

International Phytocosmetic Congress

20-23 May 2014, Quito, Ecuador

ABSTRACT 1

Analytical Techniques for the Sensory Profiling of an Aromatic Plant Product

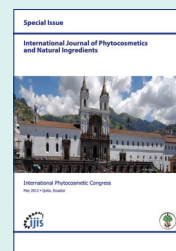
Catalina van Baren, Jennifer Riedel, Eduardo Dellacassa, Arnaldo Bandoni

Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires. Juni 956, 2 piso (1113) Buenos Aires

ABSTRACT

The Latin American flora contains one of the greatest biodiversities in the world. Thus renewable natural resources found in this region acquire an outstanding importance in the search for new useful raw materials for the fragrance and flavor industry. Many chemical and pharmacological studies have been carried on these aromatic resources. However, aromatic quality evaluations are quite scarce. Actually, several analytical technologies are applied to profiling aromatic. These are key issues that influence the development of new agrobusiness ventures. Sensory profiling by different analytical techniques in addition to the chemical characterization can contribute to a better knowledge of these native aromatic plant resources and encourage their potential industrial purposes. Such has been the case of *Adesmia boronioides* of Patagonia, its essential oils has been used to launch a perfume for a major international cosmetics company in its "Aromas de América" campaign. Actually we have studied other aromatic species of South America, *Mulinum spinosum*, motivated by previous literature proposing this plant as a surrogate of galbanum, a raw material highly appreciated in perfumery. Chemical analysis was applied by GC-FID-MS and sensory characteristics of the essential oil of this species were evaluated by GC-O and descriptive analysis and compared with that of a commercial sample of galbanum. An experienced panel of reviewers smelled the effluent gas chromatograph using an olfactometer, identifying and describing significant aromas related to chromatographic peaks. The aromagrams obtained from both samples differed significantly, however showed the same descriptors, derivatives of 2-methoxypyrazines were identified as responsible for the characteristic scent note in both products giving the olfactory similarity. Despite this, the overall flavor profile of both products differs substantially, giving *Mulinum spinosum* own olfactory and promising features. Acknowledgements: Proyect PICT 2008-1969 and University of Buenos Aires (Proyectos 20020110200118-20020100100348).

KEYWORDS *Mulinum spinosum*; essential oils; Galbanum; Aromatic profiling; Aromagrams



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ABSTRACT 2

Detection of Key Aroma Fractions of “Marcela”, *Achyrocline satureioides* (Lam.) DC. (Asteraceae)

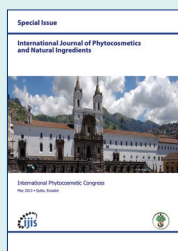
Daiana Retta, Jennifer Riedel, Mara Ebracht, Arnaldo Bandoni, Catalina van Baren

Junin 956, 2 piso (1113) Buenos Aires. Email: dretta@ffyb.uba.ar

ABSTRACT

Aromatic plant resources are not only a source of new biomolecules but also extracts with attractive sensory characteristics. The flavor and fragrance industry maintains a constant interest in the search for new molecules or extracts with novel olfactory notes. Many fractions obtained from aromatic plants offer these features. Besides, the deepening of the concept in bioethical cosmetics has strengthened the return back into raw materials of natural origin. In particular, the essential oils and oleoresins have found application not only in the production of perfumes and flavors but also in production of cosmetic and personal care products. The “marcela”, *Achyrocline satureioides* (Lam.) DC. (Asteraceae) is a native aromatic species of great regional importance. Secondary metabolites confer properties for use in medicine, cosmetics and food industry (bitter drinks). Extracts of this species have very particular sensory features for their typical and persistent notes. For the detection of the fractions bearing the typical aroma, chemical and sensory characteristics of the essential oils obtained for hydrodistillation and low polarity extracts obtained by maceration in hexane from flowers of “marcela” were evaluated. The essential oils were analyzed by GC-FID-MS identification achieving 98% of the total composition. Moreover the hexane extracts that beard the typical aroma were analyzed. Fractionations by conventional column chromatography and subsequent preparative plates of silica gel have accomplished the fractions with the aromas of interest. Finally, they were identified by spectroscopic methods. This study allowed us to determine that the essential oil does not have the typical olfactory characteristics of the “marcela” and therefore it does not constitute the aromatic fraction of interest, whilst the hexane extract (concrete) contained these interesting characteristics. The potential of these fractions for the fragrance and flavor industry are under evaluation. Acknowledgements: Proyect PICT 2008-1969 and University of Buenos Aires (Proyectos 20020110200118-20020100100348).

