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Abstracts

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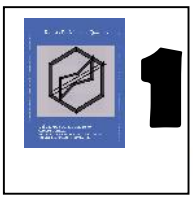

QUANTIFICATION OF BIOACTIVE COMPOUNDS IN *COFFEA ARABICA* SHELL IN BOLIVIA

CUANTIFICACIÓN DE COMPUESTOS BIOACTIVOS EN CÁSCARA DE *COFFEA ARABICA* EN BOLIVIA

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Keywords: *Protocatechuic acid, Caffeine, Chlorogenic acid, Coffea arabica, Coffee husk, coffee silverskin, La Paz, Bolivia.*

ABSTRACT

In this study, we established the content of protocatechuic acid (AP), chlorogenic acid (ACG) and caffeine (CAF) in 11 samples of coffee husks obtained from several coffee companies from northern La Paz in Bolivia. The content of these compounds was quantified by an HPLC-DAD method using an external standard in each case. The results showed that the content of AP varies between 0.32 and 9.25 mg/g of husks, the content of CAF between 0.55 and 35.68 mg/g of husks, and the content of ACG between 0.04 and 17.06 mg/g of husks. The sample with the highest AP concentration came from the company Villa Oriente with 9.25 mg/g of dry husks; the highest concentration of CAF was from the company Chulumani Café with 35.68 mg/g of dry husks, and the sample with the highest concentration of ACG was from the company Chulumani Café with 17.06 mg/g of dry husks, high values in AP and CAF in comparison to others reported for coffee husks. In addition, we determined an effective method to obtain extracts enriched in phenolic compounds (ERCF) and in caffeine (ERC), using only solid-liquid and liquid-liquid extraction processes. ACG and the AP were quantified in the ERCF whereas CAF was quantified in ERC coming from samples of coffee husk from every company surveyed. Concentration values ranged up to 99.19 mg/g for the content of AP (Villa Oriente Company), 66.22 mg/g of ACG of the ERCF and a concentration of 850.69 mg/g of CAF of the ERC (Chulumani Café Company).

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2

COMPARATIVE STUDY OF THE PROTEOLYTIC COMPLEX OF SPECIES OF THE GENUS *FICUS SPP.*

ESTUDIO COMPARATIVO DEL COMPLEJO PROTEOLÍTICO DE ESPECIES DEL GÉNERO *FICUS SPP.*

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Keywords: *Ficus spp., Proteolytic activity, Cysteine proteases.*

ABSTRACT

The studies carried out in recent years on the pharmacological and biotechnological activity of cysteine proteases have impelled us in exploring new natural sources of plant proteases. In the present work we have studied the cysteine proteases contained in the latex of *Ficus spp.* This is a plant species widely used in Bolivia and Peru for its latex, collected for the present purposes in Iquitos, Peru (P-IQ), Sud Yungas Province, Charcas II (B-SY), Los Olivos (B-SY), Hernández (B-SY) and in the Province Abel Iturralde (B-AI), Buena Vista, el Tigre, (B-AI) in northern La Paz, Bolivia. In the present paper we established the proteolytic activity of the samples with a correlation to the place of origin, the influence of the pH on the proteolytic activity as well as the proteic contents of the samples.

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3

RICE-GENERATED *ASPERGILLUS SPP.*, AFLATOXIN B1, ITS DETECTION AND QUANTIFICATION BY FLUOROMETRIC AND HPLC METHODS

AFLATOXINA B1 DE *ASPERGILLUS SPP* GENERADO EN ARROZ, SU DETECCIÓN Y CUANTIFICACIÓN POR MÉTODOS FLUOROMÉTRICOS Y HPLC

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Keywords: *Aflatoxin B1, Aspergillus spp, Oryza sativa, Fluorometry, HPLC.*

ABSTRACT

Aflatoxins are produced by toxigenic strains of *Aspergillus spp* as a part of their metabolic products. Its toxicity causes severe health damage which makes them to be considered potent carcinogens. There are *Aspergillus* strains that in substrates such as rice (*Oryza sativa*) grow and produce mycotoxins at 30 °C.

Two analytical methods for the detection and quantification of aflatoxin B1 were developed; calibration curves were constructed to validate these methods. Aflatoxin B1 production was develop by strain 114 QD (*Aspergillus spp.*) in a medium containing 50 and 20 g of rice emulating when possible the storage conditions during incubation period.

The analysis of 50 and 20 g of rice extracts by high performance liquid chromatography (HPLC) gave average concentrations of aflatoxin B1 of 94, 93 and 24,64 ppb respectively. By fluorescence spectroscopy average concentrations of 133, 37 and 27, 23 ppb were determined. Aflatoxin B1 concentrations obtained by both analytical methods show a significant difference (P <0, 05) with respect to the amount of substrate, being higher the concentration of aflatoxin B1 with greater amount of rice in the medium, the sensitivity of these methods allows to detect this toxin from 6 ppb.

