GEOGRAPHICAL TRACEABILITY OF WINES PRODUCED IN THE VALE DO FRANCISCO – BASED ON NEAR-INFRARED (NIR) AND CHEMOMETRICS

Carlos Monteiro de Lima[1], Licarion Neto[2], Giuliano Elias Pereira[3], Adriano Araújo Gomes[4], Mário César Ugulino de Araújo[2]

[1] Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte (IFRN); [2] Universidade Federal da Paraíba (UFPB); [3] Empresa Brasileira de Pesquisa Agropecuária – Centro de Pesquisa do Trópico Semiárido (EMBRAPA-CPATSA); [4] Universidade Federal do Sul e Sudoeste do Pará (UNIFESSPA)

INTRODUCTION

Brazilian wine map. (IBRAVIN, 2014)

The São Francisco Valley (VSF) wine region is located in semiarid tropical zone, between 8 and 9 ° South, with annual average rainfall between 350-800 mm, and the annual average temperature of 27 °C.

GOALS

- Propose a methodology simple, fast and of low cost,
- Based on the use of near-infrared (NIR) spectroscopy
- In pattern recognition, for classification of wine produced on VSF.
- And contributing to the acquisition of the geographical indication certificate of these wines

EXPERIMENTAL

I – 51 samples donated by producers (VSF)

II – 24 experimental samples (VSF)

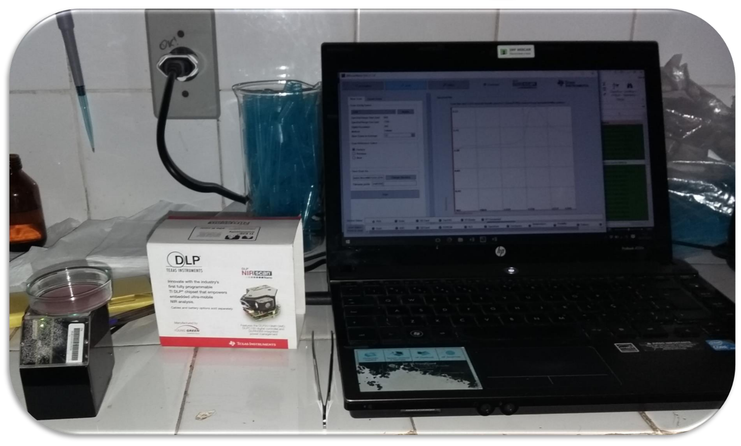
III – 16 samples bought in supermarkets (VSF)

IV – 16 samples (other regions) bought in supermarkets

Total of 107 samples

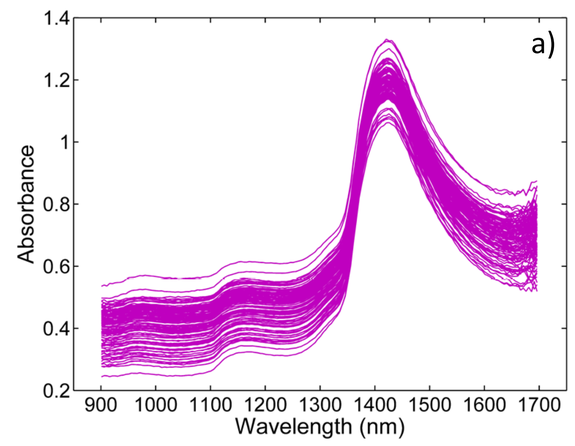
700uL (over the paper filter)

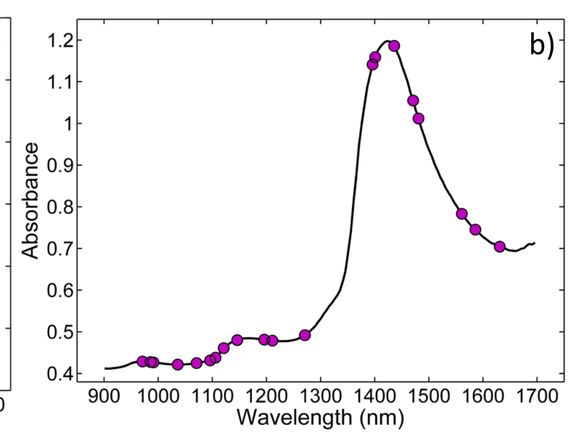
NIR, 900nm-1700nm, resolution 10nm

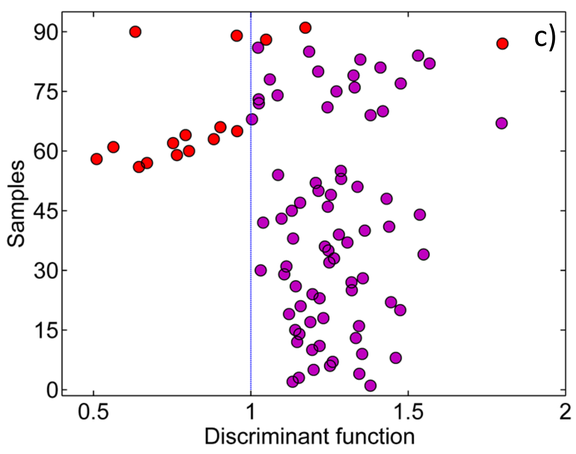


Further processing, using, MATLAB® and GA-LDA.

RESULTS







Raw spectra of the 107 samples (a) selected variables of the average spectrum of the samples (b) and discriminant functions of the model of the samples groups I e II (●) e IV (●) (c)

The spectrum shows the characteristic profile of alcoholic beverages, with band highlighted between 1350nm and 1550nm, typical OH groups.

The variable selected performed with GA-LDA 20 elected variables (wavelengths) over the whole spectrum, which may be a reflection of the great complexity of the matrix.

A model with the VSF samples (I and II) forming one class and those in other regions (IV) in the other class was constructed. A sample of the IV group showed anomalous behavior and will be better studied with discriminant function feature of the VSF. Two other samples of group IV were misclassified.

When tested, samples of group III on a class and on another class the groups I and II, 03 samples were misclassified.

In all tests samples, the VSF labeled are correctly classified.

CONCLUSION

The results, although preliminary, suggest that the NIR data carry the information able to properly discriminate the wines produced in the VSF from those wine of other regions.

The classification model built using variables selection (GA-LDA) achieved good results, we understand that there is a strong asymmetry between classes, due to the small number of samples from other regions.

The study will be continued, using other chemometric tools and possibly other techniques available and accessible to small producers.

REFERENCES

IBRAVIN – Instituto Brasileiro do Vinho. **Avaliação Setorial 2013**. ROLOFF. M; CAUS. M. (editores). Bento Gonçalves/RS, 2014.