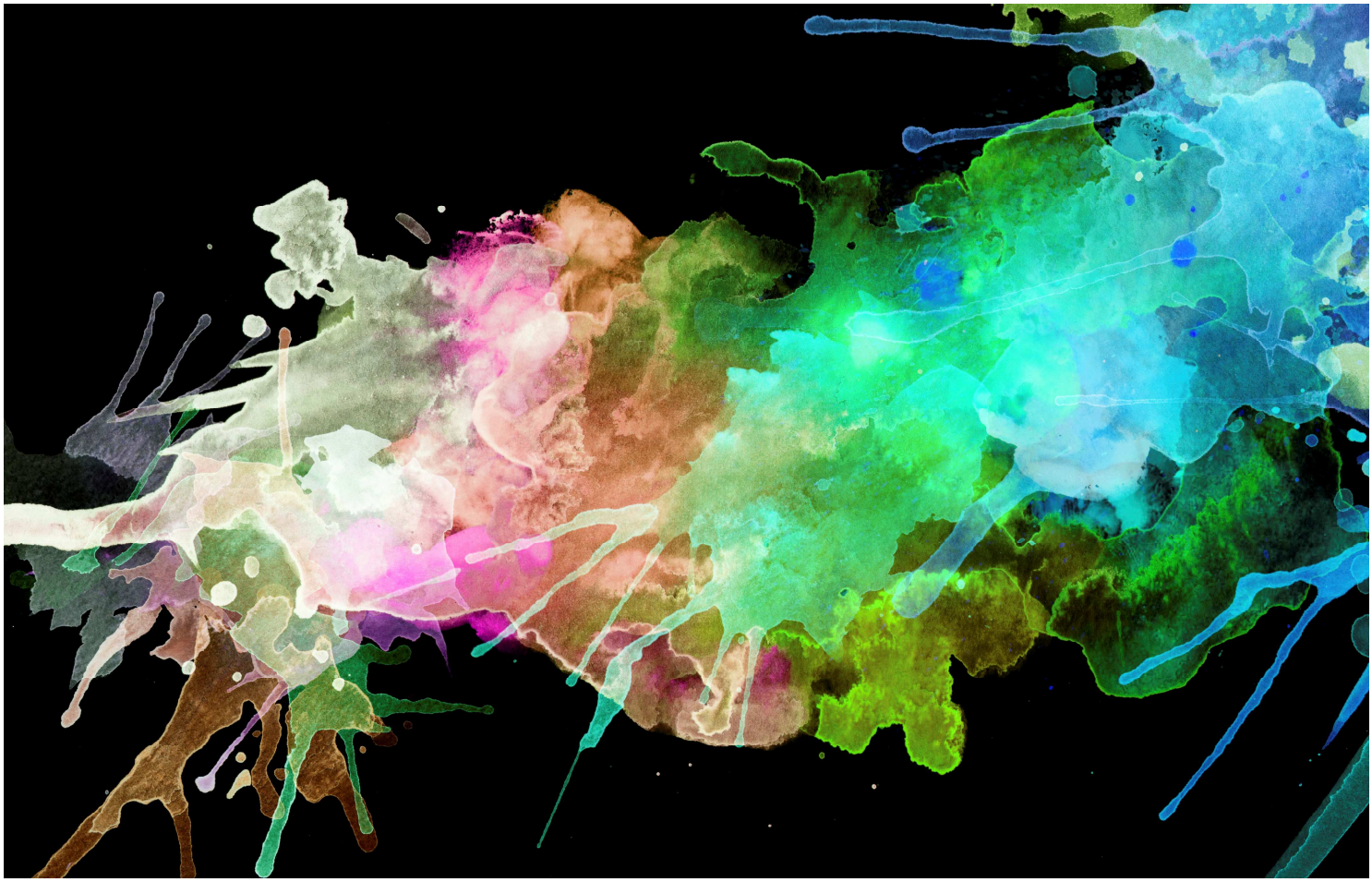
leatherhead food research



Troubleshooting Taints and Finding Off-Flavours

Angela Calder

A Leatherhead Food Research white paper

15

Troubleshooting Taints and Finding Off-Flavours

In this white paper, Angela Calder explains what manufacturers should do if they fear their product has been tainted, how to track down the source of the problem and suggests ways to prevent taints from occurring.

Imagine taking a bite of your favourite chocolate bar and finding that it has a chemical aftertaste. What would you do? Would you tell the manufacturer or simply not buy it again? It is the nightmare scenario that food manufacturers never want to experience. Although a tainted food product might not be harmful from a food safety point of view, a taint can certainly have an impact on brand image resulting in a loss in sales. In addition, there is the time and cost involved in addressing such an issue. Where did it come from? How can it be prevented from happening again?

Calling in the expert tasters

Taints cause an undesirable odour or flavour in food products. The compounds responsible are typically present at very low levels. They might be present at levels as low as parts per billion, yet can still be detected by the human senses. One of the problems with identifying whether there is a taint in the first instance, is that the level at which a taint might be detected varies from person to person. Different people may also have different descriptors for the taint. One way to standardise the descriptors used is to enlist the help of a trained sensory panel.

Leatherhead has a trained sensory panel which includes people with high sensitivity to common tainting compounds. We can conduct different sensory tests, from determining the sensory descriptors of the perceived taint, to identifying how different a tainted sample is compared to a normal untainted one.