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4

FLAVONOID CONTENTS IN LEAVES OF *BACCHARIS LATIFOLIA*, ACCORDING TO THE TYPE OF LEAF, AND ITS DEPENDENCE ON THE PHYSICOCHEMICAL PROPERTIES OF SOILS

CONTENIDOS FLAVONOCIDOS EN LAS HOJAS DE *BACCHARIS LATIFOLIA*, SEGÚN EL TIPO DE HOJA, Y SU DEPENDENCIA DE LAS PROPIEDADES FISICOQUÍMICAS DE LOS SUELOS

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Keywords: *Baccharis latifolia*, *Chilca*, *Total flavonoids*, *Apical leaves*, *Soils.*

ABSTRACT

Baccharis latifolia, commonly known as "Chilca", is a plant with a recognized anti-inflammatory activity. Part of its activity is due to its flavonoid contents, whose quantitative composition in the plant varies according to environmental conditions. This study is focused on characterizing and quantifying flavonoids of *B. latifolia* leaves in the dry season. The quantification of total flavonoids was done by chelation with $AlCl_3$ and by measuring with UV/Vis spectroscopy with respect to luteolin, by means of comparing the total flavonoid contents in apical, middle and basal leaves, at three altitudes in the hillsides of Lluto, La Paz (4187, 4000 and 3825 m.a.s.l.). Through this study, we have determined that the leaves with the highest concentration of flavonoids are the apical and that, in the dry season, there is not a clear correlation between the altitude and the production of flavonoids. Additionally, we've analyzed the correlation between some physicochemical properties of soils and the production of flavonoids, determining on the one hand, that nitrogen richer soils provoke a diminishing of concentration of flavonoids, whereas

pH, electrical conductivity and the percent of clay have a direct proportional relationship with the production of flavonoids, which means that an increase in these parameters implies an increase in the flavonoid total contents and *vice-versa*.

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5

TREATMENT OF CYANIDE SOLUTIONS AND PRECIPITATION OF CYANICIDE METALS BY REACTION WITH HYDROGEN PEROXIDE AND CAUSTIC SODA, THE PERSO METHOD; OBTAINING ECONOMICALLY USEFUL SLUDGE

TRATAMIENTO DE SOLUCIONES DE CIANURO Y PRECIPITACIÓN DE METALES CIANICIDAS POR REACCIÓN CON PERÓXIDO DE HIDRÓGENO Y SODA CAUSTICA, EL MÉTODO PERSO; OBTENCIÓN DE LODOS ECONÓMICAMENTE UTILES

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Keywords: *Total cyanide, Free cyanide, Cyanide oxidation.*

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ABSTRACT

Combination of hydrogen peroxide and caustic soda in solution, denominated by the authors "Perso method", results in the formation of a strong oxidant, which is effective in the detoxification of total cyanide and precipitation of complex metals that are found in solutions.

The present work shows the technical feasibility of reusing water from the gold tailings instead of fresh water (as in agriculture or in the mining process) avoiding the saturation of cyanicide metals in the operation circuit. After a chemical treatment at an optimum pH, follows the obtaining of a solution with a lesser amount of cyanicide metals, impacting favorably in the production of better quality doré bars.

The hexagonal experimental design was applied which involves a series of tests of different molar ratios of hydrogen peroxide and caustic soda, time (min) vs concentration of total cyanide, and concentration of copper and silver. The process was fast and efficient. With an initial concentration of 200 mg/l of free cyanide, 2.2 mg/L of silver, 200 mg/l of copper and a molar ratio of $(H_2O_2$ NaOH)/(CN^-) = 8, it was possible to achieve a final concentration of 1.5 ppm of cyanide, 1 ppm Ag, 5 ppm Cu. In contrast, a molar ratio of $(H_2O_2$ NaOH)/(CN^-) = 12, afforded a final concentration of 0.8 ppm of cyanide, 0.8 ppm Ag and 2 ppm Cu, in the same time of reaction (45 min). The precipitate of metals such as silver and copper characterized as economically usable sludge, has an economic interest in the market.

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6

DETERMINATION OF THE TOTAL ANTIOXIDANT CAPACITY, TOTAL PHENOLS, AND THE ENZYMATIC ACTIVITY IN A NON-DIARY BEVERAGE BASED ON GRAINS OF *CHENOPODIUM QUINOA*

DETERMINACIÓN DE LA CAPACIDAD ANTIOXIDANTE TOTAL, FENOLES TOTALES, Y LA ACTIVIDAD ENZIMÁTICA EN UNA BEBIDA NO LÁCTEA EN BASE A GRANOS DE *CHENOPODIUM QUINOA*

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Keywords: *Quinua, Bebida no láctea de origen vegetal, Antioxidantes, α-amilasa.*

ABSTRACT

Due to its numerous nutritional properties, the quinoa grain, constitutes an excellent alternative for its use as raw material in the elaboration of a non-dairy beverage. These grains are rich in phenolic compounds and dietary fiber, minerals such as calcium, iron and zinc, fundamental in physiological and biochemical functions of the human body.

Antioxidants are molecules capable of preventing or slowing down the oxidation of biological molecules such as proteins, lipids and nucleic acids. They are of vital importance for the prevention of the action of free radicals on the organism; decreasing oxidative processes, slowing the aging process and preventing the development of various diseases.

The antioxidant compounds present in food can be classified as vitamins, carotenoids, phenolic compounds and others. Along with vitamins, phenolic compounds are considered important antioxidant components in foods such as fruits, vegetables, tubers and cereals.

The objective of the present study was to measure the beneficial antioxidant components and the enzymatic activity in the non-dairy drink based on quinoa.

For the determination of antioxidant molecules in general, the ABTS and FRAP standardized methods that measure Total Antioxidant Capacity (TAC) were used. For the determination of phenolic compounds, the Folin Ciocalteu method was used.

The Miller (DNS) method was used to measure the activity of the added α-amylase and the amylases present in the non-dairy beverage by means of the determination of reducing sugars (maltose) produced by the hydrolysis of the starch present in the grains of quinoa.

All the methods used in the present work were adjusted and adapted to the nature of the sample to obtain reliable results.

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