

# DETERMINATION OF IRON SUPPLEMENTATION IN FOOD FORTIFICATION USING X-RAY FLUORESCENCE TECHNIQUE



D.N.S. Giovanni<sup>1</sup>, S. Metairon<sup>1</sup>, C.B. Zamboni<sup>1</sup>, E.C.R. Oliveira<sup>2</sup>, T.N. Silva-Damasceno<sup>2</sup>

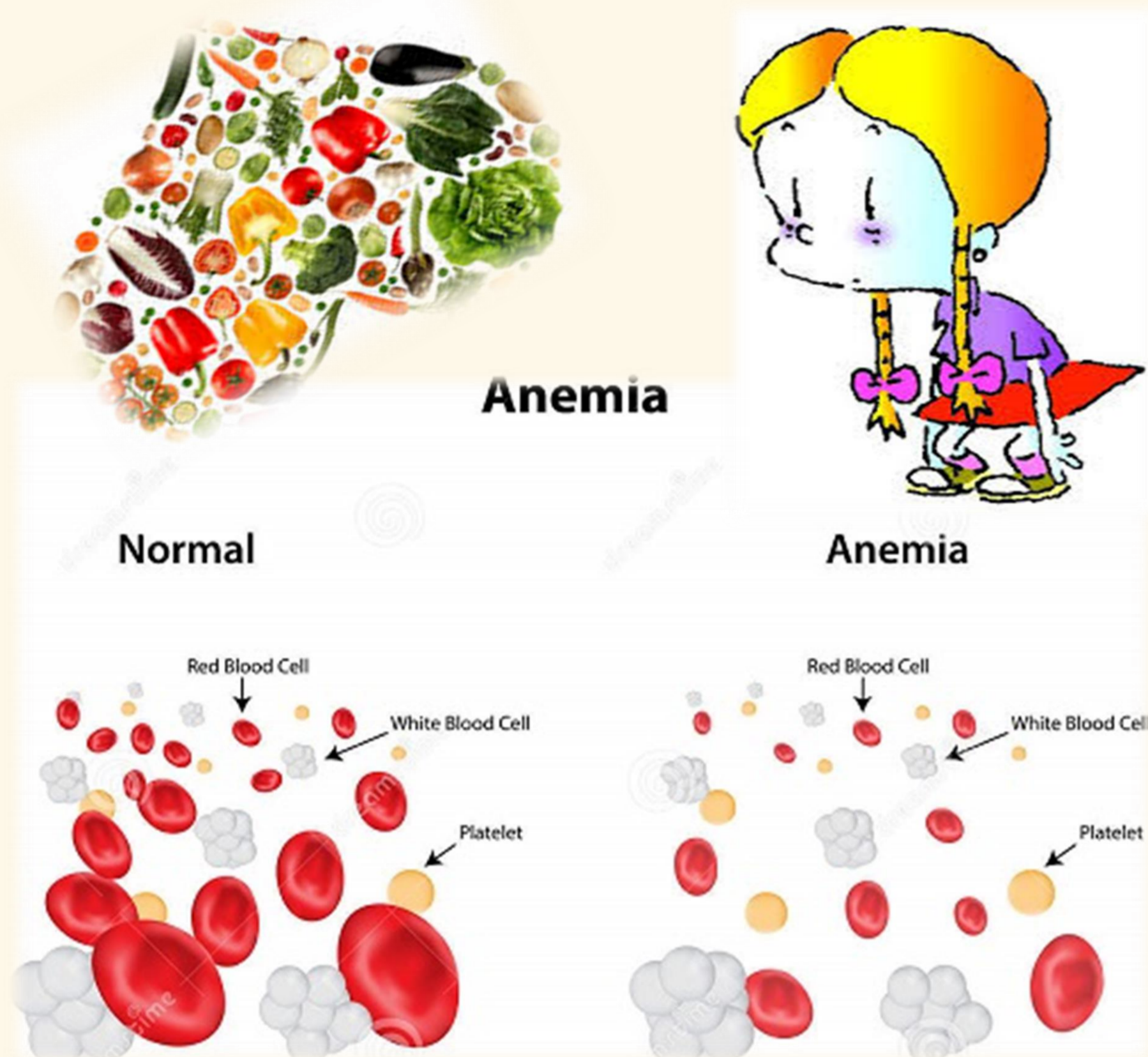
<sup>1</sup>Instituto de Pesquisas Energéticas e Nucleares - IPEN/CNEN-SP, SP, Brazil

