, which becomes larger in the generative phase when it is made up of leaves and flowers, and by a root generally of a conical shape, which is its underground organ and which can reach a length of about 18 cm and a diameter of about 6.5 cm. The dimensions can in fact vary a great deal, with very small specimen
s which reach 1 cm. in length and 0.6 cm. in diameter. Medium sizes are generally around 5-6 cm long and 3-5 cm wide.

The latter are those generally most appreciated by the Indian populations. The larger ones on the other hand, are too rich in fibre and are considered of poor nutritional value and called “shugla”. The colour of the root varies from plant to plant, ranging from light yellow to dark red and even brown-black: there exists a vast native classification of the different species which are not necessarily in relation to their quality, as shown by modern chemical studies. From a recent study carried out on 758 plants from the department of Junin, the following 13 ecotypes were found:

Colour of the root	Percentage of ecotypes
Yellow	47.8%
Red-white	16.5%
Scarlet red-white	9.0%
White-red	6.3%
Lead grey	5.4%
Black	4.2%
Red-yellow	3.7%
White	2.2%
White- scarlet red	1.6%
Yellow-red	1.3%
Light lead grey	0.8%
Scarlet red-lead grey	0.7%
Yellow-light lead grey	0.5%

Reference (3)

PHYTOCHEMISTRY

As far as the chemical composition of maca is concerned, we have to distinguish two major categories: the primary compounds (of a nutritional nature) and the secondary ones. Nutritional studies on the maca have obviously revealed a considerable difference in the content of macroinutrients. In 1968 Gloria Vasquez, in her doctoral thesis, reported for the first time the following composition (9):

Chemical composition	Percentage
Humidity	35.51 g%
Total nitrogen	1.71 g%
Proteins	10.30 g%
Lipids	26.10 g%
Carbohydrates	24.63 g%
Ashes	3.46 g%
Calcium	207.90 mg%
Iron	9.93 g%
Phosphorus	328.10 mg%
Calories	384.00 Kcal

Reference (3)

This study reveals an optimum protein content and an appreciable content of calcium and iron, which make this foodstuff indicated in many states of deficiency. In 1973 another thesis (9) appeared which in part confirms and in part scales down the previous data, reporting the following:

Chemical composition	Percentage
Major components	
Water	68.70%
Proteins	3.80%
Lipids	0.60 g%
Carbohydrates	23.00 g%
Ashes	1.40 g%
Calories	176.00 kcal

Vitamins	
Carotene	0.07 mg
Thiamine	0.15 mg
Riboflavin	0.31 mg
Ascorbic acid	3.10 mg
Minerals	
Calcium	94.00 mg %
Phosphorus	57.00 mg %
Iron	2.20 mg %

Reference (3)

The results of this second study show a protein, lipid and iron content that is significantly less than the first and a calcium content that is still very appreciable. The difference in the results is probably to be derived from the different typology of specimens analysed. The larger potatoes, even if aesthetically better, are in fact rich mainly in fibre and therefore are of a low caloric and nutritional value, whilst the smaller ones have more macronutrients. A recent thesis at the University of San Marcos (10) has tried to put some order in the subject, focusing its interest on specimens that the farmers consider suitable for human consumption.

Major compounds	**Yellow variety (g %)**	**Red variety (g %)**	**Black variety (g %)**
Humidity	9.71	10.14	10.47
Total proteins	17.99	17.22	16.31
Fats	0.82	0.91	0.82
Fibres	5.30	5.45	4.95
Ashes	3.49	3.68	3.63
Carbohydrates	62.69	62.60	63.82
Total nitrogen	2.87	2.76	2.42
Non-protein nitrogen	1.55	1.16	1.36
Pure protein (NP x 6.25)	8.25	9.97	7.7
Starch	37.86	37.52	38.18
Soluble sugars Direct reducers	6.17	6.03	7.02
Soluble sugars Indirect reducers	16.52	17.26	17.10
Vitamins	**Yellow variety (mg %)**	**Red variety (mg %)**	**Black variety (mg %)**
Niacin	43.30	37.27	39.06
Ascorbic acid	3.52	3.01	2.05
Riboflavin	0.61	0.50	0.76
Thiamine	0.42	0.52	0.43
Minerals	**Yellow variety (mg %)**	**Red variety (mg %)**	**Black variety (mg %)**
Potassium	1130	1160	1000
Sodium	20	20	40
Magnesium	70	80	80
Calcium	190	200	240
Phosphorus	320	290	280
Trace elements	**Yellow variety (ppm)**	**Red variety (ppm)**	**Black variety (ppm)**
Copper	6	6	8
Zinc	32	30	30
Manganese	22	20	22
Iron	80	62	86
Boron	12	24	26

Reference (3)

This last study, as well as confirming the concerns on the quality of the maca put on to the market, nevertheless reveals how maca has a very respectful protein content, especially if related with the low levels of fat. The fats of the maca are lower than that of the potato (1.8%), kiwicha (2.5%) or maize (3.9%). The presence of a discreet carbohydrate fraction nevertheless makes maca a foodstuff that, although reduced (comprised between 176 and 384 Kcal) is not without caloric value. This factor makes it an ideal complement in the athlete's diet (rich supply of protein, few fats but with a discreet energy supply in terms of calories). This value is increased further if we analyse in particular the type of amino acids present in this Andean tubercle (11):

Amino acids	**Concentration in mg/g of protein**
Glutamic acid	156.5
Arginine	99.4
Aspartic acid	91.7
Leucine	91.0
Valine	79.3
Glycine	68.3
Alanine	63.1
Phenylalanine	55.3
Lysine	54.5
Serine	50.4
Isoleucine	47.4
Threonine	33.1
Tyrosine	30.6
Methionine	28.0
HO-Proline	26.0
Histidine	21.9
Sarcosine	0.7
Proline	0.5
Cystine	not determined
Tryptophane	not determined

(essential amino acids in bold type),
Reference (3)

Practically all the essential amino acids, apart from tryptophane, are present. This data is also confirmed by subsequent studies (12):
Content in essential amino acids of the maca.

