# Murine biological tissues characterized by PALS Measurements

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Positron annihilation lifetime spectroscopy (PALS) is applied to characterize biological murine tissues. Due to the complexity of this type of systems, it is of interest to define optimal measurement initial conditions for the biological tissues in order to avoid the loss of radioactive material from the $^{22}$Na- source and/or the contamination of the samples. Advances in the fine-tuning of the obtention, preparation and preservation of murine tissues can potentially open a new perspective in PALS applications in biological systems. Attention was particularly paid to the degree of humidity of the samples as the PALS measurements are running. Positron annihilation parameters in biological tissues from different murine organs (lung, kidney, heart) and with different degrees of humidity are determined. Statistics based on principal component analysis (PCA) of the obtained annihilation parameters and the degree of humidity of each sample is carried out in order to establish possible correlations between the experimental measurements and variables of interest. It is relevant to determine precisely what can and cannot be concluded from PALS measurements in biological tissues. Our preliminary conclusion is that the long-lived component is not a positron annihilation parameter adequate to sense the structural particularities of biological tissues; since it is not sensitive to the internal defects that these materials have, but to the water that constitutes them. This finding is in contrast to those provided by reported publications which focus their attention only on these parameters for the characterization and structural differentiation of normal and tumor cells. From statistics based on PCA it was concluded that the second lifetime component with its corresponding intensity is the best parameter to characterize the biological tissues. This component is usually assigned to positron annihilation in defects. Therefore, in order to characterize biological tissues, all the annihilation parameters must be considered together, not only the component corresponding to the formation of o-Ps.