KEYWORDS Achyrocline satureioides; Essential oils; Extracts; Odorant compounds; Falvor and fragrance industry



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ABSTRACT 3

Optimization of Oil Extraction *Euterpe precatoria* Mart. (Asaí) Cosmetic Grade By Enzymatic Treatment

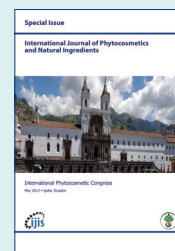
Elizabeth Ortega, Arilmi Gorriti, Karin Zamudio, Elvira Aparicio

Laboratorio de Farmacognosia y Medicina Tradicional, Facultad de Farmacia y Bioquímica

ABSTRACT

Asaí oil is an exotic rainforest product whose components are associated with antioxidant/anti-aging, regenerative, and moisturizing properties, making asaí oil well suited for use in all cosmetic and dermatological applications. The present study aims to compare yield and quality of asaí pulp oil when applying three distinct processes: in the first, pulp drying in a tray dryer at 45°C to 12% moisture and was combined with enzymatic treatment and pressing to oil extraction; in the second, a simple process was carried out with drying asaí pulp (45°C to 12% moisture) by pressing. Finally oil was obtained by solvent extraction using acetone: ethanol (3:2). In this study, raw asaí fruits were collected in Iquitos, Perú. The fruits were washed and disinfected with 10-15 ppm sodium hypochlorite and stored under refrigeration. A commercial enzymatic extract (Pectinex® Ultra SPL - Sigma Aldrich (Pectinase from *Aspergillus aculeatus* aqueous solution, =3800 units/mL)) was used for hydrolysis of asaí pulp, prior to oil extraction. The oil extractions were carried out by hydraulic pressing, with or without enzymatic incubation (3h, 45°C, pH= 6.0, E/S 0.5%) and other by only solvent extraction. The oil content in the asaí pulp (26% w/w) and the physicochemical characteristic of the oil was determined according to standard analytical methods. Free fatty acids, peroxide values, iodine and saponification indices were respectively 5.16 mg KOH/g, 9.49 meq/kg, 70.13 and 193.40. Solvent extraction has presented higher efficiency but higher oxidation of unsaturated fatty acids. On the other hand, asaí pulp pressing at room temperature has produced better quality oil. However its efficiency is still smaller than the combined enzymatic treatment and pressing process. This combined process promotes cellular wall hydrolysis and pulp viscosity reduction, contributing to at least 5% of oil yield increase by pressing.

KEYWORDS *Euterpe precatoria* Mart; Solvent extraction; Hydraulic pressing; Oil quality index; Enzymatic treatment



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ABSTRACT 4

Tyrosinase Inhibitory Activity By Ten Piper Species From Guatemala With Potential Application in Phytocosmetic Development

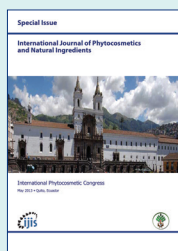
F Almeda

Email: acaceres46@gmail.com

ABSTRACT

Tyrosinase is an enzyme part of the melanogenic cycle which provides color to skin, hair and eyes; when present in high concentrations it produces hyperpigmentation. The main inhibitors of tyrosinase in the cosmetic industry are hydroquinones and kojic acid as synthetic drugs, and arbutin as a natural compound, both inducing an anti-pigmentation effect. The aim of this study was to determine tyrosinase inhibitory activity of extracts from ten Guatemalan species of Piper genus (*P. amalago*, *P. auritum*, *P. hispidum*, *P. jacquemontianum*, *P. oradendron*, *P. psilorhachis*, *P. retalhuleuense*, *P. sempervirens*, *P. umbellatum* and *P. variable*). Specimens were collected from managed or wild sites, shadow-dried, and a voucher sample deposited at Farmaya herbarium (CFEH). Dry leaf material was milled and extracted sequentially by percolation with dichloromethane and methanol, concentrated in rotavapor. Inhibitory activity was demonstrated by two enzymatic methods: Qualitative by bioautography using thin layer chromatography (TLC) plates, and quantitative by micrometric spectrophotometry, in both cases using mushroom tyrosinase. To validate both tests, kojic acid was used as standard, preparing drug dilution to demonstrate dose-effect relationship. The kojic acid demonstrated inhibitory activity (IC₅₀ 1.2±0.07 µg/mL). All the extracts demonstrated some degree of inhibition by the bioautographic procedure, followed by quantification. Extracts with the best inhibition activity in both solvents were *P. variable* (IC₅₀ 2.0±0.1 µg/mL) and *P. umbellatum* (IC₅₀ 4.9±0.2 µg/mL), and methanol extract of *P. jacquemontianum* (IC₅₀ 6.8±0.3 µg/mL) and *P. psilorhachis* (IC₅₀ 6.5±0.3 µg/mL). Kojic acid activity was higher than Piper extracts, but these analyzed extracts deserve further attention. In this preliminary screening of activity it was demonstrated that 4 species of Piper genus have tyrosinase inhibition activity which can be applied to the development of new phytocosmetics for whitening skin spots. Species of Piper genus might be an important source of tyrosinase inhibition activity for new phytocosmetic development. Further bioguided-isolation will demonstrate the nature of these active molecules.