Amino acids	G/100g of protein
Isoleucine	4.3
Leucine	6.8
Valine	6.3
Lysine	5.8
Phenylalanine + Tyrosine	4.8
Threonine	4.5
Methionine + cystine	3.3

The maca is therefore an ideal food for the athlete, precisely due to its richness in those nutrients essential for the development of a muscular mass that is adequate to sustain considerable and, above all, prolonged, effort. This obviously does not mean that we have in front of us the concentrations which certain "gym" supplements have made us used to, with great concern for safety and perplexity for their real effectiveness. The position of maca as a dietary supplement is more diversified and in a certain sense, more "complete". It contains in the correct dietary concentrations, all the nourishment required by a person subjected to intense physical effort (such as a peasant obliged to work for 8 – 10 hours at over 4,000 metres above sea-level). In addition, the energizing action of the maca is not limited to its nutritional value. Experiments on rats have shown that taking maca in alimentary doses can increase the levels of glucose in hypoglycaemic rats after a prolonged fast (18hours) or after pharmacological induction (insulin): this data is particularly significant as it shows an action of glucogenesis, the production of glucose from the reserves of glycogen in the organism (13). The availability of glucose is put into relation with the energy reserves of the organism and the hypoglycaemic crisis is the first sign of the "collapse" of athletes subjected to prolonged effort. The utility of the maca for the athlete is therefore particularly indicated for those who are seeking an improvement in their physical resistance and in prolonged effort.

The concentration of relevant doses of minerals (11) make it more useful for this purpose.

Minerals	mg/110 g of dry plant
Iron	16.6
Manganese	0.8
Copper	5.9
Zinc	3.8
Sodium	18.7
Potassium	2050.0
Calcium	150.0

The presence of significant concentrations of iron and calcium also make it suitable to supplement all those situations of increased requirements, especially in women: pregnancy and ageing, above all. In particular the concomitant presence of high concentrations of these minerals and of all the essential amino acids necessary for the growth of the foetus make it an excellent source of nutrition during pregnancy, as reported by the Andean tradition knowledge. Naturally on condition that significant doses are reached, corresponding to about 5-10 g per day. On the other hand, its highly publicised use as a slimming supplement leaves us perplexed. Given its low but not negligible caloric value, the maca can represent an interesting foodstuff for slimming diets on condition that it is part of the daily calorie count: otherwise its use as an additional supplement risks altering the real calorie supply, compromising the result of the diet.

THERAPEUTIC ACTIVITY

As far as the secondary compounds currently identified in the maca are concerned, these are essentially of three categories:

- **COMPOUNDS OF A STEROID NATURE**

These include the following compounds (11):

Steroid compounds	Percentage
Sitosterol	45.50%
Campesterol	27.30%
Ergosterol	13.60%
Brassicasterol	9.10%
Ergostaniedol	4.50%

At the state of present knowledge and of the concentrations of these compounds present in the maca,. none of these components appear to be able to exercise a significant action on the properties of this foodstuff.

- **AROMATIC GLUCOSINOLATES**

The maca contains isothiocyanates of an aromatic nature already shown in many other Brassicaceae. Between these glucotropaenoline and m-methoxyglucotropaeoline have been shown in particular (13). These compounds seem to have preventive activities on many models of tumours (especially of the gastrointestinal system) on experiment animals. It must however be specified that the concentration of these substances is much higher in foodstuffs closer to our dietary tradition (Brussels sprouts, broccoli etc.) therefore it appears decidedly illogical to use the maca to seek this chemical-preventive effect.

- **ALKALOIDS**

Four alkaloids have been identified in the maca (3): macaine 1,2,3 and 4. The presence of these compounds has been put into relation with the aphrodisiac and anti-sterility activity of the maca but to date scientific proof is lacking in order to support this function.

- **POLYUNSATURATED FATTY ACIDS: THE PROBLEM OF THE ACTIVE INGREDIENTS.**

The maca has, in traditional Andean medicine, an aphrodisiac and anti-sterility function. Altitude has in fact a strongly inhibiting action on sexuality and on the reproductive capacities of man and animals. The Andean peoples have always maintained that a diet based on the maca can contrast this effect. This action has been shown today in some experiments on farm animals. Regularly taking maca induces an increase in sexual relations and an increase in the Graaf follicles in the female animals, whilst in male animals the volume of seminal fluid is increased by 20%, sperm motility by 40% and the number of spermatozoids by 33%: all this can be translated in the end by a larger number of pregnancies brought to term (3). To reach these objectives the percentage of maca flour in the diet should correspond to about 6%. The limit of these studies mainly consists of the absence of a control group. This effect has subsequently been the object of at least four studies on animals (with a relative control group) which have at least confirmed the aphrodisiac effect. On the basis of this research it is probable that the active fraction is that regarding the polyunsaturated fatty acids; amongst these, two in particular take on particular importance, macaene and macamide (15). However, the presence of these compounds varies enormously in the various products on the market, oscillating between 0.15% and 0.84%, with the result that the consumption of these compounds oscillates between 1-52 and 14.88 mg/die (16). Other Authors had hypothesized in this sense a role of the isothiocyanates (1) or the steroid substances (11).

