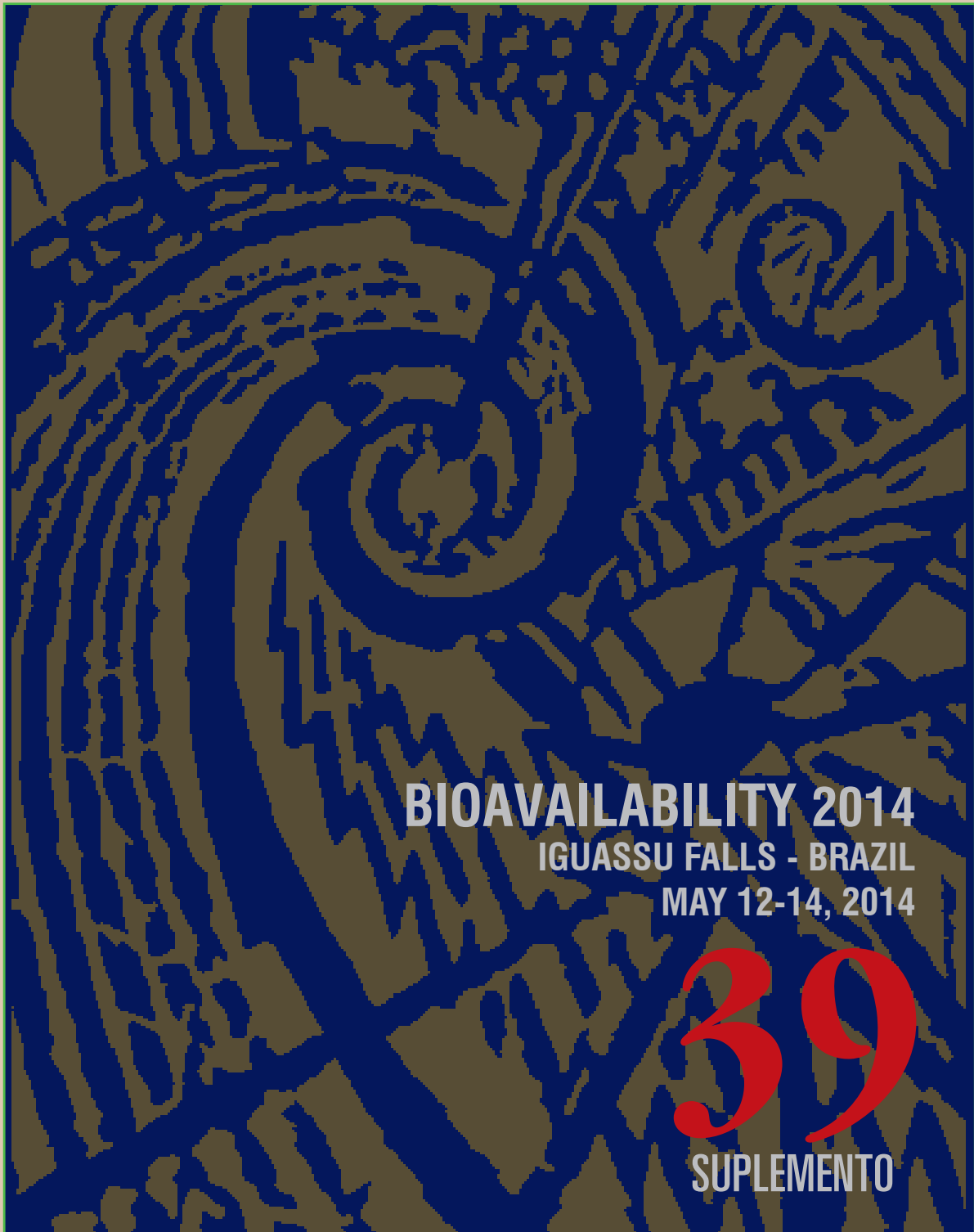


# Nutrire

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**BIOAVAILABILITY 2014**  
IGUASSU FALLS - BRAZIL  
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SUPLEMENTO

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# BIOAVAILABILITY 2014

UNDERSTANDING THE BIOAVAILABILITY OF MICRONUTRIENTS AND BIOACTIVE COMPOUNDS SO AS TO IMPROVE PUBLIC HEALTH

MAY 12-14, 2014 - HOTEL RECANTO - IGUASSU FALLS - BRAZIL

## OR-05 - IRON BIOAVAILABILITY OF CAROTENOIDS AND IRON ENHANCED CONTENT CROPS

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**Country:** BRASIL

**Session:** SHORT COMMUNICATION - Date: 13/05/2014 - Room: ANTHURIUM - Time: 12:00-12:15:00

### BACKGROUND

Iron deficiency is a nutritional problem that affects thousands of people in the worldwide. The correlation between vitamin A intake and iron status has been widely investigated. These facts have been induced researchers to develop biofortified foods with iron and carotenoids, which are of the low cost and included in the feeding habits of the Brazilian population.