KEYWORDS Piper; inhibition; Tyrosinase; Kojic acid; Phytocosmetic



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ABSTRACT 5

The Effects of Surfactants on Extracting Essential Oils From the Fruit of *Zanthoxylum ailanthoides* By Steam Distillation

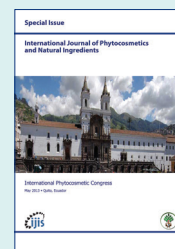
Han-Mou Yu, Shi-Xiu Feng, Xin-Tao Jiang, Jian-Zheng Li, Hai-Hong Xiao, Tao Chen

R&D Center of Shenzhen Boton Flavors & Fragrances

ABSTRACT

The effect of surfactants in different concentrations on extracting essential oils from the fruits of *Zanthoxylum ailanthoides* Sieb. et Zucc. by steam distillation was tested, and volatile components of the essential oil were also analyzed by gas chromatography-mass spectrometry. The results showed that at the concentration of 0.25% surfactants, essential oil extraction rates (mL Kg⁻¹) are 43 (Sodium dodecyl-benzenesulfonate), 40 (Ethoxylated hydrogenated castor oil), 39 (Lecithin), and 36 (control). The essential oil extraction also increases with the amount of sodium dodecyl-benzenesulfonate, and reached the highest oil content (51 mL Kg⁻¹) at the concentration 0.5% of the surfactant. Sixty two chemical compounds were identified in the essential oil from the fructs of *Zanthoxylum ailanthoides* Sieb. et Zucc., and the main component of the essential oil is 2-undecanone with the peak-area ratio of 77.787%-80.337%. It is concluded that surfactants generally raised the contents of essential oil, but not significantly influenced the oil composition.

KEYWORDS Surfactant; Essential oil; Steam distillation; *Zanthoxylum ailanthoides*; 2-undecanone; GC-MS



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ABSTRACT 6

The Application of Fatty Acids in Cosmetics

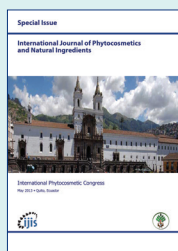
Ilze Vermaak, Baatile Komane-Mofokeng, Alvaro Viljoen

Department of Pharmaceutical Sciences, Faculty of Science, Tshwane University of Technology, Private Bag X680, Pretoria 0001, South Africa

ABSTRACT

The cosmetic and wellness industry is growing exponentially at an annual growth rate of 5% and there is a continued search and demand for skin rejuvenating, anti-aging and hydrating cosmetic products. Fatty acids are popularly included in cosmetic formulations for their purported beneficial effect on the skin. This presentation provides an overview of the biological properties of fatty acids used in cosmetics and will acutely focus on fatty acids for which compelling scientific evidence exists. A systematic search and review of articles available through various search engines (Scopus, Google Scholar, Sciencedirect and PubMed) was performed. Publications providing scientific evidence of the beneficial effect of fatty acid in skin care were included. Sixteen unsaturated and twelve saturated fatty acids were identified for further investigation. Fatty acids are an integral component of cellular membranes and are responsible for various biological functions. Linoleic acid, an essential fatty acid, has been most extensively researched. Typical symptoms of essential fatty acid deficiency such as scaly dermatitis were successfully treated with the topical application of linoleic acid, skin lightening effects after UV-induced hyperpigmentation were observed and it is useful in the treatment of mild acne. Docosahexanoic acid (DHA) and palmitoleic acid application showed beneficial effects in the treatment of cellulite while eicosapentanoic acid exhibited photoprotective and anti-aging properties. Several fatty acids such as oleic, linoleic and linolenic acids have been shown to enhance skin penetration thereby providing an indirect benefit as product excipients by the increased delivery of other active ingredients. They also possess emollient, humectant and occlusive properties. There exists scientific evidence that the topical application of fatty acids can be beneficial to the skin. However, to validate historical and modern uses, more extensive research including clinical studies are required to substantiate claims made on consumer products.

KEYWORDS Biological properties; Cosmetics; Fatty acid; Skin



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ABSTRACT 7

Prediction of the Bioactivities of Natural Products With Interest in Phytocosmetic

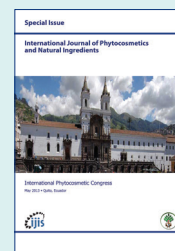
Jose Prieto-Garcia

UCL School of Pharmacy 29-39 Brunswick Sq. Email: j.prieto@ucl.ac.uk

ABSTRACT

For long time aromatic plants have been at the centre of the cosmetic industry due to their antioxidant, antibiotic, and anti-inflammatory activities, among others. Their bioactivity relies on a well characterised subset of their metabolome, namely essential oils. Our aim is to develop tools for predicting the bioactivity of complex natural products of defined chemical composition or metabolome. We here report on the use of multivariate analyses and artificial intelligence to predict antioxidant and antibiotic activities of essential oils as a first step towards linking metabolome and bioactivities as well as to characterise the anti-inflammatory activities of important herbal medicines. Our results confirm that these tools can be used as reliable, fast and cheap means for predicting bioactivities of natural products with well defined metabolomes. Limiting factors for their performance are the inherent errors of the *in vitro* assays and the complexity of the network. Importantly these strategies pave the way to predict the activities of highly variable complex natural materials, so the industry can make informed choices in the supply of raw materials and the formulation of phytocosmetics.

KEYWORDS Essential oils; Artificial Intelligence; Antioxidant; Clusterin analyses; Anti-inflammatory; Antiinfective



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ABSTRACT 8

Effect of Nitrogen and Phosphorus Fertilizers on Growth and Oil Yield of Mint (*Mentha longifolia* L.)