CLINICAL STUDIES AND EXPERIMENTAL PHARMACOLOGY

Two studies have been carried out in Italy, one in China and one in Perú. Two studies were carried out by the University of Modena. In the first, it was shown how the aphrodisiac effect, on experiment rats- visible through an increase in copulative performance, is independent of the nutritive value of the maca (17). In the second however, it was shown how above all the hexanic extract is responsible for this and not the chloroform extract (17). The Chinese study showed how by supplementing the diet of experiment rats with such an extract at 10% for 22 days there was, in the group treated, an increase in the number of sexual intromissions that was four times greater and an increase in the number of females positive with the presence of sperm of 2.5 times. (18). Whilst a Peruvian study showed that an aqueous extract of maca (66.7 mg/ml) given for 14 days results in an increase in the weight of the testicles and of the epididymis, with an increase in the number of mature spermatozoids (19).The last two studies essentially maintain how the use of maca has as a primary indication male sterility rather than a simple aphrodisiac effect and this action, from a therapeutic point of view, would without doubt be more fascinating and in tune with traditional Andean medicine. It must be underlined that a recent Peruvian study has shown how taking tablets of maca (1500-3000 mg/die) for four months led in nine subjects aged between 22 and 44 to an increase in seminal volume, in spermatozoid count and an increase of sperm motility and the number of mobile spermatozoids. None of these effects was in any way traceable to a hormone-mediated action due to an increase in luteinizing hormone, stimulating follicle, to an increase in prolactin, testosterone of estradiol (20). Given the worrying risks in the long term connected with an increase in these hormones, this is no meagre result.

The primary interest of maca for anti-sterility and possibly as an aphrodisiac (even if in this case we are still far from clear evidence) lies precisely in the fact that it seems to depend on compounds that contribute in some way to its food value. That is, it would be a question of natural substances with a wide safety margin (tests on animals have not shown any sign of toxicity at doses of 3 g/kg) which make maca a completely different aphrodisiac from substances such as ginseng, muira puana or yohimbina, for which (in the absence of equally clear evidence) there always exists the danger of side effects. Maca is a natural foodstuff that can be used for long periods and with an excellent margin of safety: the Andean peoples have been using it for thousands of years at high doses without any sign of toxicity having been shown.

PRODUCTION AND USES

As mentioned earlier, there exists a serious problem of availability of ground for maca: the Andean populations have consequently developed over the centuries a refined technology to maximise as far as possible the preservation of the beneficial properties of this foodstuff. The traditional method of preparation appears to consist of a slow drying of the fresh potatoes which takes from six to eight weeks. During the day the maca is spread out on special sacks and exposed to the sun of the Andes: it is

gathered in the evening in order to protect it from the night freezing and exposed again the next day. Drying in the sun modifies the taste, making it more pleasant, perhaps degrading the fraction of glucosinolates or hydrolyzing the fibre content. At this point only the smaller potatoes are selected, as they are poor in fibre and richer in nutritive substances. The larger ones are kept as animal fodder. The pressure exercised by the commercial success in recent years of maca-based products today risks modifying this traditional system of production. There have been cases where the maca potatoes have been put on to the market without considering their dimensions and often dried quickly in rudimentary ovens. Even the Institute for the Study of Genetic Resources of the FAO in Rome intervened on the matter and which, in collaboration with the prestigious Centre for the Study of the Potato of Peru, set up a specific programme to protect the quality of maca put on to the market and to promote organic cultivation, free of chemical additives.

Today the advice for those who wish to use maca as an energizing foodstuff is without doubt that of using the flour or the whole potato: modern research has shown that this is the best way to preserve all the nutritive elements. Moreover, no research exists to date that has been able to isolate a fraction responsible for the energizing or anti-hypoglycemizing activity. The matter of the aphrodisiac properties is more complex: in this case, the experiments available would give more evidence for the use of extracts that exploit the presence of polyunsaturated fatty acids: different preparations, mainly in the form of capsules. are present on the European and American markets. Three thousand years on, the small potato from the Andes never ceases to amaze.

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ARTICULO 2 (ARTICLE 2)

BUDDLEJA GLOBOSA: A MEDICINAL PLANT OF CHILE, THEIR CHEMISTRY, BIOLOGICAL ACTIVITY AND TRADITIONAL USES

PETER J. HOUGHTON[4]

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ABSTRACT: *Buddleja globosa* has been found to contain flavonoids, phenylethanoids, iridoids, sesquiterpenes, diterepens and triterpenoids. In vitro tests have shown that the flavonoids and phenylethanoids have activities related to the traditional use of the leaves for wound healing and for liver ailments. The sesquiterpenoids present have antifungal properties and anti-inflammatory properties and an extract has shown antiplasmodial activity which warrants further investigation to determine the compounds responsible.

Resumen: En *Buddleja globosa* se ha encontrado que contiene flavonoides, feniletanoides, iridoides, sesquiterpenos, diterepenos y triterpenoides. En análisis in vitro se ha mostrado que los flavonoides y feniletanoides tienen las actividades relacionadas al uso tradicional de las hojas para la curación de las herida y para las dolencias más fuertes. Los sesquiterpenoides presentes tiene propiedades antihongos y propiedades antiinflamatorias y un extracto ha mostrado actividad antiplasmodial que garantiza la investigación extensa para determinar los compuestos responsable.

