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SENSORY TESTING OF FOOD PACKAGING COATED WITH ADHESIVES: EVALUATING ODOUR AND TASTE MIGRATION

The development of packaging materials follows a series of steps and checks to determine that they are fit for purpose, among which the odours generated by them are one of the aspects to be taken into account. In this sense, the packaging should a priori not add odours to the final product, on the contrary, it should preserve the olfactory perception of the packed food product. The regulatory requirements of food packaging are particularly strict for safety and quality reasons. To this end, specific standards define emission limits for odours, taste, and/or volatile organic compounds in food contact materials. For odours and taste, emission limits are determined based on sensory evaluation methods performed by trained panels, while for volatile organic compounds chemical instrumental analysis should be adopted. The standards also define strict sampling protocols to mimic the real conditions of use of these materials, as well as the application of negative controls to confirm possible migration effects.

The aim of this study is to analyse two food packaging foils coated with novel polyurethane-based adhesives manufactured by the company MORCHEM. One of the main changes in the new adhesives, which were the subject of the study, was the use of safer compounds for the end consumer. The methodology was based on the Standard “DIN 10955:2023-02: Sensory Analysis – Testing of Food Contact Materials and Articles”. In summary, the studied foils were shaped as fillable bags in which different test food and drink products were confined: mineral water, unsalted butter and grated milk chocolate. The odour and taste of these products were evaluated by a trained sensory panel after 24h of storage under ambient temperature. Additionally, the odour of mineral water was also evaluated after a 10-day storage period at 40°C. Panellists assessed if there were detectable differences between test and control samples by expressing the intensity of that difference in a 5-level scale (from 0 “not detectable difference” to 4 “strong difference”). A Difference from Control Test (DfC) was performed to determine whether these differences were significant and, in case they were not, an additional Triangle Test based on the Standard “DIN ISO 4120:2021: Sensory analysis Methodology - Triangular test” was performed to investigate if both films were comparable in sensory terms. The results of the DfC Test showed that, for all tested parameters and treatments, the differences between the highest and lowest ratings did not exceed 2 units of the difference scale. The median for both odour and taste evaluations in all treatments was also not greater than 2 units. Consequently, according to the Standard, there were no detectable differences between the odour/taste migration effect on both foils when tested on a variety of food/drink products. This result was re-confirmed by the subsequent Triangle Test.

In conclusion, this study illustrates the usefulness of sensory techniques when applied to evaluate the sensory performance of innovative food packaging materials. Such tests are fundamental to ensure the quality and consumer-pleasant perception of packed food, specially under the current need for the development of safer packaging materials that have new functionalities and are more environmentally sustainable.