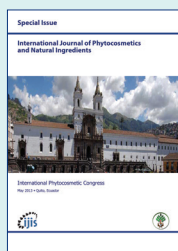
Mahmoud Alsafar

Email: malsafar@hotmail.com

ABSTRACT

A field study was conducted to determine the effect of different rates of application of N and P fertilizers at different time intervals on the growth and essential oil yield of indigenous mint (*Mentha longifolia*) during 2000-2001 and 2001-2002 cropping seasons. The experimental treatments consist of three time intervals of fertilizer application (2 weeks and 45 days after sowing, and 2 weeks after flowering) and 6 fertilizer treatments with different combinations of N and P fertilizers. The experimental soil was sandy loam having ECe of 7.3 dS m⁻¹ and a pH of 7.3. The treatments were replicated three times. The experiment was laid out by following a Split-Plot Statistical design. Essential oil contents in the top 10-cm leaf/stem tissues (leaves, floral parts and new branches) were extracted by steam distillation in a mixture of hexane and petroleum ether. Total dry matter yield and Leaf area index (LAI) were measured. Mean maximum value of LAI was 2.26 in 2000-2001 and 2.49 in 2001-2002. The Leaf Area Index (LAI) increased significantly with increasing rate of fertilizer from 75/50 kg N/P₂O₅/ha (F4) to 100/75 kg N/P₂O₅/ha (F5) than other treatments. Mean total dry matter (TDM) yield was 470 g/m² in F0 (control, no fertilizer), 478 g/m² in F1, 590 g/m² in F2, 594 g/m² in F3, 595 g/m² in F4 and 634 g/m² in F5. However, mean TDM ranged yield from 4.30 t/ha in 2001-2002 to 6.34 t/ha in 2000-2001, while at the highest rate of fertilizer application (F5), it increased to 7.60 t/ha. The total dry matter and essential oil yield increased significantly receiving a fertilizer dose of 75/50 kg N/P₂O₅/ha than other treatments. Essential oil yield increased with an increase in the total number of leaves/plant and leaf area. Overall, the essential oil yield of indigenous (wild) mint was maximum in F4 treatment (75/50 kg N/P₂O₅/ha) under the climatic conditions of Al-Hassa, Saudi Arabia.

KEYWORDS Mint (*Mentha longifolia*); Nitrogen, Phosphorus; Oil contents; Leaf area index; Indigenous; Plant growth



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ABSTRACT 9

Design and Development of a Repellent Lotion From Essential Oil of *Bursera graveolens* (Palo Santo)

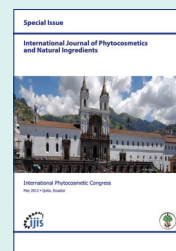
Marisol Vacacela, Santiago Ojeda, Santiago Ojeda

Loja, Ecuador. Email: mfvacacela@utpl.edu.ec

ABSTRACT

In the present research we studied the essential oil of the specie *Bursera graveolens* (Palo Santo) as the main component of a natural repellent lotion. For this, we made studies about pre-formulation and formulation using the factorial design of Plackett and Burman which allowed finding the suitable excipients that do not affect degradation or decrease in power of the essential oil. Likewise we valued the presence of essential oil by Gas Chromatography coupled Mass Spectrometry (GC/MS). The obtained results were subjected to statistical processing using the XLSTAT program, allowing us to choose the most stable formulation. In this case the chosen formula excluded the excipient BHT due to its presence caused a decrease in the concentration of essential oil. Finally the obtained formula was subjected to toxicological studies (Acute Dermal Toxicity performed in Wistar rats), stability at different temperatures (ambient: 17°C approximately, 30°C and 40°C) and shelf life to ensure the safety and efficacy of the repellent lotion.

KEYWORDS GC/MS; *Bursera graveolens* (Palo Santo); Repellent natural origin; Phytocosmetics



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ABSTRACT 10

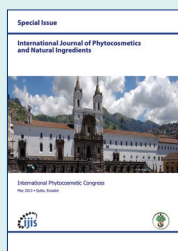
Screening Plants From the Genus *Silene* for 20-Hydroxyecdysone

Nazim Mamedov, Nilufar Mamadalieva, Lyle Craker

ABSTRACT

Phytoecdysteroids are common plant constituents and have been isolated from all types of plants, including ferns, gymnosperms, and angiosperms. Use of phytoecdysteroids as an alternative medicine to anabolic-androgenic steroids may be desirable due to the apparent lack of any adverse effects. Toxicity of the phytoecdysteroids is quite low with an LD50 for 20-hydroxyecdysone (20E) of 6.4 g/kg (per os) and 9.0 g/kg (preoral), making extended treatments of pathological conditions possible. The 20E does not bind to the cytosolic steroid receptors, but rather appears to influence signal transduction pathways, similar to the anabolic steroids, possibly via membrane bound receptors. While the commercial tonic and anabolic preparation Ecdistene (20E) is produced from *Rhaponticum carthamoides* (Asteraceae), *Pfaffia irisinodes* (Amaranthaceae), and *Serratula coronata* (Asteraceae), the limited availability of these plants and their relatively low content of 20E leads to a high cost of these preparations. The aerial parts of eight *Silene* plant species growing in Uzbekistan were screened for 20-hydroxyecdysone. The screened species included *S. brahuica* Boiss., *S. guntensis* B. Fedtsch., *S. linicola* L., *S. oreina* Schischk, *S. praemixta* M. Pop., *S. pseudotites* Besser ex Rchb., *S. viridiflora* L., and *S. wallichiana* Klotzsch. Structures and content of isolated constituents were established on basis by physical-chemical constants and HPLC. Confirmation of the compound 20-hydroxyecdysone in samples was by co-chromatography of with a known sample of 20E. Of the examined plant species, all, except for *S. oreina*, contained the phytoecdysteroid 20E. The concentrations of 20E, however, differed among the tested species. The screening confirmed the presence of 20E in most species of *Silene* growing in Uzbekistan. More than 170 *Silene* species have been analyzed for phytoecdysteroid content. Of these, 140 were positive for phytoecdysteroids, yielding 93 different ecdysteroids. Regional variations in the concentration levels of 20E have been observed, but some species, such as *Silene otitis*, contain a relatively high content of 20-hydroxyecdysone (almost 1% dry tissue). The *S. viridiflora* screened in the current study is known to contain 1.6% phytoecdysteroids, making this species a good source for production of the commercial tonic and anabolic preparation Ecdistene.