<sup>2</sup> Universidade Anhanguera de São Paulo, SP, Brazil

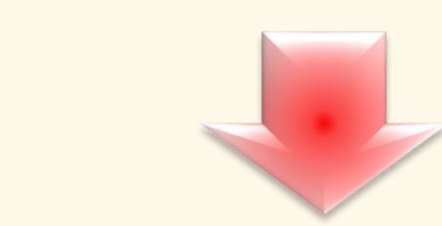


Anemia in Brazil is a public health problem due to iron-deficiency. According to National Health Surveillance Agency (ANVISA) several strategies have been adopted to prevent this deficiency, such as: food fortification. Among the foods highly consumed by the Brazilian population, iron fortified wheat flour food is a target of nutritional relevance to combat anemia. In this research various brands commercially available in São Paulo city were evaluated by iron determination using Energy Dispersive X-Ray Fluorescence technique. The results were compared with the minimum amount recommended and with the tolerable intake limit.

## INTRODUCTION



The word **anemia** came from Greek and means reduction of red blood cells (hemoglobin)



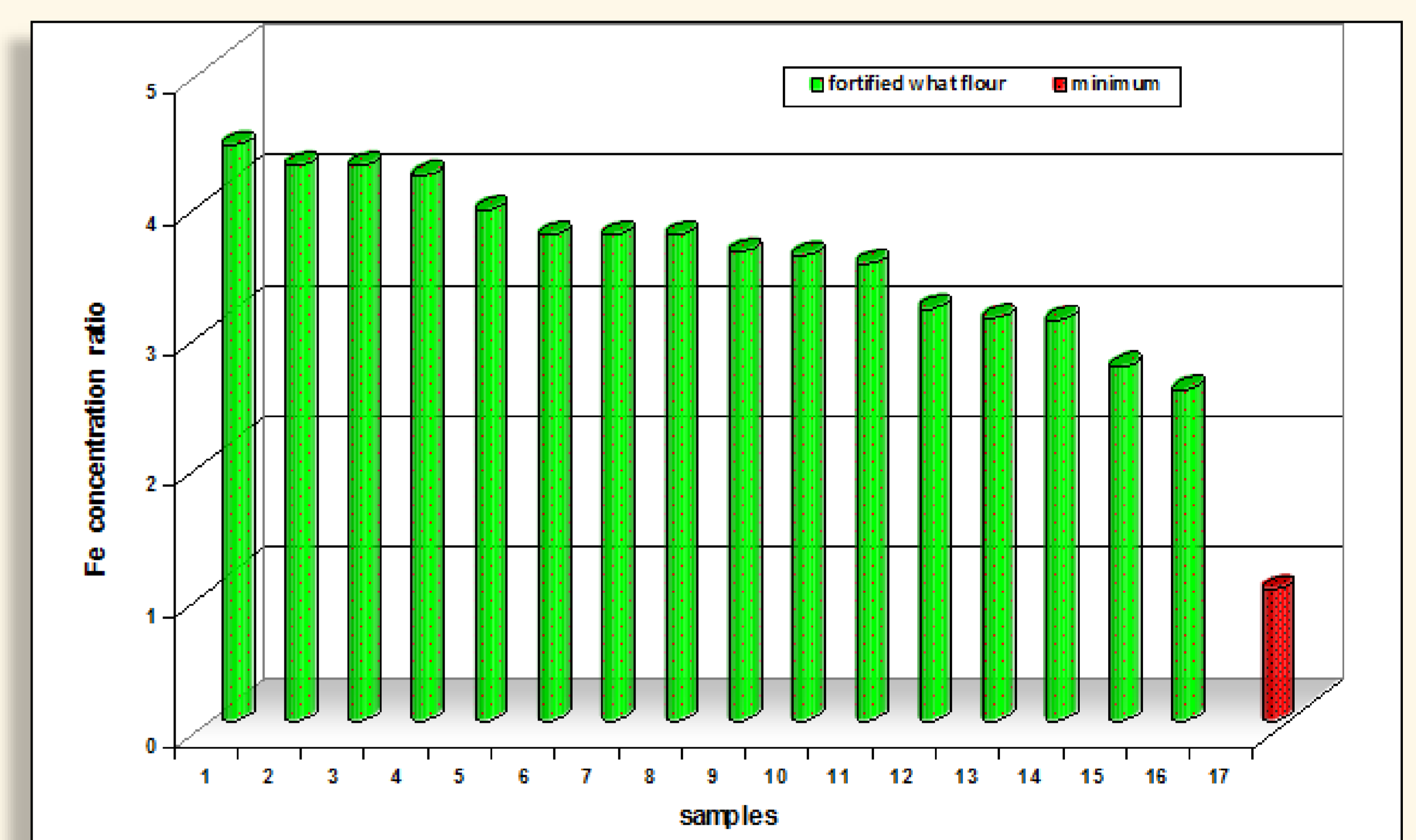
### Main symptoms

- ❖ weakness and lack of memory
- ❖ breathing problems
- ❖ mental and appetite disorders
- ❖ dizziness and nausea