### OBJECTIVES

The aim of the study was to evaluate the iron bioavailability of bean and a mix of bean and rice and/or sweet potatoes and/or pumpkin and analyzing the influence of carotenoids on iron bioavailability.

### METHODS

Foods (Pontal bean, rice, pumpkin and sweet potato) with iron, zinc and beta carotene were developed at Embrapa by the biofortification programs in Brazil: Breeding Crops for Better Nutrition (BioFORT and HarvestPlus). The iron bioavailability was assessed by bioassay by the method of depletion-repletion. Were tested seven experimental groups (n = 8): Pontal Bean (B); Rice + Pontal Bean (RB); Pontal Bean + Pumpkin (BP); Pontal Bean + Sweet Potato (BS); Rice + Pontal Bean + Pumpkin (RBP); Rice + Pontal Beans + Sweet Potato (RBS), Positive Control (ferrous sulfate). Hemoglobin was measured at the beginning and end of the repletion phase. We evaluated gain hemoglobin (GHb), Hb regeneration efficiency (HRE) and relative biological value of HRE (HRE of RBV).

### RESULTS

The experimental groups showed values of GHb similar to the control ( $6.9 \pm 1.95$ ; Dunnett,  $p > 0.05$ ), except for the groups B and RB ( $2.61 \pm 1.33$  and  $3.84 \pm 1.03$ , respectively). The test groups showed similar levels of HRE: RB ( $0.87 \pm 0.16$ ), BP ( $0.86 \pm 0.12$ ), BS ( $0.86 \pm 0.24$ ), RBP ( $0.81 \pm 0.11$ ), BRS ( $0.81 \pm 0.25$ ), which were higher than the control ( $0.76 \pm 0.14$ ), except for the group B ( $0.6 \pm 0.55$ ). The GHb values of all test-groups were similar, except of the group B. The RBVHRE indicated that BP ( $1.12 \pm 0.16$ ) and RB ( $1.13 \pm 0.21$ ), were higher than the control.

### CONCLUSIONS

The association of bean and pumpkin, or rice and bean are a good strategy to increase iron bioavailability and prevent iron deficiency.

ACKNOWLEDGMENT: EMBRAPA, HARVESTPLUS, FAPEMIG, CAPES, CNPQ and UFV

## OR-06 - DETERMINANTS OF CIRCULATING FOLIC ACID AMONG POPULATION WITH MANDATORY FORTIFICATION: POPULATION BASED SURVEY IN SAO PAULO - BRAZIL

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**Session:** SHORT COMMUNICATION - Date: 13/05/2014 - Room: ANTHURIUM - Time: 16:45-17:00:00

### BACKGROUND

High oral doses of folic acid have been shown to bypass the normal folate absorption mechanism, resulting in circulating form of the vitamin. Several adverse health outcomes have been associated with exposure to high intakes of total folate and folic acid. Existing levels of circulating folic acid (FA) increased after fortification. In Brazil, the mandatory fortification of flour with FA has occurred since 2004.

### OBJECTIVES

The goal of this research is to determine the prevalence of detectable circulating FA and to assess the determinants of circulating FA.

### METHODS

This is a cross-sectional population-based survey that included 750 residents in Sao Paulo City-Brazil. The participants provided fasting blood samples. Samples were assayed for total plasma folate, circulating FA, homocysteine (hcy), vitamin B6 and B12. Affinity/HPLC with electrochemical detection method was used to measure circulating FA. DNA was isolated and the genotypes were determined by RT-PCR system. Generalized linear models (GLM) with Gaussian distribution and log link function were applied to model circulating FA according to sex, age, smoking, hcy, B12, B6, folate and polymorphism (C677T MTHFR: CC and T-carriers; A1298C MTHFR: AA and C-carriers; deletion in DHFR: non-del/del and del/del). The descriptive analyses were performed with STATA version 10.0 and GLM were run in R, version 3.0.2.

### RESULTS

The mean of age was 46.2 y (95% CI: 44.4-47.9), and women accounted for 58.1% of the study population. Only 2.2% of population had serum folate  $< 6.8$  pmol/ml (3ng/ml), cut-off of deficiency. Circulating FA was detected in 80% of the population with a mean concentration of 2.29 pmol/ml (95% CI: 1.92-2.65) in men and 2.19 pmol/ml (95% CI: 1.95-2.47) in women. Significant effects of female ( $p < 0.02$ ), age ( $p < 0.001$ ), total folate ( $p = 0.001$ ), homozygotes for the deletion in DHFR ( $p = 0.035$ ) and vitamin B6 ( $p = 0.001$ ) were found in GLM. An increase of one pmol/ml in folate was associated with increased of 1.46% in circulating FA considering fixed effects of all others variables in the GLM.

### CONCLUSIONS

Higher levels of folate are associated with higher levels of circulating FA. The finds point the mandatory fortification with folic acid has resulted in high exposure to circulating FA. There is growing experimental evidence that higher circulating folate levels can contribute to adverse effects. Further research is needed to elucidate these complex relationships, and to guarantee the safety of exposure to folic acid.

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