BNCT-AR
Software development for the analysis of histological and autoradiographic images

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For certain analysis, **rapid** measurements of boron distribution (qualitative and quantitative) are required.

In this work we developed BNCT-AR, a software which allows the rapid and easy determination of boron concentration in ROIs of the tissue section, by evaluating the grey levels of the corresponding autoradiographic images.

ROI: region of interest

Irradiation at the RA-3 (CAE) reactor facility. Fluence: 10^{13} n.cm^{-2}

high fluence autoradiography

Etching with PEW (30g KOH + 80g ethanol + 90g H_2O) solution 70°C 4 and 5 min

k: normalization constant = average grey level of the autoradiographic image of a «control» sample (C).

Each element of the matrix C is corrected as follows:

CM_(i,j)=k/C_(i,j)

The autoradiographic image (AR) is corrected applying the CM:

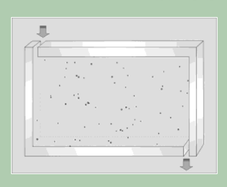
Corrected AR_(i,j)=CM_(i,j) • AR_(i,j)

i={0,1,2…N}; j={0,1,2…M}

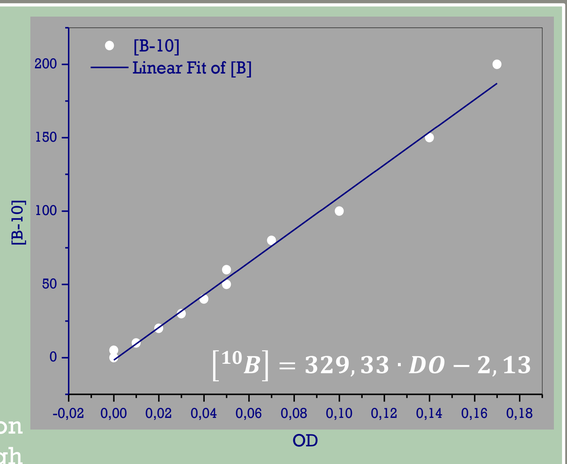
Light correction

Calibration curve

SLCs



Aqueous solutions of enriched boric acid (99%) in Small Lexan™ Cases.



In order to analyze neutron autoradiographs through grey levels (as a parameter that accounts for light transmission) the response can be modeled considering that the image is formed as a two-dimensional array of visible tracks on the detector surface.

$$OD = \log \frac{I_0}{I} = -\log T$$

- T is light transmission
- I_0 is initial light Intensity (NG of Control AR)
- I is light Intensity after passing through the sample (NG of the sample)

IDE Microsoft visual Studio

BNCT-AR

developed in C#

Database

My SQL

Database

Parameters modification

Conditions

Existent study

Connection BNCT-AR / database

Study

Edition

visualization and alignment of the histological and autoradiographic images

point alignment

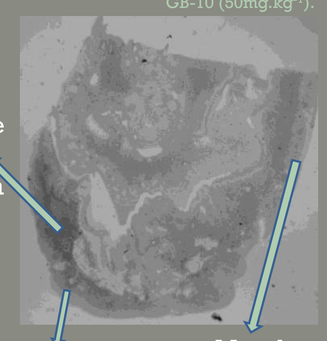
contour alignment

Analysis

By delimiting ROIs on the histological image, the software generates masks that are automatically superimposed on the autoradiography.

Premalignant tissue sections of hamster cheek pouch and its corresponding autoradiographic image. GB-10 (50mg.kg^{-1}).

Report



BNCT-AR is an interactive software for the simultaneous visualization of histological and autoradiographic images.

BNCT-AR allows the rapid determination of boron concentration values in different ROIs.

BNCT-AR

It manages the storage of generated studies in a database developed for this purpose.

The versatility of the software enables future applications to new conditions of sample processing and different samples and procedures.

These features make it a very useful tool for a rapid evaluation of the samples, which can then be thoroughly measured by the quantitative method if necessary.

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