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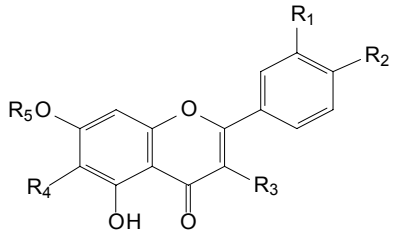
INTRODUCTION

The genus *Buddleja* (Buddlejaceae) is sometimes named *Buddleia* in the scientific and popular literature and previously was included in the Loganiaceae. *Buddleja globosa* Hope is a bush attaining 4m in height which is common in the central and southern regions of Chile and also in similar areas in Argentina, Bolivia and Peru. It is widely grown as an ornamental in parks and gardens in the United Kingdom because of its globose heads of golden-yellow flowers which attract large numbers of honey bees in early summer. *B. globosa* is known in Spanish as 'matico' and as 'palñin' or 'pañil' in the language of the Mapuche, the indigenous inhabitants of central Chile, and as 'palguin' in Quechua (1,2). The leaves of the plant were official in the first Chilean Pharmacopeia (1886) and an infusion of the leaves was used for washing wounds while the powdered dried leaves were used to heal ulcers and old wounds (1,2). An infusion of the leaves was drunk to treat chronic dysentery, haemorrhoids, hepatitis and catarrh. The juice of the leaves was also used to treat warts and callous ulcers(1). These uses in traditional medicine are very similar to those for other *Buddleja* species from central America, southern Africa and eastern Asia (1).

CHEMICAL CONSTITUENTS

B.globosa contains a variety of compounds including flavonoids **1- 6**, phenylethanoid esters **7,8** and terpenoids including iridoids, sesquiterpenes, diterpenes and saponins:



Structure 1 = Luteolin				
R_1 = OH	R_2 = OH	R_3 = H	R_4 = H	R_5 = H
	Reference 3			

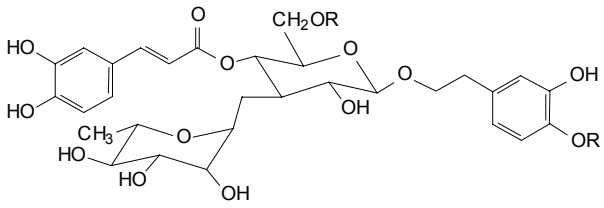
Structure 2 = 6-hidroxyluteolin				
R_1 = OH	R_2 = OH	R_3 = H	R_4 = OH	R_5 = H
	Reference 3			

Structure 3 = Linarin				
R_1 = H	R_2 = OCH_3	R_3 = H	R_4 = H	R_5 = H
	Reference 4			

Structure 4 = Aqpigenin-7-O-glucoside				
R_1 = H	R_2 = OH	R_3 = H	R_4 = H	R_5 = Glucose
	Reference 4			

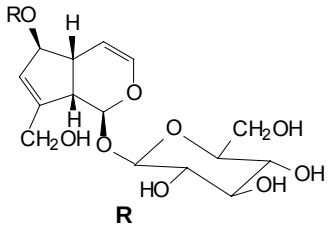
Structure 5 = Rutin				
R_1 = H	R_2 = OH	R_3 = O-Rut.[5]	R_4 = H	R_5 = H
	Reference 4			

Structure 6 = Scutellarein 7-O-glucoside				
R_1 = H	R_2 = OH	R_3 = H	R_4 = OH	R_5 = Glucose
	Reference 4			



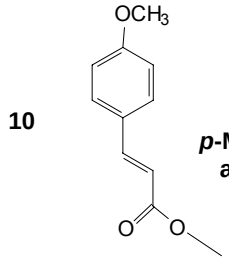
7 R = H Verbascoside
8 R = glucose Echinacoside

The terpenoids isolated from *B. globosa* include the 9 carbon iridoids aucubin **9**, catalpol **11** and related compounds **10, 12-14** which are found in greatest amounts in the leaves (5-7).

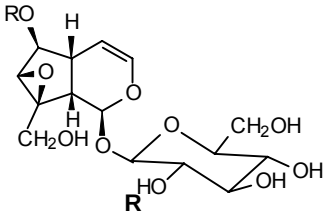


R

9 H Aucubin

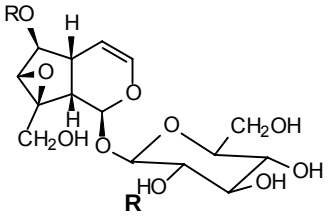


10 ***p*-Methoxycinnamoyl aucubin**



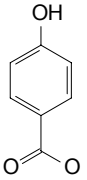
R

11 H Catalpol
12 Me Methylcatalpol

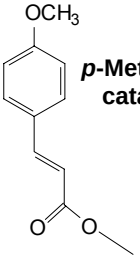


R

11 H Catalpol
12 Me Methylcatalpol



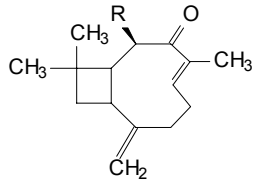
13 **Catalposide**



14 ***p*-Methoxycinnamoyl catalpol**

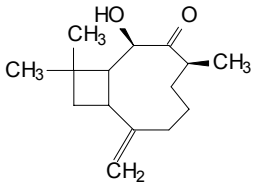
[5] O-Rutinose

The stem- and root-bark has been found to contain sesquiterpenes **15-21** of the caryophyllene type (8,9) and also abietane diterpenes **22-25** including the bisditerpenes maytenone **26** (8,9).

