

from the matrix (referred as bioaccessibility) and transepithelial passage efficiency. In vitro digestion models are being extensively used to predict carotenoids bioaccessibility in a rapid and cheaper way, besides not involve ethical aspects as in vivo assays. The aim of this study was to assess carotenoids bioaccessibility from five available capsule-formulations of nutraceuticals in the Brazilian market, claimed as carotenoid source and with several health benefits. The nutraceuticals products were purchased in local stores in Rio de Janeiro, Brazil.

**Methods:** An in vitro digestion model was applied by mimicking oral, gastric and intestinal physiological conditions. Five percent (w/w) of canola oil was added to the samples. Analyses involved enzymes as  $\alpha$ -amylase, pepsin, bile, pancreatin, lipase and inorganic salts. Physiological variations were reproduced by the bath shaker with orbital gyros (37°C) and ultracentrifugation (5000g, 45 min). Identification and quantification of carotenoids were performed by HPLC, using a 33°C column oven, PDA detector, and a C30YCM Column. Carotenoids separation was obtained by a gradient elution of methanol and methyl tert-butyl ether, using a 0.8mL/min flow rate, injection volume of 15  $\mu$ L and run time of 28min.

**Results:** Bioaccessibility of carotenoids was decreased after pass through the gastro-intestinal model and varied among the five formulations. A lycopene formulation presented greater bioaccessibility in the small intestine (48,02%) than other ones rich in  $\beta$ -carotene (0.96%, 31.29%, 34.45% and 36.22%) or one rich in lutein (0.86%).

**Conclusions:** These results showed that the available carotenoids amounts for absorption in these products are much lower than declared in the label.

**Key words:** In vitro digestion,  $\beta$ -carotene, lycopene, lutein, bioavailability

---

## PO2944

### PEANUT BUTTER FRUIT: A RICH SOURCE OF LYCOPENE

R. Borguini<sup>1</sup>, S. Pacheco<sup>1</sup>, R. Godoy<sup>1</sup>, M. Souza<sup>2</sup>, L. Nascimento<sup>1</sup>, M. Santiago<sup>1</sup>, F. Peixoto<sup>3</sup>

<sup>1</sup>Embrapa Food Technology, Embrapa, Rio de Janeiro, Brazil

<sup>2</sup>Department of Botany, National Museum, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

<sup>3</sup>Program of Post Graduate Food Science and Technology, Rural Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

**Background and objectives:** The interest in South American native plant species has been growing in recent years due to their health benefits. The species *Bunchosia armeniaca* (Cav.) DC. is a plant from Andes and the popular name is peanut but-

ter fruit. In Brazil it is cultivated for a long time, but only in domestic orchards, known as caferana, cafezinho, ciruela, caramela, ameixa-do-pará or ameixabrava. Due to its orange to red color, typical of carotenoids, the aim of the present study was to quantify and determine the carotenoids profile in the edible parts of the fruits.

**Methods:** Peanut butter fruits were collected in January 2013 in the city of Rio de Janeiro, Brazil. Total carotenoid content were evaluated by spectrophotometric method at 450nm and the carotenoids profile by High Performance Liquid Chromatography.

**Results:** The fruit pulp presented high levels of total carotenoids (40 mg/100 g wet basis), in which 89% was lycopene (36 mg/100 g), followed  $\beta$ -carotene (2.5 mg/100 g) and lutein (0.3 mg/100 g). Lycopene is the carotenoid with the highest antioxidant activity and is present in high concentrations in the prostate tissue, which may explain its role in reducing the risk of prostate cancer. In Brazil, prostate cancer is the second most common among men, behind skin cancer. It is the sixth most common cancer type in the world and the more prevalent in men, accounting for about 10% of all cancers. The tomato and its products are considered the main sources of lycopene in the Western diet.

**Conclusions:** The peanut butter fruits are a rich source of lycopene presenting 10 times more than the tomato fruit (3.5 mg/100 g). This biodiversity fruit has a great potential of use, once it has a good taste to eat fresh and can also be used as an ingredient in preparations to increase the lycopene levels in food.

**Key words:** *Bunchosia armeniaca*, carotenoids, biodiversity fruits, bioactive compounds.

---

## PO2945

### EVALUATION OF ANTHOCYANIN PROFILE IN APPLE PEEL OF THREE CULTIVARS PRODUCED IN BRAZIL

A. Gouvêa<sup>1</sup>, M. Santiago<sup>2</sup>, R. Godoy<sup>2</sup>, R. Borguini<sup>2</sup>, S. Pacheco<sup>2</sup>, L. Nascimento<sup>2</sup>

<sup>1</sup>Program of Post Graduate Food Science and Technology, Rural Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

<sup>2</sup>Embrapa Food Technology, Embrapa, Rio de Janeiro, Brazil

**Background and objectives:** The annual apple production in Brazil has remained around one million tonnes/year. In the processing industry of fruit juices, apple juice is considered one of the main products. This juice production generates 25 to 30% of waste (bagasse: peel, pulp and seed) which has aroused the interest of the scientific community, aiming its use for the

obtaining of new products from these residues. The peel is the part of the residue with the higher concentration of pectin and flavonoids, such as anthocyanin, being its antioxidant activity responsible for reducing the risk of cardiovascular diseases and chronic diseases such as cancer. The objective of this study was to compare the anthocyanin profile in apple peel of three cultivars produced in Brazil.

