Uniformity of Multivitamins Tablets by Elemental Mapping by LIBS

Luiz R. Bizaio[1]* (PQ) e Erica A. F. R. Bizaio[1,2] (PQ).

* luizbizaio@bizaio.com.br

1 – Bizaio Com. de Instr. de Medida Ltda. Rua Cel. Luiz Relvas, 175. CEP: 12620-000. Piquete, SP, Brazil
2 – Faculdades Integradas Teresa D'Avila. Av. Dr. Peixoto de Castro 539. CEP: 12606-580. Lorena, SP, Brazil

Palavras Chave: *LIBS, Laser, Elemental Mapping*

Abstract

LIBS was used to Elemental Mapping in Multivitamins Tablets to verify the Uniformity inside tablet. The mapping information indicates that the tendency of a given concentration of the sample that is opposite to the distribution of carbon.

Introdução

The quantification of multivitamin tablets have been used for many years using analytical techniques such as AAS, ICP-OES and ICP-MS. The determination of the elements has been performed reliably and stably, where concentrations always correspond to the specified. A current concern with the increased efficiency of multivitamin makes the homogeneity of these tablets is questioned. Laser induced breakdown spectroscopy (LIBS) has been used as an analytical tool for determination of elements[1] and mineral analyzes. Some work came to be made with the use of LIBS, but the elemental mapping was never realized. The aim of this study was to use automatic mapping tools by LIBS in multivitamins tablet to identify the distribution of some elements inside of tablet.

Resultados e Discussão

The tests was performed using a commercially available J200 Tandem LA/LIBS system from Applied Spectra, Inc.. Iron, Sodium, Carbon, Potassium, Zinc, Magnesium and Calcium lines was used to detect and to get an Elemental Mapping inside of tablet. The system was configured with a 50mJ/pulse @ 266 nm laser with 5-ns pulse width, 1–20 Hz repetition rate, spot size adjusted to 50um and a 6 channel CCD-based broadband spectrometers. The gate delay was defined in 1us and a single shot was collected. The sample table drive system in positions X, Y and Z have enabled rapid and accurate positioning of samples to achieve the shots. The total data collection time was less than 2 minutes, covering the spectral range between 190 and 1040.

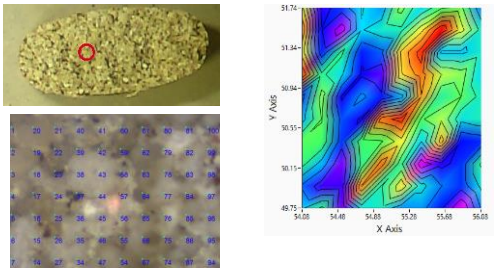

Fig 1. Picture of sample, Shot points and C Intensity distribution in sample.

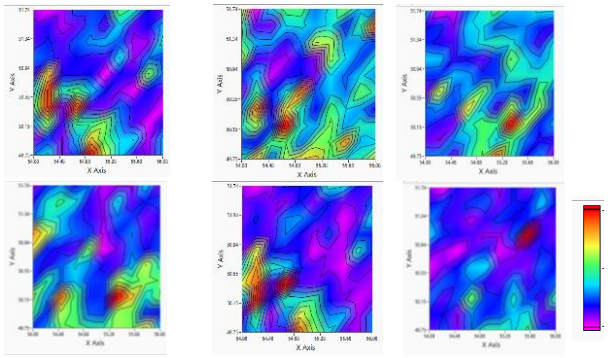

Fig 2. Intensity distribution in sample for Ca, Mg, Zn, K, Fe and Na.

Viewing the sample and the mappings can be seen the difference in the distribution of elements. The presence of Magnesium is visible when comparing the sample photo and Magnesium distribution.

Conclusões

The mapping information indicates that the tendency of a given concentration of the sample that is opposite to the distribution of carbon. The tablet has elements and also an amount of organic vitamins, that the distribution of carbon appear to be clustered in a region. LIBS can be helpful in Elemental Mapping to check uniformity of tablet and other products.

Agradecimentos

Thank you for Prof. Edenir.

1 Quarles, C.D.; Gonzales, J.J.; East, L.J.; Yoo, J.H.; Morey, M. and Russo, R.E. *J. Anal. At. Spectrom*. **2014**, *29*, 1238-1242