MOSH and MOAH; a laymen's explanation.

Mineral oil saturated hydrocarbons and mineral oil aromatic hydrocarbons.

Description of the problem.

The recent years we have seen many publications, often copies of each other, drawing attention to "oil" found in food. Soon this was allocated to mineral oil and the terms MOSH and MOAH surfaced. As we safely may say, nobody in the public or NGO's understood what this meant and soon it was seen as a threat to human health. Moreover, because it was tested on products that often are given to children like breakfast cereals and chocolate emotions fuelled the issue. The immediate result was serious commercial damage to the producers of aforementioned products as they were confronted with reduced sales. One of the common used phrases was that the MOAH found could potentially cause cancer, MOSH was linked to liver damage. This sort of warnings always warrants a lot of attention and is used by many of the consumer organisations resulting in an immediate reaction of the state bodies responsible for human health. The facts are of lesser importance as the burden of proof lies with the industry and the often difficulty of explaining complex scientific studies to a scared public.

During the recent months suppliers of high quality lubricants, specially designed for the food industry, generally known as "food grade lubricants" but more accurately defined as "lubricants for incidental food contact - H1" have been confronted with request from their customers to supply lubricant free of MOSH and MOAH.

To start with the conclusion: This is NOT possible. It is not possible to make a mineral oil based lubricant free of both MOSH and MOAH, like it is not possible to make fat free bacon.

Looking at the recent publications this would mean we have a serious problem. Luckily CONCAWE has been very active in analysing the problem. It meant that lots of testing was done taking series cost and much time. Also a 2 year thorough data search was done over the archived material including studies and samples spanning over more than 30 years. The problem was that these data were spread over Europe and the US and needed to be brought together. A huge task done by Mr. Juan-Carlos Carrillo a senior Shell toxicologist and chairman of the MOCRINIS (mineral oil cross industry issue) working group under strong support from CONCAWE.

MOAH

As this is a laymen's explanation I will give an example that is clear for all. Many years ago we learned that cholesterol was bad, very bad, until scientists discovered that there are more types of cholesterol, good and bad.
The recently finalised studies have shown a similar result for MOAH. There are good MOAH and bad MOAH. The good news is that all the bad MOAH containing 3 or higher PAC (Polycyclic aromatic compounds) have been taken out of the oil by the severe refining process. These higher numbered rings are indeed the material you do not want in or on your body.
The MOAH with lower PAC rings 1 and 2, do not form a risk due to their structures. This has been proven using toxicology knowledge and actual carcinogenity tests.
However if one measures without prior knowledge food for the presence of MOAH you will find a number and if you than assume it is "the bad" MOAH than you create concern. The point is that non of these "bad" MOAH is present in our lubricants. There may be however, contamination with bad MOAH already present in food, but this is not an issue of the

lubricant per se, but rather of bad industrial hygienic practices during manufacturing or transport (contamination with used motor oil as an example).

MOSH

MOSH is and was present in our product and always will be in our products. When a test is done on food stuff it can well be that this is from lubricants, mould release products, food additives, environmental causes and so on. If the food is tested it is impossible to trace the original source of this "contamination" and here we must ask ourselves: where is the problem?

Here we must differentiate the 2 main reasons how our products are used. We have lubricants that are made of technical white oils and that have as main use the lubrication of food producing equipment. We generally refer these as H1 lubricants. The description is incidental food contact. As such these should not be part of the food and should not come in contact with the food. If this happens it is an INCIDENT and basically the food should be disposed off. Of course these product have been designed with components that have been approved for their use and are safe. If a small leak occurs it should not pose a risk for the consumers. For that reason the FDA have defined an upper limit of 10 p.p.m. (part per million). Technical white oil per se is not dangerous, but it does not meet the technical specifications to be regarded as an oil to come into direct food contact.

For the direct food contact there are products generally known as 3H, a category for food additives and, among others, mould release. These products are made from medicinal white oils (but do contain MOSH and MOAH). The key point here is that the FDA (food and drug authority) have given clearly defined limits to the amount that may be used. The EU (EFSA) have also defined very strict limits and this is given in 3 categories called class 1, 2 and 3. I will not go into the limits here but the most important point to be aware of is that the viscosity of the product used is most important. The larger the molecule, the higher the viscosity and the lesser the concern. This means that a product with a viscosity of 100 cst has a much higher ADI (acceptable daily intake) (class 1 is max 12mg/kg body weight) than that of a product with a viscosity of 68 (very low ADI).

If an analytical test is done by a concerning party it should not only look for the total amount of MOSH but also to the size of the molecules to determine if there is a risk or even a violation of the law. It seems that this was not done in the various consumer tests and that as such concern was raised for the wrong reason. The MOSH that are used for the production of food have been tested on adverse effects on human health and have received a clean bill of health from the doctors.

The MOSH concern of liver toxicity, is linked to the low viscosity oil (class II, and III), which are not allowed to be used for 3H applications. As a side note, the liver effects linked to these oils was only seen in one type of rat which is very different from all other animals and humans. More and more toxicologists are of the opinion that this well may be a “false positive” and that the liver effects are peculiar to this type of rat and not relevant for humans.

Concluding.

Our products, provided they are made the way we registered them at INS or NSF, are safe.

All products will contain MOSH and MOAH.

There is a difference in the interpretation of the 3H category where the EU (EFSA) wants the use of the higher size, viscosity, molecules.

Need for better education of NGO´s and governmental bodies.

The Author

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