UNTARGETED AROMA FINGERPRINT vs TARGETED METABOLITE PROFILING IN THE DEFINITION OF THE COFFE'S SHELF-LIFE RELATED TO PACKAGING

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1. – Introduction

Coffee is a complex and "evolutive" food whose sensory quality is affected by endogen chemical reactions of characteristic reactive aroma components mainly influenced by pH, water activity and temperature external effects, storage and packaging.
Packaging significantly influence coffee processing, storage and marketing. Controls of possible interactions between coffee and packaging are therefore necessary because of its effect on the sensory quality of the final product over time [1-2]. This study aims to define the evolution of coffee aroma stored under different conditions (stressed and conventional) as a function of packaging through untargeted aroma fingerprinting and targeted profiling by a HS-SPME-GC-MS.

2. – Body

The shelf-life is defined in function of a tolerable decrease of the coffee quality and determines the time limit within which the progressive reactive events produce not perceivable modifications of its sensory properties and/or it is still acceptable in terms of safety of use [3-4]. Its definition is product-depending and it is related to specific quality markers that are able to describe the sensory decay over time correctly. This approach is based on the direct measure of the shelf-life of the product under the conventional conditions of storage and can easily be developed for perishable foods for which the decay is rapid, but it is more complex for a stable food, such as roasted coffee powder, that has a longer shelf-life. In this study, the shelf-life is artificially modified (shortened) by acting on factors that may influence the quality depletion. Different production batches of roasted coffee samples, stored in packaging composed by three coupled laminate materials (PET-Al-PE) in modified atmosphere (AlMap) were studied. Samples were analyzed both from a chemical and sensory point of view at 0, 7, 14, 30, 60, 120 180 days of storage. Preliminary analytical results show that the untargeted fingerprinting approach fails in the definition of a kinetic model that correctly describes the decay of the coffee powder over time due to the complexity of the coffee aroma and that a detailed study dealing with the changing of the aroma component profile is necessary.

3. – Conclusion

Aging markers of coffee have already been identified, but they were mainly related to the freshness because the time delay considered was too short for a product with such a long shelf-life [6-8]. Shelf-life assessment requires the definition of a criterion to establish the end of the product life and involves not only the product but also its packaging. These preliminary results show that the evolution of aroma components during storage of the roasted coffee

powder significantly differ and are strongly related to the packaging here considered. These complex phenomena are difficult to be correctly described through a fingerprinting approach but they require in depth studies on specific marker(s) to define a kinetic model suitable to describe the aging of coffee under conventional storage conditions, in particular with different packaging. Moreover, the shelf-life of the roasted coffee powder is meaningful only when the analytical results are correlated to the sensory evaluation data defining the limits of product acceptability.

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