KEYWORDS Anabolic; Medicinal plants; Phytoecdysteroids; *Silene viridiflora*



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ABSTRACT 11

Vaccaria segetalis, (Prairie Carnation) a Versatile Species for Production of Phytocosmetic Products

Paul Arnison, Jiayun Lu

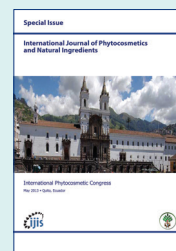
c/o Botanical Alternatives, Suite 176, 8B-3110, 8th Street E, Saskatoon, SK, S7H 0W2, Canada.

Email: faargone@yahoo.ca

ABSTRACT

Vaccaria segetalis (Neck) Garcke, (= *Vaccaria hispanica*, [Miller], *Saponaria vaccaria*, L., *Saponaria pyramidata*, [Medicus]) is a widely distributed feral species belonging to the family Caryophyllaceae or Pink/Carnation family. This species is known by the common names: cowcockle, cowherb, and cow soapwort. It has been used in Chinese herbal medicine for centuries where it is known as Wing Bu Liu Xing. The species has been domesticated and used as an ornamental and in Canada as a field crop known locally as Prairie Carnation. The seed of Prairie Carnations is comprised (60%) of an extremely fine starch with ideal properties for use in cosmetic and specialty food formulations. The cuboidal starch grains range in size from 0.5 to 1.5 microns and when sprayed dried adhere together to produce spherical starch balls that impart a smooth and silky feel to the starch. The entire plant and expressly the seed comprise a high concentration of saponins that have manifold uses as detergents, surfactants, adjuvants and drugs. Saponins from this species have been shown to be highly immunogenic and also stimulate apoptosis in breast and prostate cancer cell lines at very low concentrations. The seed of *Vaccaria segetalis* additionally comprises a high concentration of unique circular cyclic peptides known as orbitides. Even though these peptides are small, (5-9 aa) they have been shown to be gene encoded and demonstrate exciting potential as drugs and bioactives. Methods have been developed to purify the starch on a commercial scale and to isolate and characterize individual saponins and cyclic peptides for biological activity.

KEYWORDS *Vaccaria*; Prairie Carnation; Starch; Cosmetics; Cyclopeptides; Orbitides



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ABSTRACT 12

Prairie Carnation: A Dynamic Species for Phytocosmetic Applications

Paul Arnison, Jiayun Lu

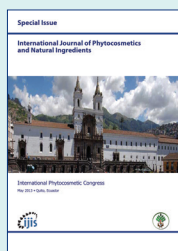
213, 619 Saskatchewan Cr W., Saskatoon, SK, Canada, S7M 0A5.

Email: faargone@yahoo.ca

ABSTRACT

Saponaria vaccaria, = *Vaccaria hispanica* (Prairie Carnation) is a member of the Caryophyllaceae and is known commonly in many places as a soapwort. This species that exists in many feral forms is distributed worldwide and has been known for thousands of years from Chinese herbal medicine as Wang Bu Liu Xing. Prairie Carnation is unique as a source of cosmetic ingredients in many ways. The seed is comprised (60%) of an extremely fine starch with exceptionally smooth feel and unique physical characteristics. Unlike many species of interest for cosmetics Prairie Carnation can be farmed on a large scale using conventional farming equipment. The agronomy of field production has been investigated and landraces adapted to large scale cultivation have been developed. Additionally, a microspore cell culture method has been devised for the production of doubled haploids for use in breeding new lines efficiently. A process has also been developed for the commercial scale milling of seed and the separation of starch and bioactive ingredients. In addition to the wonderful starch the seed is comprised of several categories of bioactive compounds. In Chinese herbal medicine Wang Bu Liu Xing is used for womens ailments, to promote lactation, improve circulation, reduce swelling and promote healing, (especially breasts). It is fed to cows to increase milk production, (hence cowherb name). *Saponaria* seed is comprised of about 3% saponins which are present largely in the seed coat and germ. Saponins can be used for many purposes ranging from simple detergents to vaccine adjuvants and powerful drugs. *Saponaria* saponins are structurally closely related to soapbark tree (*Quillaja saponaria*) saponins but are much more immune stimulatory. Specific saponins also have strong anticancer (breast and prostate) activity and act via stimulation of apoptosis at very low concentrations *Saponaria* seeds also comprise unique families of cyclopeptides that are now known as orbitides. These peptides make remarkable drugs that have been shown to have many potential uses, especially in skin care. They are known to impart the estrogenic quality of the Chinese medicine. We made the surprising discovery that these small proteins (5-10 amino acids) are gene encoded by DNA sequences that have a remarkable structure. Up to 0.3% of the mass of the seed is comprised of these cyclic peptides. What their role is in planta is currently unknown. I will speculate on what they do for plants which has many interesting implications. It is now known how the peptides are made in planta and the two genes required have been cloned. Finally *Saponaria* also makes phenolic compounds that are similar to those from Passion fruit.

