

Accepted Manuscript

Short communication

Discrimination of Brazilian lager beer by ^1H NMR spectroscopy combined with chemometrics

Luis Augusto da Silva, Danilo Luiz Flumignan, Aristeu Gomes Tininis, Helena Redigolo Pezza, Leonardo Pezza

PII: S0308-8146(18)31481-X

DOI: <https://doi.org/10.1016/j.foodchem.2018.08.077>

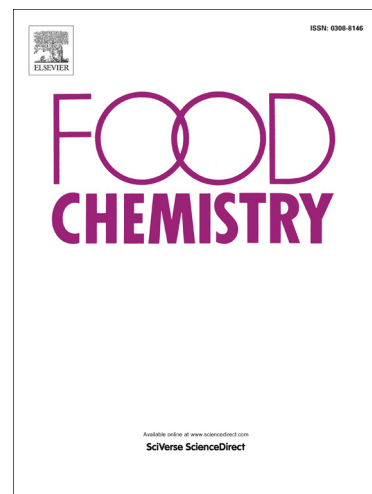
Reference: FOCH 23418

To appear in: *Food Chemistry*

Received Date: 7 May 2018

Revised Date: 16 August 2018

Accepted Date: 19 August 2018



Please cite this article as: da Silva, L.A., Flumignan, D.L., Tininis, A.G., Pezza, H.R., Pezza, L., Discrimination of Brazilian lager beer by ^1H NMR spectroscopy combined with chemometrics, *Food Chemistry* (2018), doi: <https://doi.org/10.1016/j.foodchem.2018.08.077>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Discrimination of Brazilian lager beer by ^1H NMR spectroscopy combined with chemometrics

Luis Augusto da Silva^a, Danilo Luiz Flumignan^b, Aristeu Gomes Tininis^b, Helena Redigolo Pezza^a, Leonardo Pezza^{a,*}

^a*Institute of Chemistry, São Paulo State University (UNESP), Rua Prof. Francisco Degni 55, Araraquara, Brazil*

^b*São Paulo Federal Institute of Education, Science and Technology (IFSP), Rua Stefano D'avassi 625, Matão, Brazil*

Abstract

^1H NMR spectroscopy combined with chemometrics was employed to discriminate lager beer samples from two different classes, according to their style and information provided on the label. Partial replacement of barley malt by adjuncts is a common practice adopted by large breweries, which can lead to a decrease in diastatic power, requiring the use of exogenous enzymes. For this reason, small variations in the spectral profile can occur in the carbohydrates region. Many studies have focused on differentiating beers according to type and brewing process. However, there have no studies concerning the discrimination of beers of the same type that differ only in style, using ^1H NMR spectroscopy. In this study PCA (first three components explained 81.5% of the dataset variability), PLS-DA and SIMCA models proved to be powerful tool with predict power higher than 90% for distinguishing lager beers based on the raw materials employed in the brewing process.

Keywords: Brazilian lager beer, malt barley and adjunct, NMR, PCA, PLS-DA, SIMCA

1. Introduction

Beer, the world's most popular fermented alcoholic beverage, is made using water, barley malt, hops, and yeast (Silva, Augusto, & Poppi, 2008). Malt is the main source of

*Corresponding author

Email address: pezza@iq.unesp.br (Leonardo Pezza)

Download English Version:

<https://daneshyari.com/en/article/11005661>

Download Persian Version:

<https://daneshyari.com/article/11005661>

[Daneshyari.com](https://daneshyari.com)