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Protocol for emergency dosimetry based on EPR spectrometry on nails

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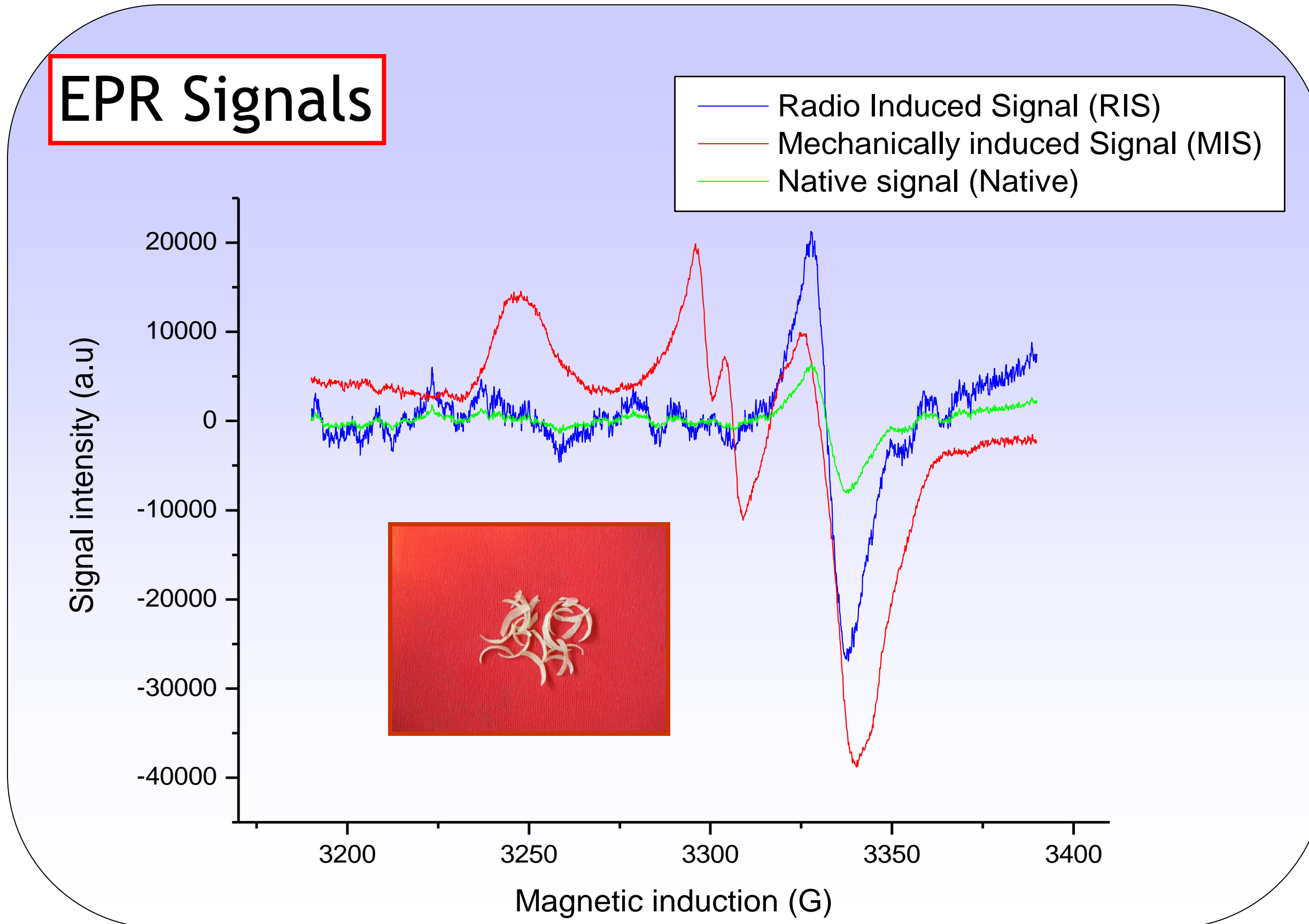
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In case of an accident involving a large number of victims, most of dosimetric techniques are limited by the necessary short delay of the answer or the invasive sampling. In this specific case, it is very important in a first time and as quick as possible to sort population according to the severity of the exposure. Nevertheless, EPR dosimetry on materials easily sampled on the victims (hairs or nails) may be a pertinent tool. In this context, the objective of this work was to study the EPR properties of nails to propose a first protocol for fast triage of population.



EPR Dose estimation

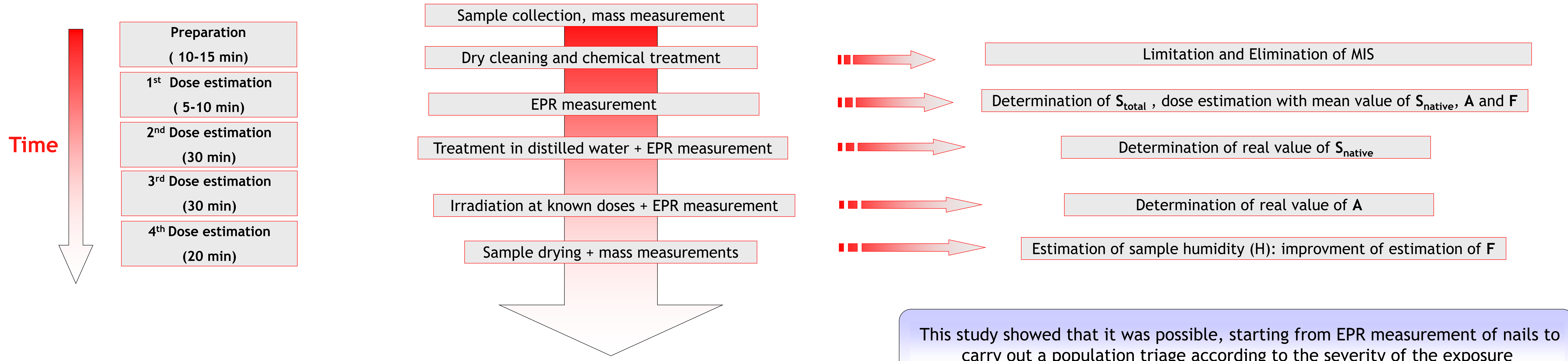
$$\text{Dose} = (S_{\text{total}} - S_{\text{native}} - S_{\text{MIS}}) \cdot F(t, T^\circ, H) \cdot A$$

with $S_{\text{total}} = S_{\text{RIS}} + S_{\text{native}} + S_{\text{MIS}}$

F : fading correction factor depending on time elapsed between irradiation and measurement **t**, temperature **T°** and humidity **H** and **A**: dose coefficient

Dose estimation Protocol

The protocol is divided in different stages. A first estimation is done very quickly using averaged value of main characteristics (fading constant, radiation sensitivity, amplitude of background signal) previously determined on a large set of samples. At each next stage, the determination of the real values of the different constants for each sample allows to increase the accuracy of the dose estimation.



This study showed that it was possible, starting from EPR measurement of nails to carry out a population triage according to the severity of the exposure