KEYWORDS *Saponaria*; Prairie Carnation; Starch; Saponins; Cyclic Peptides; Orbitides



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ABSTRACT 13

Identification of *Centella asiatica* Extract in a Cosmetic Cream

Paula Gladys López, Laura Cogo, Ingrid Cufre, Verónica Paola Tarcaya, Alejandra Vanina Catalano, Adriana María Broussalis

Junín 956, 2nd floor. CP1113 CABA Argentina.

Email: plopez@ffyb

ABSTRACT

Centella cosmetic creams or emulsions contain - among other actives - extracts of *Centella asiatica*. These extracts contain triterpene saponins (asiaticoside, madecassoside) and sapogenins (asiatic and madecassic acids) in smaller quantities. The health authority requires performance of an assay that allows the identification of claimed active ingredients in cosmetic formulations, without quantifying components. When the active ingredient is a plant extract, this identification is performed by chromatographic analysis to define a profile. This profile should be detected in the cosmetic product. In this work we determined by TLC and HPLC the presence of the *Centella asiatica* extract in a cosmetic cream. Solution of *Centella asiatica* extract: Prepare a solution of *Centella asiatica* extract raw material in MeOH of 1 mg/ml using an ultrasonic bath (45°C, 10 minutes). Sample solution: Prepare a solution of cosmetic cream in MeOH of 100 mg/ml employing an ultrasonic bath (45°C, 10 minutes). Asiaticoside reference solution: Prepare a solution of 1 mg / ml in methanol of asiaticoside. Excipients solution: Prepared in the same manner as the sample solution. Chromatographic systems: TLC: Stationary phase: Silicagel Merck HF 254; 0.2 mm thick; mobile phase: ethyl acetate, formic acid, acetic acid, water (100:11:11:27); detection: Anisaldehyde sulfuric reagent (heated at 100°C for 5-10); development distance: 9.0 cm HPLC: C8 (15 cm x 4.6 mm; 5 µ); Solvent A phosphoric acid (3%), solvent B: ACN in a linear gradient; 1 ml/min; detection 205 nm; 20 µl. TLC and HPLC: The chromatographic profile of *Centella* extract raw material in the cosmetic cream is observed. Chromatographic methods used are appropriated for the quality control of a cream contained *Centella asiatica* extract.

KEYWORDS Cosmetic cream; *Centella asiatica*; Extract; Identification; TLC; HPLC



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ABSTRACT 14

Characteristics of Passion Fruit Seed Oil From Brazil

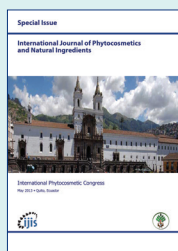
Sandro Reis, Rosemar Antoniassi, Allan Wilhelm, Adélia Machado, Humberto Bizzo, Sergio Cenci

EXTRAIR, Óleos Naturais. Email:gerencia@extrair.com.br; 2. Embrapa Food Technology, Email:rosemar.anton

ABSTRACT

Brazil has long holds a well-established passion fruit industry with large-scale juice extraction plants in charge of processing approximately 40% of the 920.000 ton of fruits produced annually. This processing by food industry generates thousands tons of waste that is disposed without any treatment and may result in pollution of the environment. Significant part of the waste generated during processing of passion fruit consists of seed which contains up to 35% of oil that has possible technological applications in food, pharmaceutical and cosmetic industry. Continuous pressing is a widely applied process for the extraction of oil from oilseeds and nuts and oil quality depends on the pretreatment conditions as well as the equipment employed. In this work, *Passiflora edulis* seeds were collected at different pulp processing industries, transported to Extrair Óleos Naturais at Bom Jesus do Itabapoana (Rio de Janeiro Brasil) and treated as soon as possible to keep the oil quality. The treatment includes seed washing to remove pulp residues in an equipment specially designed to this purpose followed by a drying step until the seeds reach a desirable range of moisture. Seeds were then expeller pressed in 100 kg/h capacity equipment and the oil submitted to press filtering. The oil yield of this process was above 80% and the meal residual oil content was less than 7%. Oil composition and quality analysis were carried out according to AOCS (2009). Free fatty acids content was below 1% and peroxides were not detected. It was observed that oil major fatty acids are linoleic (68%), oleic (17%), palmitic (11%), stearic (3%) and linolenic (0,4%). Because of its high polyunsaturated fatty acid content, the oil stability index (Rancimat) was less than 7 hours. However, linoleic acid has an important job in developing phytocosmetic. These results indicate that it is possible to recover good quality passion fruit seed oil when factors like absence of broken seeds, washing and drying well-adjusted parameters and gentle pressing conditions are closely observed.

