Towards the simplicity and sustainability of sample preparation

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Sample preparation is a step common to any analytical process, unavoidable in practice and with an enormous impact in the quality of the results. Therefore, much effort is being devoted to designing analytical processes that allow samples to be processed with a minimum treatment. These developments must evaluate the level of the basic analytical properties (sensitivity, selectivity, precision) achieved. However, this evaluation must consider other parameters such as simplicity and sustainability.

Simplification has been very recently incorporated to analytical processes in general and sample treatment in particular. However, many of these approaches have not considered the complex synthesis processes of the materials used for the isolation of analytes. Indeed, the inclusion of highly efficient/selective materials in the preconcentration process does not means that the overall process is simpler as in most cases the complexity of the synthesis is not included in the evaluation of the simplicity.

In parallel to this trend, a global concern on the impact that our activity (as chemists) has on the planet and the progressive deterioration/contamination of environmental compartments caused mainly by anthropogenic activity has been progressively installed. The principles of Green Chemistry (GC) and Green Analytical Chemistry (GAC) have become guides for the development of new measurement processes to reduce their environmental impact. In this sense, the use of materials from renewable sources is identified in both GC and GAC principles to improve their environmental friendliness.

The new strategies on sample preparation must be, therefore oriented to the design of analytical processes that preferably consider the simplification of the workflows and the inclusion of novel extractant materials obtained after a sustainable synthetic route.

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