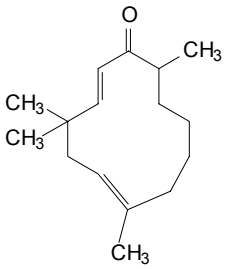


R

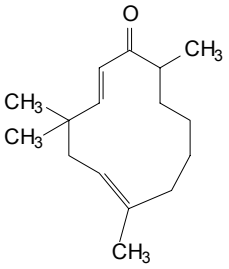
15 OH Buddledin A
16 H Buddledin B
17 $OOCCH_3$ Buddledin C



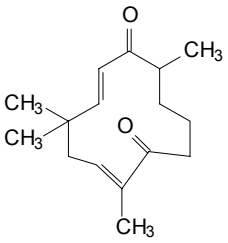
18 Dihydrobuddledin A



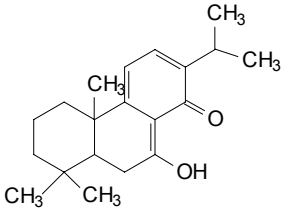
19 Zerumbone

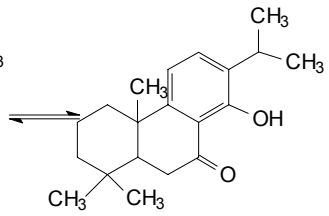


20 Buddledone A

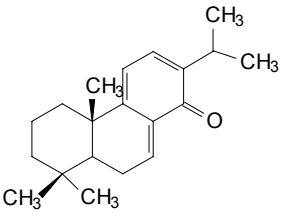


21 Buddledone B

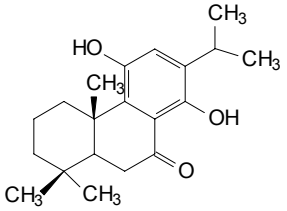




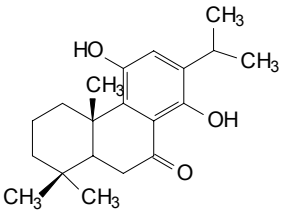
22 Buddlejone



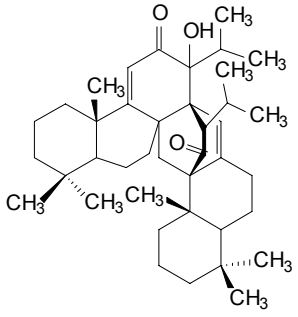
23 Deoxybuddlejone



24 Hydroxybuddlejone

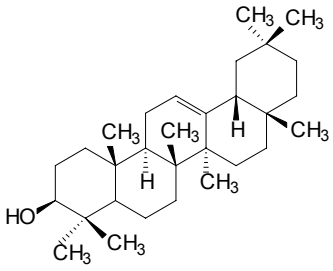


25

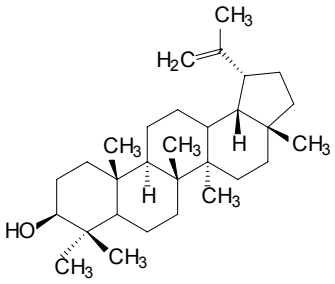


26 Maytenone

The triterpenoids β-amyrin **27** and lupeol **28** have been isolated from the leaves and flowers respectively (10,4).



27 β-Amyrin



28 Lupeol

BIOLOGICAL ACTIVITY ASSOCIATED WITH TRADITIONAL USE

No clinical or *in vivo* studies have been carried out to validate the traditional uses of *B. globosa* but some *in vitro* investigations have been conducted which give some support to its ethnopharmacology, particularly its use in wound healing and for treating liver complaints (1).

The leaves of *B. globosa* are used as a poultice in wound healing in Chile (1,2). Wound healing is a complex process and may be accelerated by compounds with various activities such as stimulation of fibroblast proliferation. In addition, plant extracts may reduce the unwanted aspects of wound healing, such as inflammation, or may act against factors which adversely affect the wound healing process such as microbial infections and attack by oxygen free radicals. A recent study tested a water extract of *B. globosa* leaves for stimulation of growth of cultured fibroblasts and for protection of the same cell line against oxygen free radical attack induced by hydrogen peroxide (11). A weak and not statistically significant increase in growth was observed at concentrations of the leaf extract below 1µg/mL but concentrations above 10µg/mL inhibited growth and appeared to be cytotoxic. The results for antioxidant activity were more significant with the 50µg/mL of the total extract of the leaves displaying about 50% of the protective activity of the positive control, catalase 250 I.U. Fractionation through Sephadex LH-20™ and subsequent testing showed that the activity was due to small molecular weight compounds. Five compounds, three flavonoids **1- 3** and two phenylethanoids **7,8** were isolated from the active fractions and all five showed activity, giving about 70% protection at 2.5 µg/mL and 100% protection at 10 µg/mL. When doses were considered in terms of molarity, verbascoside **7**, echinacoside **8** and linarin **3** were approximately twice as active as the flavonoid aglycones **1** and **2**. It therefore appeared that the antioxidant properties might contribute to any wound-healing effect rather than any stimulation of fibroblast proliferation.

It should be noted that some constituents of the leaves have shown activity related to anti-inflammatory effects which may be of benefit in treating wounds. Thus catalpolside **13**, one of the iridoids present in *B. globosa* leaves, has recently been shown to inhibit NO synthase, an enzyme involved in the pro-inflammatory response (12). It should also be noted that iridoids present such as aucubin **9**, have also been shown to have anti-inflammatory effects (13).

Another traditional use of the leaf aqueous extract, in common with several other *Buddleja* species, is as an oral medication for liver diseases (1). An aqueous extract of *B. globosa leaf* 1mg/mL gave protection of cultured hepatocytes challenged with carbon tetrachloride, galactosamine and complement-mediated cytotoxic medium (CMC) (7). Bioassay-guided fractionation led to the isolation of five iridoids **9 - 12, 14**, the phenylethanoid glycosides verbascoside **7** and echinacoside **8** and the flavonoid linarin **3**. Activity was measured by the reduction in glutamic-pyruaric transaminase (GPT) released from the liver cells challenged with the hepatotoxic agent. Linarin **3** was the most active compound giving at 1mg/mL a 40% reduction in cells challenged with carbon tetrachloride and a 75% reduction with cells challenged with galactosamine. Echinacoside **8** was also active giving 45% and 66% reeduction at the same concentrations. The activity was thought to be associated with antioxidant properties related to the catechol groups in these molecules (1) and it is interesting to note that these results follow those obtained for antioxidant effects on cultured fibroblasts (11). Aucubin **9** had also been reported to have hepatoprotective activity (14) but this was not observed in the work reported.