KEYWORDS Passion fruit; Oil; Composition; Fatty acid; Cosmetic; Natural



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ABSTRACT 15

Design and Evaluation of a Formulation From Calahuala Extracts (*Phlebodium pseudoaureum*) for Possible Use As Cosmetic Antisolar Agent

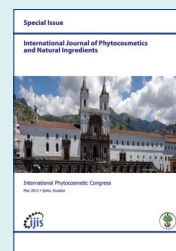
Sully M. Cruz, Ana Carolina Valdez, Lucrecia Perez de Batres, Armando Caceres

University of San Carlos, Guatemala

ABSTRACT

The aim of the study was to develop a stable phytocosmetic formulation from the extracts of *Phlebodium pseudoaureum*, from which the absorption spectrum has been previously determined. The genus *Phlebodium* and *Polypodium* are constituted by various species commonly called calahuala, epiphytic ferns growing from Mexico to South America. Traditionally are used to treat several conditions, such as respiratory, cardiac and genitourinary conditions, diabetes, rheumatism, and hypertension. From the aqueous extract of *Phlebodium* rhizome it has been obtained a saponin named anapsos, which is used to treat atopic dermatitis, psoriasis and vitiligo. Fronds and rhizome were collected from managed areas. The extract was obtained by percolation, detection of secondary metabolites was determined by phytochemistry screening. Determination of flavonoids and sun factor by absorption spectrum and formulation of two cosmetics products. The frond extract contained flavonoids in higher percentages than the rhizome extract (0.5%-1.5%), selecting the frond extract over the rhizome extract due to its higher sun protection factor. Five phytocosmetic formulations were developed at different concentrations of frond extract (1%, 2%, 3%, 4%, 5%). Two different cosmetic bases were evaluated: cream o/w and gel. The optimal concentration of calahuala frond extract in the phytocosmetic formulation was of 3%, since it maintains its organoleptic, physicochemical and microbiological properties over time. The gel was selected over the cream base due to its pH value which is similar to the pH of a normal skin (4.5-6.5). The phytocosmetical formulation proposed is a gel base, 3% calahuala frond extract, and 2% octylmethoxy-cinnamate, to synergize the sun factor of the calahuala extract.

KEYWORDS Calahuala extract; Phytocosmetic formulation; Sun factor; Antisolar agent



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ABSTRACT 16

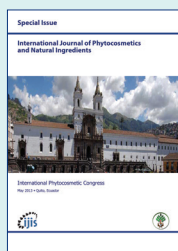
Evaluation of Mangrove (*Rhizophora mangle* L.) Extracts Collected in Monterrico Reserve As Colorant, Antioxidant and Biocide for Its Sustainable Use and Conservation

Sully M. Cruz, Maria Nereida Marroquin, Luis E. Alvarez, Dora Elena Chang, Armando Caceres

ABSTRACT

Guatemala has a potential of 1% of its territory to accommodate mangrove forests. These forests currently represent 0.5% of the national forest cover; spread over 14500 acres in the Pacific coastline and 704 acres in the Atlantic. Due to their fragility and the uncontrolled exploitation it is necessary to promote conservation, restoration and sustainable use of this endanger resource. Mangrove populations were selected in Monterrico Reserve in Guatemala, for its chemical characterization and biological evaluation in leaves, roots and bark. Ethanol extract were prepared and secondary metabolites identified by macro and semi-micro tests. The antioxidant activity was determined by ABTS and DPPH tests, and antibacterial activity by a microdilution test. The best extraction yields of bark was obtained with ethanol extract (30%), most common secondary metabolites were identified as flavonoids and tannins. Leaf samples demonstrated the greatest number of flavonoids expressed as chlorogenic acid; in the bark and roots the most common secondary metabolites were tannins. The ethanol extracts of root and leaf showed the highest antioxidant activity by DPPH and ABTS tests, showing IC₅₀ of 0.179 mg/mL and 0.151 mg/mL respectively. The extracts showed moderate antibacterial activity against *Escherichia coli* and *Salmonella typhi* at 1 mg/mL. The tests showed the cosmetics use as coloring extracts, it can be used in concentrations of 1%, 3% and 5% which had colorations from yellow to orange as possible substitutes for artificial yellow dyes such as Nos. 5 and 6. Likewise stability different pH 3, 5 and 7 and thus ensure evidenced use. It is demonstrated that Mangrove products can be used as coloring agents and antioxidant for interesting use in cosmetic, pharmaceutical and food industry. Utilization of this by-products might help in preserving Mangrove from depredation and sustain exploitation in ecological reserve areas.

