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# *EX-VIVO* BIOLOGICAL TISSUE DIFFERENTIATION BY THE DISTRIBUTION OF RELAXATION TIMES METHOD APPLIED TO ELECTRICAL IMPEDANCE SPECTROSCOPY

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## ABSTRACT

We present the distribution of relaxation times (DRT) method applied to the electrical impedance spectrum data for improving the differentiation of biological tissues by means of two scenarios, a non-parametric representation and a parametric model. The complex electrical impedance from 1 kHz to 1 MHz was measured for *ex-vivo* WISTAR rat liver, heart, kidney, lung, muscle, and spleen tissues using a homemade electrical impedance spectroscopy (EIS) instrument and analyzed by the DRT method in a time constant domain revealing a particular non-parametric representation for differentiating each tissue using the retrieved distribution function. A larger number of relaxation time constants are found giving the possibility of studying the different polarization processes related to the tissues. We propose a parametric impedance model associated to DRT in the frequency domain to estimate the complex impedance of EIS measurements. Our results were compared with that obtained by the classical impedance Cole-Cole model.

KEYWORDS – *Bioimpedance, Electrical impedance spectroscopy, Distribution of relaxation times method, Ex-vivo biological tissue.*