OTHER BIOLOGICAL ACTIVITIES

Tests for inhibition of eicosanoid synthesis on compounds isolated from *B. globosa* roots showed that the sesquiterpenes buddledins A-C **15 – 17** showed inhibition at 50µg/mL of both cycloxygenase (COX) and 5-lipoxygenase (5-LOX) (9). The diterpene **25** also showed an inhibitory effect against these two enzymes. For both types of compounds the activity was stronger against 5-LOX. Buddledin A **15** showed the greatest activity with 89% inhibition against COX and 98% against 5-LOX respectively at 50µg/mL (9). Zerumbone **19** and dihydrobuddledin A **18** showed no activity against either enzyme at the concentration used.

It was observed that the roots of *Buddleja* species had an appreciable odour when they were dug up, and this led to the hypothesis that the volatile compounds released might serve as protective substances against soil pathogens, especially fungi. Sunsequent testing of the lipophilic extracts *of B. globosa* roots against a range of fungi showed that the sesquiterpenes present, but not the diterpenes , were selectively antifungal compounds against dermatophytes and soil fungi but had little effect on *Penicillium notatum , Aspergillus niger* or *Candida albicans* (8). Buddledin A **15** had a minimum inhibitory concentration (MIC) of 43µM and buddledin B **16** of 51µM against *Epidermophytum floccosum, Trichophyton interdigitale* and *E. rubrum*.

A screening for antiplasmodial activity of several species of Argentinian plants with a reputation of use for treating symptoms of malaria included the aqueous and methanol extracts of *B. globosa* aerial parts (15). The IC_{50} values for ^{3}H-hypoxanthine uptake in cultured *Plasmodium falciparum* were 6.2 µg/mL and 8.7 µg/mL for the methanol and water extracts respectively. The compounds responsible for this activity have not yet been isolated.

CONCLUSIONS

Work carried out gives some credence to the traditional use of *B. globosa* in wound healing and as a liver protectant agent. The flavonoid glycosides and phenylethanoid compounds present appear to be largely responsible for these effects. The lipophilic compounds in the bark and the roots, especially the sesquiterpenes, have interesting antifungal and anti-inflammatory activities which do not appear to have been exploited in traditional medicine.

It should be noted that similar compounds to all of those mentioned have been isolated from other *Buddleja* species and this reflects the uniformity of traditional use in all parts of the world where the genus is endemic (1).

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FORO

En el Nº 2 de Marzo de 2002 aparecio un articulo derl Dr. Jorge Alonso de Buenos Aires, Argentina), al respecto se ha recibido la siguiente respuesta:

Dr. Jorge Rodriguez, La Habana, Cuba: He tenido el privilegio de leer su articulo publicado en BLACPMA de Marzo, el cual me parece fantastico. Concuerdo completamente con usted y creo que una de las soluciones para un mundo como el actual, donde millones de personas no tienen acceso pleno a todas las ventajas de la medicina moderna, son los fitofarmacos. A diferencia del refere soy un poco más optimistas y creo que en muchos paises las autoridades sanitarias se han dado cuenta de las ventajas que traen los fitofarmacos como ocurre en muchos paises asiaticos. Creo que tambien, los empresarios farmaceuticos y la comunidad medica debe comenzar a aunar esfuerzos para llevar a cabo el desarrollo de estos productos, que cunado se les realiza los ensayos preclinicos y clinicos correspondientes tienen la misma seguridad y eficacia y en algunos casos mas, que los productos sintéticos.

Dr. Jorge Alonso, Buenos Aires, Argentina: Me parece muy bien lo de la carta de Cuba. Quizás la nota abra algún foro de discusión sobre el tema, que estimo será muy constructivo para conocer la opinión de todos los que leemos el Boletín. Conozco al Dr. Rodríguez quien me merece el mayor de los respetos, como investigador y persona. Con él estuve en Antigua en ocasión de las reuniones del CYTED, y en Cuba, cuando fui invitado a dictar un curso por el CIDEM. Cuba es uno de los pocos países de América que entienden perfectamente la problemática sanitaria y saben valorar sus propios recursos a efectos de paliar los problemas que aquejan la isla. Sus excelentes indicadores sanitarios y resultados epidemiológicos son una prueba de ello

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Dr. Banjamin Castañeda[6], Lima, Perú:
He leído con mucho agrado el último Boletín, felicitaciones. Me interesó el artículo de Jorge Rubén Alonso, donde revisa la gran riqueza que tienen nuestros países, en relación a biodiversidad. He notado algunas cosas que no son ciertas, como por ejemplo aquello de que la d-tubocurarina es un potente anestésico. La tubocurarina (extraída del curare) es un relajante muscular, que anteriormente fue muy útil durante la anestesia general, pero que en la actualidad ha sido reemplazado por otros fármacos con mayores ventajas

Respuesta del Dr. Jorge Alonso: Estimado Benjamín: Muchas gracias por sus comentarios hacia mi nota. Respecto a la d-tubocurarina, efectivamente es un bloqueante neuromuscular empleado como preanestésico, aunque hoy en día se emplean a partir de ella otros derivados semisintéticos más modernos como la dimetiltubocurarina o metocurina, entre otros. La idea respecto a la mención del curare en la nota era expresar su aporte al área de la ANESTESIOLOGIA, lo cual como bien dice Ud. haya sido mal expresado. En el resto de la nota, espero haya compartido el espíritu que me guió al hacerla, en haras de reinvindicar nuestra flora autóctona. Le envío un muy cordial saludo.

