## Abstractul tezei în limba engleză

The main objective of this study was to establish a protocol for the identification and characterization of components of cultural heritage materials using the non-invasive Mobile Universal Surface Explorer (NMR MOUSE) technique for collagen based materials (parchment, leather, gelatin / glue).

The results of the relaxometric analyses were correlated with the results obtained using consolidated and widely used analysis techniques to characterize the state of conservation of artifacts and the diagnosis of historical materials from leather and parchment such as thermal microscopy or Micro Hot Table (MHT), ATR-FTIR spectrometry, Dynamic Differential Calorimetry (DSC) / Micro DSC, Differential Thermogravimetry (TG) / Differential Thermogravimetry (DTG), and Electronic Scanning Microscopy (SEM). The following have also been achieved:

- A protocol for measuring the relaxation parameters  $T_1$  and  $T_2$  using the NMR MOUSE technique.
- Identification of characteristic values (value ranges) for the characterization / identification of modern and historical collagen based materials.
- Correlation of the variation of the relaxometric parameters with the evolution of the collagen deterioration process such as cross-linking, cleavage of polypeptide chains, de-tanning.
- Identification of types of tanning, vegetable or mineral, and the possibility of differentiation between tannins with hydrolyzable structure and those with condensed structure.
- The NMR MOUSE technique can be successfully used in the following applications:
- Study of mechanisms of ageing / degradation of cultural heritage materials and industrial materials.
- Study of the tanning mechanism with different types of tanning materials.

- Designing and obtaining innovative collagen materials / composite materials / intelligent materials with special features needed in areas such as conservation and restoration, design, fashion, industry, agriculture etc., such as innovative materials / biomaterials: polymeric materials, biomaterials, composites etc.