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Solid Board Packaging: No migration of mineral oil hydrocarbons under wet and cool storage conditions

Since 2009 the problem of migration of mineral oil hydrocarbons (MOSH/MOAH) from cartonboard packaging into food is discussed. At the present time, however, numerous other sources for the occurrence of mineral oil hydrocarbons in food have been identified.

Solid board packaging consist of up to 100 percent recycled fibres (secondary raw materials) and are mostly (80 %) applied for food packaging, in particular for fresh food like dairy products, fruit and vegetables, meat and sausage products, fish and others typically stored under wet and cool conditions

In the last years, the migration of mineral oil hydrocarbons (MOSH/MOAH) from paper and board packaging containing recovered paper via the gas phase into dry foodstuffs has been widely analyzed and published. So far, less knowledge is present concerning the migration of MOSH and MOAH from recovered paper based packaging under wet and cool conditions.

Therefore, the German solid board branch association VVK in 2017 has started the project „Inquiries on the migration of mineral oil hydrocarbons (MOSH/MOAH) from recovered paper based packaging into food under wet and cool conditions" in order to close the existing gaps of knowledge and to give an answer to the basic question, whether a migration of MOSH/MOAH substances from solid board packaging and crates actually can happen during storage under those conditions.

This question has now been answered by a scientific inquiry of the mineral oil migration behavior of solid board packaging with a clear NO!

The two years study has been carried out by the Technical University Darmstadt - Paper Manufacturing and Mechanical Process Engineering (PMV) and the ISEGA Forschungs- und Untersuchungsgesellschaft mbH in Aschaffenburg.

Four different representative solid board packaging types and grades have been stored under realistic storage conditions with food contact. The migration of MOSH and MOAH substances with a carbon number between C16 and C35 from the packaging into different foodstuffs has been tested.

Fruit and vegetables have been stored in solid board packaging for maximum 20 days in room temperature and under cooling conditions (5 °C), chicken breast and salmon under frozen conditions with -18 °C and a storage life up to 6 months. For lyon sausage with a primary PE/PET packaging, the solid board packaging served as secondary packaging for cool storage up to 10 days.

With none of the examined food a significant migration of MOSH and/or MOAH substances has been detected in the investigation scenarios.

Though, there were single scenarios during storage in room temperature respectively cool temperature in which MOSH concentrations in the foodstuff exhibited a slightly higher value as the blank values (without packaging). Indeed, these differences are not significant as the measure of MOSH/MOAH concentrations yield considerable scatter of values. .

Also, reverse cases occured in which the measure values in the foodstuff turned out to be lower after corresponding storage life than the proper blank value.

In none of the tests, migration of substances which have to be counted as MOSH was ascertainable. Also, storages under frozen conditions showed no migration of MOSH/MOAH substances, even during storage life up to 6 months.

Parallel to the food storages and with the same solid board qualities, studies on Tenax migration have been performed to make the results comparable to standardized, in legal requirements specified test methods. The Tenax migration tests confirmed the investigation results of the real contact scenarios in all cases and thus their food safety.

With regard to the parameter MOSH/MOAH, as part of the VVK project representatively examined solid board qualities and solid board packaging can be used safely for all simulated contact scenarios, so the conclusion of the study.

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