NOTICIAS

RECOMENDAMOS

ASOCIACIÓN DE FITOMEDICINA DE ARGENTINA
www.plantasmedicinales.org

RED BOSQUE
www.prodar.org/redbosque

[6] Director del Instituto de Investigaciones de la Facultad de Medicina de la Universidad de San Martín de Porres, Lima, Perú.

INTERNACIONAL SOCIETY OF ETHNOPHARMACOLOGY

http://www.ethnopharmacology.org

REVISTA DE FITOTERAPIA DE ESPAñA

http://www.fitoteraspia.net

BOLETÍN PROCASUR

http://www.procasur.org

CUMBRES AUSTRALES

http://www.cumbresaustrales.cl/

SOCIEDAD ITALIANA DE FITOTERAPIA

www.sifit.org

SOCIEDAD ARGENTINA DE FITOTERAPIA

www.saf.org.ar

REDECO

http://www.redeco.com

BIODIVERSIDAD EN AMÉRICA LATINA

http://www.biodiversidadla.org

AVES DE NICARAGUA

www.avesnicaragua.org

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EVENTOS

IV CONVENCIÓN SOBRE MEDIO AMBIENTE Y DESARROLLO
Y
IV CONGRESO IBEROAMERICANO DE EDUCACIÓN AMBIENTAL
2 al 6 de Junio de 2003.
La Habana – Cuba
Informes
Aracelly Mateo de Acosta Fernández
IV Convención sobre Medio Ambiente

THE SECOND HAWAII INTERNATIONAL CONFERENCE ON SOCIAL SCIENCES
12 al 15 de Junio de 2003
Island of Oahu – Honolulu – Hawai – USA
Informes
2003 Hawaii International Conference on Social Sciences

DIVERSITY AND DIVERSIFICATION PROCESES IN HIGH MOUNTAIN ECOSYSTEM: BRIDGING THE GAP BETWEEN POPULATION, PHYLOGENETIC AND ECOLOGICAL APPROACHES
23 al 27 de Junio de 2003
Aussois – Francia
Informes
Irene Till – Bottraud
E-mail: Irene.till@ujf-grenoble.fr

TERCER CONGRESO INTERNACIONAL DE PLANTAS MEDICINALES
Y
FITOTERAPIA FITO 2003
EXPOSICIÓN INTERNACIONAL DE PRODUCTOS FITOTERAPÉUTICOS
FITO EXPO 2003
6 al 9 de Agosto del 2003
Lima, Perú
Informes
Instituto de Fitoterapia Americano
www.infaperu.com

IV CONGRESO ECUATORIANO DE BOTÁNICA
Y
II CONGRESO DE CONSERVACIÓN EN LOS ANDES Y LA AMAZONÍA
25 al 30 de agosto del 2003
Loja – Ecuador
Organizan
FUNBOTANICA
Herbario Loja
Universidad Técnica Particular de Loja
Informes
Pablo Lozano
E-mail: pablo_lozano@hotmail.com

51TH ANNUAL GA CONGRESS
31 de Agosto – 4 de Septiembre de 2003
Kiel – Alemania

XII CONGRESO ITALO-LATINOAMERICANO DE ETNOMEDICINA " NUNO ÁLVARES PEREIRA "
8 al 12 Septiembre 2003
Rio de Janeiro – Brasil
Informes:
http://www.farmacia.ufrj.br/silae

TERCER SIMPOSIO INTERNACIONAL DE DROGAS NATURALES
2 al 4 de Octubre de 2003
Naples – Italia
Informes
Dra. Francesca Borrelli
E-mail: franborr@unina.it

XXXVIII CONGRESO NACIONAL DE CIENCIAS BIOLÓGICAS (COLOMBIA)
7 al 10 de Octubre de 2003
Quindío – Colombia
Informes
Dra. Patricia Landazuri
E-mail: cimb@uniquindio.edu.co

INTERNATIONAL GINSENG CONFERENCE: THE GLOBALIZATION OF GINSENG
27-30 de noviembre de 2003
Melbourne – Victoria – Australia
Informes:
E-mail: agga@nex.net.au

V TALLER INTERNACIONAL SOBRE RECURSOS FITOGENÉTICOS FITOGEN 2003
2 al 5 de Diciembre de 2003
Estación Experimental de Pastos y Forrajes
Sancti Spiritus – Cuba
Informes
MSc. Tomás Cancio Morales
Estación Experimental de Pastos y Forrajes
Apdo. 2228. CP. 60100
Sancti Spíritus. Cuba
Email: cancio@pastos.yayabo.inf.cu
Tel: 53-41-23876, 53-41-27818

2º CONGRESO INTERNACIONAL DEL CENTRO DE QUÍMICA FARMACÉUTICA: "RETOS DE LA INDUSTRIA QUÍMICO-FARMACÉUTICA"
29 de Marzo al 1 de Abril del 2004
La Habana, Cuba
Informes:
E-mail:
2.congreso@cqf.co.cu