KEYWORDS Antioxidant activity; Antibacterial activity; Colorant capacity; Mangrove



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ABSTRACT 17

Fotoprotector Activity of TAXO (*Passiflora tripartita*) and Basil (*Ocimum basilicum*), for Use in Sunscreen

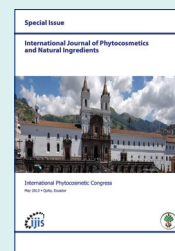
Susana Abdo

Escuela Superior Politécnica de Chimborazo, Facultad de Ciencias, Laboratorio de Productos Naturales. Panamericana Sur Km 1, Riobamba-Ecu

ABSTRACT

By its geographical location and position in the Andes, Ecuador is the country that receives the most solar radiation in the world. UV radiation produces damage to DNA and oxidative stress in human skin, leading to photoaging and photocarcinogenesis. The adequate protection of the skin against solar radiation to which we are exposed is essential. Investigations show that cinamats, flavonoids and polifenoles have photoprotector characteristics for what was verification of this activity, from Taxo (*Passiflora tripartite*) and Basil (*Ocimum basilicum*) leaves and a mixture of the two. Flavonoids and total cinnamates, were quantified in fluids extracts of each plant by spectrophotometry and pharmacognosic analysis was performed. The study was carried out through the application of a cream with 1.5% of fluid extracts of each plant, in volunteers with skin type III with protective forearm divided into areas with 6 experimental surfaces subjected to solar radiation under specific conditions, according to the efficiency in solar products using the COLIPA method. The results showed photoprotective levels of FPS of 3 for *P. tripartite*, FPS 5 for *O. basilicum*, and the combination FPS 7. Creams presented s photoprotective levels and an interesting synergistic effect was observed.

KEYWORDS Photoaging; UV radiation; COLIPA method; *Ocimum basilicum*; Creams



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ABSTRACT 18

Comparative Study of the Efficiency of a Mixture of Antibacterial Parabens From Rosemary Oil (*Rosmarinus officinalis* L.) Used As a Preservative in Cosmetic Formulation

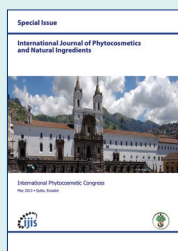
Tatiana Mosquera

Quito, Ecuador. Email: tmosquera@ups.edu.ec

ABSTRACT

Cosmetics are a developing market and as such the need to research suitable preservatives is important. All items of cosmetic use require an a preservative, or substance that will inhibit bacterial growth in its lifetime. The selected option for the current project, is the essential oil of Rosemary, which presents preservative qualities and is a natural ingredient, and as such it can be considered as a main ingredient in cosmetic formulations. The study compares the antimicrobial abilities of two ingredients in two cosmetic formulations. The first one is a mixture of parabens (Phenoxyethanol, Methylparaben, Ethylparaben, Propylparaben, Butylparaben, Isobutylparaben), widely used in the cosmetics industry despite the questioning that exists in regards to their safety. The compounds in the naturally occurring essential oil of rosemary (*Rosmarinus officinalis* L.) contain a number of tonic compounds and is also used in the cosmetic industry for its antioxidant and antimicrobial properties. Five formulations of shampoos have been prepared, in which the only variation was the compound used as a preservative and its action. A formula containing a commercial preservative, corresponding to 0.7% concentration of parabens (which is accepted by international regulations and regulatory bodies such as COLIPA; Cosmetics Europe - The Personal Care Association) three combinations using essential oil of rosemary (*Rosmarinus officinalis*) 1%, 1.5% and 2.5%, and the fifth with none of the antibacterial ingredients. Method ISO 11930:2012 Preservative Efficiency of EC Regulation 1223/2009 (Challenge Test) applies. The essential oil, incorporated to the cosmetic formulations from the lowest concentration of 1% generates a similar preservative efficacy as the commercially available preservatives that comprise a mixture of parabens incorporated in the formulation. The essential oil can be considered an acceptable preservative system.

KEYWORDS Preservatives; Parabens; Essential oil; *Rosmarinus officinalis*; Challenge test



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ABSTRACT 19

Evaluación De La Actividad Antibacteriana In Vitro Del Aceite Esencial De Hierba Luisa (*Cymbopogon Citratus* [Dc] Stapf), Poaceae En Una Formulación Cosmética Con Finalidad Antiacnéica

Tatiana Mosquera

Quito, Ecuador. Email: tmosquera@ups.edu.ec

ABSTRACT

The study evaluated the antibacterial activity in vitro and in vivo the essential oil of Lemongrass (*Cymbopogon citratus*) against *Propionibacterium acnes*, the bacteria that causes acne. The essential oil obtained from the leaves, by the method of hydrodistillation drag steam. The chemical composition determined by gas chromatography coupled to mass spectrometry (GC/MS), found as major components: β -pinene, β -citral (Neral) and α -citral (Geranial). Determination of in vitro antibacterial activity of the essential oil and the lotion was performed by the method of diffusion in agar, demonstrating a significant antibacterial activity at concentrations from 0.05% to 5%. With concentrations where activity is present a topical lotion was formulated, the lotion was subjected to a test of irritability (Patch Test only Simple) and an efficacy study in vivo to determine the decrease of porphyrins by the method of scanning does invasive Visiopor PP 34N[®]. The results of the irritability and efficacy studies indicate that the lotion can be used in a reliable manner in this skin pathology. The study has concluded that the lotion has an antibacterial effect against *P. acnes*.

KEYWORDS Essential oil; *Cymbopogon citratus*; Acne; Antibacterial; Porphyrin; *Propionibacterium acnes*