X-123 SDD X-Ray Spectrometer from Amptek

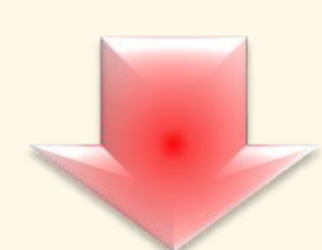
Parameter	Conditions
X - Ray tube	Ag target
Voltage	30 kV
Current	5 $\mu$ A
Detector	Si Drift(25 mm <sup>2</sup> x 500 $\mu$ m) Be window (12.5 $\mu$ m)
Fixed counting time	300 s
Emission line	K $\alpha$ : 6.40 keV
Quantitative analysis	WinQxas software

## RESULTS



In the last decade, according to ANVISA, **anemia** still a public health problem in Brazil: the prevalence among children under 5 years old and pregnant women are in a range of 20-40%.

Recent studies have shown that Fe supplementation still inappropriately used: many iron fortified foods does not reach the minimum amount (8mg/day) or exceed the recommended limit (44mg/day).



## MOTIVATION

In this study various wheat flours commercialized in São Paulo city were analyzed to verify compliance with ANVISA recommendation in relation to iron fortification.

## EXPERIMENTAL PROCEDURE

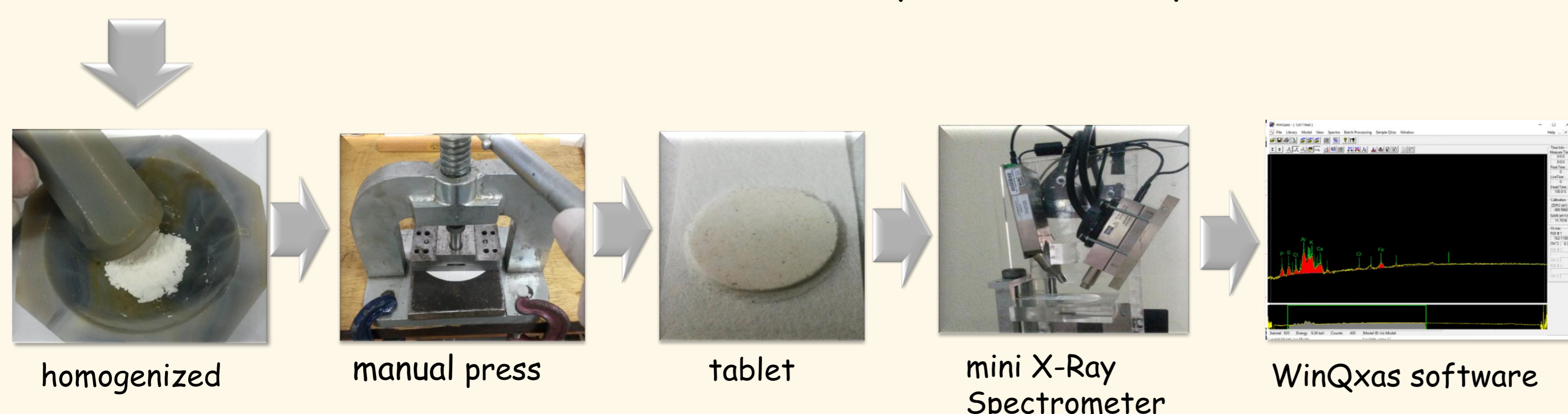
Samples of 16 wheat flour, commercialized in the large region of São Paulo city (SP- Brazil), were evaluated using EDXRF technique

### SAMPLE PREPARATION



wheat flour brands

- ❑ First the wheat flour was sifted and homogenized;
- ❑ After each sample been pressed at manual press, each tablet brand was prepared in duplicate;
- ❑ This method of preparation do not require agglutinative and/or substrate, so the sample can be analyzed on both sides.



## CONCLUSION

- ❑ The Fe concentration in wheat flour samples, commercialized at São Paulo city, showed 2.7- 4.5 times over of the minimum value required.
- ❑ All brands investigated meet ANVISA recommendations.
- ❑ Finally, it is important to emphasize that good diet can generate incredible benefits:



"Remember"

they are not anemic because they keep an iron rich diet

REFERENCE:

ANVISA - RDC No. 344 of 13 December 2002

Financial Support: FAPESP and CNPq