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CORRESPONDENCIA

Desde Esquel, Argentina:
Estimado José Luis: Gracias por el envío de BLACPMA. Lamentablemente aún no pude enviar la contribución prometida, debido a que en el Departamento de Química al cual pertenezco estamos trabajando muy intensamente en el área de extensión, ya que se está intentando instalar una enorme mina de oro a cielo abierto por lixiviación con cianuro, a sólo 6 km de Esquel, y está en seria amenaza nuestra provisión de agua y la biodiversidad de la zona. Hasta pronto y gracias. Dra. Silvia González, Facultad de Ciencias Naturales Sede Esquel, Universidad Nacional de la Patagonia (4 de Marzo).
E-mail: silviagh@ciudad.com.ar

Desde Sao Paulo, Brasil:
Prezado Jose Luis Martinez, Agradecemos o envio do arquivo contendo o Boletín Latinoamericano y del Caribe de Plantas Medicinales y Aromáticas. Em nome da Diretoria da Sociedade Botânica do Brasil (SBB) - gestão 2003-2005 desejamos parabenizar os distintos colegas pela iniciativa em produzir e divulgar o citado periódico com excelente conteúdo. Informamos que foi veiculado o seu e-mail no Site da SBB para que aqueles que visitam o nosso site possam ter acesso ao BLACPMA. Queira, por favor, visitar www.botanica.org.br na página LINKS. Pedimos que tão logo tenham sua página web nos informem, para então podermos substituir o acesso ao BLACPMA. Cordialmente, Maria Margarida R. Fiuza de Melo, Editora Responsável pelo Site da SBB (4 de Marzo).
E-mail: margaridamelo@terra.com.br

Desde Tucumán, Argentina:
Estimado Dr. Martínez: Recibí el Nº 2 del vol. 2 de BLACPMA que leí con completo. Al igual que los números anteriores encontré abundante información de interés tanto general como específica para aquellos que estamos involucrados en el estudio y aplicaciones de las plantas medicinales y aromáticas. La información, puntos de vista y opiniones vertidas en el Editorial, Nota del Editor y Publicaciones además de ser pertinente, es enriquecedora y esta presentada en forma amena. Mis felicitaciones por el esfuerzo, dedicación y búsqueda de superación, Cesar Catalán (5 de Marzo).

E-mail: ccatalan@unt.edu.ar

Desde Lima, Perú:

Estimado José Luis: Te agradezco el envío del BLACPMA ultimo, como siempre conteniendo interesante información sobre las Plantas Medicinales. Nuevamente mis felicitaciones por el esfuerzo, Dra. Olga Lock Sing, Departamento de Ciencias - Sección Química, Pontificia Universidad Católica del Perú. (7 de Marzo).

E-mail: olock@pucp.edu.pe

Desde San José, Costa Rica:

Estimado José Luis: Gracias por el envío del Boletín, siempre con importantes aportes, me llama de suma manera el articulo del médico de Argentina con el tema del Bosque y su riqueza de plantas medicinales, que interesante su opinión, quisiera que forestales por ejemplo tuvieran esa visión, felicitaciones al Dr. Alonso, Rafael A Ocampo; Bougainvillea (10 de Marzo).

E-mail: quassia@sol.racsa.co.cr

Han acusado recibo: Jorge Díaz (Chile), Leonardo Blanco (Cuba), Lionel Germossen Robineau (Guadalupe), Salvador Cañigueral (España), Khalid Rahman (Inglaterra), Antonia Izquierdo (Chile), Helmuth Goecke (Chile), Silvia González (Argentina), Mario Maino (Chile), Maria Margarida R. Fiuza de Melo (Brasil), Osman Ayala (Colombia), Elsa Anselmi (España), Benjamín Castañeda (Perú), Arnaldo Bandoni (Argentina), Francisco Morón (Cuba), Guillermo Riveros (Chile), Fabio Moscovich (Argentina), Ana Ladio (Argentina), Alejandro Flores (Chile), Hermine Vogel (Chile), Eduardo Maza (Chile), Angela Duque (Colombia), Diego Estomba (Argentina), Maria Elena Mendiondo (Argentina), Nestor Lagos (Chile), Ernesto Medina (Nicaragua), Claudia Tramón (Chile), Benjamín Rojano (Colombia), Michel Delens (Venezuela), Carlos Céspedes (México), Carmen Trujillo (Perú), Javier Bustos (Argentina), Mahendra Rai (India), Cesar Vettorazi (Guatemala), Fernando Suárez (Chile), Jacqueline Ruz (Chile), Mirtha Parada (Chile), Olga Lock (Perú), Rita Zeichen (Argentina), Secretaria de la Asociación Argentina de Farmacia y Bioquímica Industrial, Paula García (Chile), Pierre Zaya (Canadá), Nestor Oscar Caffini (Argentina), Dayami Laza (Cuba), Edelira Velásquez (Paraguay), Antonio Sanabria (Colombia), Mario Bernardo-Filho (Brasil), Sara Lourdes Cortes (Cuba).

FRASES

No deben preocuparnos las arrugas del rostro, sino las del cerebro

SANTIAGO RAMÓN Y CAJAL

***

No anheles impaciente el bien futuro;
Mira que ni el presente esta seguro

FÉLIZ MARÍA DE SAMANIEGO

***

La vida privada de un ciudadano debe ser recinto amurallado

CHARLES DE TALLEYRAND-PÉRIGORD

***

Volver la vista atrás es una cosa y marchar atrás, otra...

CHARLES C. COLTON

***

El azar favorece a una mente bien entrenada

LOUIS PASTEUR

***

Abrid escuela para cerrar prisiones

VICTOR HUGO

***

La casualidad siempre es actual; ten echado tu anzuelo.
En el remanso donde menos lo esperes, estará tu pez

OVIDIO

***

No todos los ojos cerrados duermen, ni todos los ojos abiertos ven

BILL COSBY

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