**Methods:** The cultivars Gala, Fuji and Red were obtained in local market in the municipality of Rio de Janeiro, Brazil. The apple peels anthocyanins were extracted with acidified methanol solution. Chromatography analysis was performed on a Waters® Alliance 2695 system, with a Waters® 2996 photodiode array detector, Thermo® Scientific C18 BDS (100mm x 4.6mm; 2.4µm) column and gradient elution method with acetonitrile and formic acid. It was observed the same anthocyanin profile among cultivars.

**Results:** The majoritary anthocyanin detect was cyanidin-3-galactoside (corresponding to 88% of total anthocyanin content in the evaluated matrix). This anthocyanin, compared to others present in food, has one of the highest antioxidant activity.

**Conclusions:** Therefore, the three apple cultivars can be considered a source of anthocyanin, being wasted each year by juice industry in large quantities, while could be used, for example, as a food ingredient with antioxidant properties. It could also allow the fruit sector to diversify its production and increase income.

**Key words:** antioxidant, flavonoids, residues

---

## PO2946

### EFFECT OF NON-ALCOHOLIC BEER IN THE SUBJECTIVE SLEEP QUALITY IN AN UNIVERSITY STUDENT POPULATION UNDER STRESS

L. Franco<sup>1</sup>, R. Bravo<sup>1</sup>, C. Galán<sup>1</sup>, A B. Rodríguez<sup>1</sup>, C. Barriga<sup>1</sup>, J. Cubero<sup>1</sup>

<sup>1</sup>University of Extremadura, Spain

**Background and objectives:** Sleep deprivation affects the homeostasis of the physiological functions of organism. Beer is the only beverage that contains hops, a plant with sedative effect. Our objective is to determine the improvement of subjective sleep quality using the Quality Index Questionnaire Pittsburgh Sleep.

**Methods:** The assay was conducted in a population of 30 university student. The experimental period was 3 weeks, the first 7 days for the control, and following 14 days individuals ingested beer during dinner.

**Results:** The results revealed that one beer took during dinner improve the Subjective Quality of Sleep, because the Sleep Latency (time period measured from going to bed until the onset of sleep) decreases ( $p < 0.05$ ) respecting to control.

**Conclusions:** The overall rating Subjective Quality of Sleep also improved significantly ( $p < 0.05$ ). In conclusion, the consumption of non-alcoholic beer at dinner is recommended to improve the quality of sleep.

**Key words:** Sleep, Pittsburgh, hop, beer, stress.

---

## PO2947

### HYPOCHOLESTEROLEMIC EFFECT OF COWPEA VICILIN IN RATS FED A HIGH-CHOLESTEROL DIET

V. Neves<sup>1</sup>, E. S. Ferreira<sup>1</sup>, A. Demonte<sup>1</sup>, A. L. Amaral<sup>1</sup>, C. F. Zanelli<sup>2</sup>

<sup>1</sup>Department of Food and Nutrition, School of Pharmaceutical Sciences, São Paulo State University, Brazil

<sup>2</sup>Department of Biological Sciences, School of Pharmaceutical Sciences, São Paulo State University, Brazil

**Background and objectives:** In this work was evaluated the hypolipidemic effects of cowpea vicilin (γ-vignin) and a statin in rats.

**Methods:** Rats male (n=27) were divided into three groups that received a hypercholesterolemic diet (20% palm oil, 1% cholesterol and 0.5% cholic acid). Hypercholesterolemic group (HC diet) was treated with saline solution, while that HC+7SC (HC diet, plus cowpea γ-vignin), and HC+SVT (HC diet, plus drug simvastatin) have received daily doses of 300 and 50 mg/kg/day of protein and drug, respectively, by gavage during 4 wk.

**Results:** The HC+7SC group showed a decrease in the total serum cholesterol, non-HDL-C and the atherogenic index (32.5, 54.3 and 70.7%, respectively), and these values were higher than those treated with simvastatin. Serum HDL-cholesterol levels were increased (57.1%) in the HC+7S-C group and hepatic cholesterol and triglyceride contents were significantly lower than in the HC (13.7 and 17.1%, respectively). The lipoprotein lipase activity was higher in the HC+7S-C group than the others; however, there were no differences in glutamic pyruvic transaminase activities. Furthermore, the expression of low density lipoprotein receptors (LDLr) in the liver has presented an upregulation (more 119%), while others were downregulated: the sterol regulatory element-binding protein 2 (SREBP-2) minus 34%; the 3-hydroxy-3-methylglutaryl Coenzyme A-reductase minus 52%; HMGCoA-synthetase minus 77%; and the fatty acid synthase minus 10%.

**Conclusions:** Based on these data, it can be suggested that the oral daily administration of isolated vicilin from cowpea can promote a hypolipidemic effects in rats fed hypercholesterolemic diets and these effects could involve the regulation of