In a taint investigation, informal sensory testing is a good starting point. Sensory descriptors can be useful in determining what kind of compounds might be the cause of the taint. For example, ‘antiseptic’ and ‘disinfectant’ descriptors are characteristic of halogenated phenols, while halogenated anisoles can be distinguished by their characteristic ‘musty’, ‘mouldy’ and ‘earthy’ descriptors. Some compounds may even smell different depending on how much is present. With the compound trans-2-nonenal, the descriptors change with increasing amounts present, from ‘plastic’ to ‘woody’ to ‘fatty’ to ‘cucumber’.

Another point to be aware of is that when a tainting compound is identified, it may be a compound which might not be unpleasant in another food. This is the case with geosmin which has been reported in tainted water, but is also typically found in beet.

Off to the laboratory

In the laboratory there are a range of analytical techniques which can help identify what is causing the taint. Samples will first require extraction so they are suitable for analysis. Combined steam distillation, Solid Phase Micro Extraction (SPME) and ‘Purge and Trap’ are all common extraction approaches. Usually

Gas Chromatography – Mass Spectrometry (GC-MS) is used for investigating taints. While the GC separates the volatile compounds, the MS data is used to help identify the compounds present. Leatherhead has a Time of Flight (TOF) mass spectrometer, enabling the collection of full scan data without compromising sensitivity. It is useful for screening the volatile profiles of a tainted sample and comparing it against a non-tainted sample (control) and identifying differences. The TOF further allows the measurement of accurate mass which gives a further degree of selectivity. Any compounds identified as potential tainting sources can be tentatively identified by comparing the data to a library database.

Off flavours may be to blame

Sometimes off flavours can be caused by the deterioration of oils and fats in a food product, giving rise to rancid off flavours. In such cases, there may be other analytical tests which may be useful in identifying where changes have occurred in the tainted food product. Leatherhead has the capability to investigate lipid oxidation (which occurs when oils and fats deteriorate). For example, comparison of the fatty acid profile of a sample by GC-FID (Gas Chromatograph – Flame Ionisation Detector) could be carried out, or checks of the p-anisidine and peroxide values. It is important to know which ingredients the tainted food product contains as this will affect the suggested analytical approach.

Pinpointing the source of the taint

With taint investigations, several questions are raised. Why and where has it occurred? How can we prevent this happening again?

Taints commonly occur when there has been a change in the process. Perhaps suppliers have been switched or machinery has been replaced. Cleaning procedures may have been carried out on a different day or by a different operator. Keeping records of anything different in the process is important and sometimes this can be difficult. For example, if transportation is suspected to be the origin of the taint, it is not always easy to track. Again, identifying why and where it has occurred depends on the processes involved.

Identifying potential taint risks before they occur

In terms of prevention, if the taint is related to ingredients used, checks can be set up to ensure it is picked up prior to use. Regular product screening could be carried out, for example. If changes must be made to the product, for example with the packaging, it might be useful to compare the old style and new style packaging to determine if there are any differences that might affect the product.

Sometimes it may be difficult to control the perceived taint, but it is still important to try and find out the origin. For example, bromophenols have been reported as a flavour contributor in salt water fish at parts per billion levels. Any higher and the presence of such compounds may result in a taint occurring. Knowing this means that regular screens can identify when it happens before it is sent out and sold.

Taking a proactive and preventative approach to identifying potential taints before they occur will reap rewards in the long term; it ultimately means manufacturers will not only make

financial savings, but reputational ones as well.

How Leatherhead can help

Leatherhead has sensory scientists, food chemists and microbiologists who are highly experienced in identifying taints and off-flavours. If you are concerned about a possible taint, we will ensure we bring together the most relevant experts to track down the source of the taint. We can also advise on identifying potential taint risks before they occur.

About the author

Angela Calder is a Senior Scientist in the Food Chemistry team. At Leatherhead Food Research, she is responsible for the analysis of taints and off-flavours by GC-MS. She has significant analytical experience, particularly in chromatographic techniques such as HPLC and GC.

About Leatherhead Food Research

Leatherhead Food Research provides expertise and support to the global food and drink sector with practical solutions that cover all stages of a product's life cycle from consumer insight, ingredient innovation and sensory testing to food safety consultancy and global regulatory advice. Leatherhead operates a membership programme which represents a who's who of the global food and drinks industry. Supporting all members and clients, large or small, Leatherhead provides consultancy and advice, as well as training, market news, published reports and bespoke projects. Alongside the Member support and project work, our world-renowned experts deliver cutting-edge research in areas that drive long term commercial benefit for the food and drink industry.

Leatherhead Research is a Science Group (AIM:SAG) company. Science Group provides independent advisory and leading-edge product development services focused on science and technology initiatives. It has six offices globally, two dedicated, UK-based R&D innovation centres and more than 350 employees. Other Science Group companies include Oakland Innovation, Sagentia and OTM Consulting.

help@leatherheadfood.com T. +44 1372 376761 www.leatherheadfood.com

About Science Group plc

Science Group plc offers independent advisory and leading-edge product development services focused on science and technology initiatives. Its specialist companies, Sagentia, Oakland Innovation, OTM Consulting and Leatherhead Food Research, collaborate closely with their clients in key vertical markets to deliver clear returns on technology and R&D investments. Science Group plc is listed on the London AIM stock exchange and has more than 350 employees, comprised of scientists, nutritionists, engineers, mathematicians and market experts.

Originally founded by Professor Gordon Edge as Scientific Generics in 1986, Science Group was one of the founding companies to form the globally recognised Cambridge, UK high technology and engineering cluster. Today Science Group continues to have its headquarters in Cambridge, UK with additional offices in London, Guildford, Epsom, Boston, Houston and Dubai.

info@sciencegroup.com

www.sciencegroup.com

