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BOOK OF ABSTRACTS

OR30 - RAPID NON-INVASIVE QUALITY CONTROL OF SEMI-FINISHED PRODUCTS FOR THE FOOD INDUSTRY BY DIRECT INJECTION MASS SPECTROMETRY HEADSPACE ANALYSIS: THE CASE OF MILK POWDER, WHEY POWDER, AND ANHYDROUS MILK FAT

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Milk and dairy products contain many nutrients deemed as crucial in everyone's diet [1]. In the food industry, dairy ingredients, such as skimmed milk powder (SMP), whole milk powder (WMP), whey powder (WP) and anhydrous milk fat (AMF), are widely used as ingredients, with applications that encompass the dairy and bakery sectors, such as milk chocolates, confectioneries, sauces, and ready meals manufactures.
Given this importance of dairy ingredients, companies are spending immense efforts on increasing the worldwide acceptability, shelf life and quality of their products using various dairy ingredients with different characteristics. Among the various factors influencing the success of their work are flavor and aroma of such ingredients, namely defined through their volatile profile [2]. Volatile organic compounds (VOCs) play an important role in this regards, and ever since, research has been focused on detecting, quantifying and characterizing the different flavor and off-flavor VOCs originating from dairy ingredients [2,3]. In this work, for the first time, we applied Proton-Transfer-Reaction Mass Spectrometry (PTR-MS) coupled to a Time of Flight analyzer (ToF) for the rapid and non-invasive analysis of volatile compounds in different samples of SMP, WMP, WP, and AMF. To test the suitability of PTR-ToF-MS to improve decision-making in the choice of dairy ingredients for the food industry, we simulated concrete situations of dairy ingredient selection (e.g. same producer and different expiration times, different producers and same days of storage, different producers). PTR-ToF-MS allowed the separation and characterization of different samples based on the volatile

organic compounds (VOCs) profiles. The good separation of SMP samples from WMP samples suggested the possible application of PTR-ToF-MS to detect suspicious cases of adulteration of dairy ingredients for the food industry.

Our findings, demonstrating the efficient and rapid differentiation of dairy ingredients on the basis of the released VOCs, suggesting PTR-ToF-MS analysis as a versatile tool of interest i) to facilitate the optimization of dairy ingredients selection in the food industry and ii) as a driver of innovation in the production of dairy ingredients.

References

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