



Smoke flavourings – trendy and safe

DR PETER HENRIKSEN shares an all-round view of smoke flavourings, from how these are produced to their applications*

SMOKE flavourings continue to be popular and have been one of the hottest food trends in the past year. Chefs all over the world enthuse about smoke. It is not just meat and fish, BBQ sauces and snacks – the smoky flavour can be found throughout menus, even into desserts and cocktails served before the meals. The smell of wood smoke reminds us about fire, and fire means roasted meat, warmth and safety. Some believe that it is in our genes to find fire and wood smoke attractive.

Azelis was one of the pioneers in Scandinavia to manufacture and introduce Scansmoke® smoke flavourings in the market place. Many consumers had difficulties to understand what a smoke flavouring was and assumed it was a synthetic flavour developed in a laboratory. This is far from true. Smoke flavourings are still manufactured by burning wood chips or sawdust, as is the case with traditional methods. The smoke vapour is then condensed and trapped in cold water to remove the tar as waste. The tar typically contains potential carcinogenic polycyclic aromatic hydrocarbons (PAH). This group of components are typically formed during smoking, roasting and grilling of foods or from burning woods. The higher temperature the more PAH, but the level is also influenced by a range of other parameters.

The removal of the PAH components is one of the most important steps in the production of smoke flavourings. When the tar is removed, the liquid smoke flavouring is filtered to obtain a primary smoke flavouring. This can then be further processed by concentration, dilution, spray drying or extraction and distillation processes. From all these processes, it is possible to tailor make a smoke flavouring, that exactly suits the food manufacturers needs in the production site. Most smoke flavourings are still

atomised into the smoking or cooking chamber. Due to the heat and humidity in the smoking chamber the liquid smoke flavouring will turn into a regenerated smoke vapour, and it will not be possible to judge whether a traditional or liquid smoking process is used by opening the door to the chamber during the smoking process. Comparison of the flavour and colour to traditional smoking methods also shows no significant differences.

Smoke flavourings are composed of hundreds or thousands of components, which is a result of the pyrolysis of the cellulose, hemicellulose and lignin in woods. Typically, only hardwoods are used to create a smoke flavouring. During the pyrolysis, which typically takes place at 300-400 degrees Celsius, the cellulose and hemicellulose are broken down to carbonyls and organic acids mainly acetic acid. One of the main browning agents in the group of carbonyls is hydroxyacetaldehyde, which is the simplest sugar known. This sugar does react with food proteins during heating, and via a Maillard reaction forms the golden, browning colour associated to a smoked food. The carbonyls also typically contribute a sweet flavour to the smoke flavouring. The acetic acids play a role for the preservative effect of a smoked food, but also shows direct correlations to the mild sour note found in a smoke flavouring according to sensory studies.

From the lignin many smoky flavour components are formed. Typically the group of guaiacols and syringols are found in biggest concentrations. The flavour profile of these are slightly different. Guaiacol has a green and woody flavour, whilst syringol – and especially the higher syringols like 4-methylsyringol, 4-ethylsyringol, 4-vinylsyringol and allylsyringol – has smoky and more sweet notes. Caramel, coffee and cognac notes can easily be identified by evaluating these components in their single form. Therefore, the sweet note from carbonyls, the acid note from the organic acids and the smoky and woody notes from the guaiacols and the syringols do complete the overall flavour. This is then spiced up by the presence of smaller amounts of e.g. pyridines, pyrazines and various other components like terpenes. All of these components are exactly what you will find in a smoke vapour coming out of a smoke generator from using traditional smoking with wood chips.

In Europe, all the smoke flavourings sold in the market have been tested in a large package of toxicology studies, and approved by the European Food Safety Authorisation (EFSA). A number



“*Suited for the needs of vegetarians, smoke flavours will play a key role in creating an association with meaty notes*”

of other studies and analysis including the 90-day animal feeding studies has been conducted to assure the safety of the flavouring. There was a very clear positive effect seen due to the fact, that the unhealthy PAH components have been removed in the production process. This is a vital and important to the final flavour. Many studies have shown that the concentration of PAH in traditionally smoked meat products are significantly higher compared to meat smoked with smoke flavourings.

The advantages of transitioning to smoke flavourings are plenty. For a start, they are healthier – as the tar has been removed – and they are cleaner. The messy reality of tar particles clinging to walls, floors, cracks and, most importantly, food products, is eradicated. The costs for cleaning are significantly decreased. Smoke flavourings also help ensure quality control. A pump that atomises liquid smoke into the smoking chamber will result in a more standardised end product compared to burning sawdust at site. Fresh wood can be more or less wet or the airflow through the production site might vary and vary the temperature of the pyrolysis. It is also possible to dip or shower the food product in the smoke flavouring to get the same smoky end result. Azelis' products make for faster smoking, which translates into higher yields. Plus, there is reduced weight loss. Finally, it provides a much cleaner exhaust and waste-water output, which is an important consideration in production sites nowadays. Meat processors will also see a significant drop in insurance because of the change from open fire to liquid smoking. This is an advantage often not taken into consideration.

Approximately 75 – 80% of all smoke flavourings in the market worldwide are used to replace traditional smoking. In Europe approx. 35% of all smoked meat, fish and poultry are smoked with smoke flavourings. This is expected to grow to 70% over the next 5 years. In the US, the percentage is much higher and in Asia Pacific at this point significant lower. The remaining 20 – 25 % of the smoke flavourings are used mainly in the flavour and food blender industry, which uses the smoke flavourings in

a large range of flavours and spice blends from a standard BBQ snack flavour over a tandoori flavour to coffee and chocolate flavourings. In some dishes, smoke flavourings can add a salty note to the final food product, making it possible to reduce the addition of salt in the final recipe. The flavour boosting effect of smoke flavourings is something that will be used more and more in the food industry. The use of flavourings such as smoke, that can resemble monosodium glutamate or yeast as a flavour enhancer, will also increase. Rather than act as the sole smoky flavour, it can be added in low dosage to soups and sauces to boost the overall flavour profile without being smoky.

Across the world there is another trend that rolls into the food industry with bigger and bigger impact – the vegetarian trend. Many traditional meat companies project a 30–50% of turnover in the next five years will come from vegan or non-meat products. In UK alone, there are now 350% more vegetarians compared to the last decade and the high numbers are due to combinations of a wish to be healthier and the need for a more sustainable lifestyle. The vegetarian cuisine opens a world of opportunities for smoke flavourings. Smoke flavours will play a key role in creating an association with meaty notes. The broad spectra of plant-based proteins, soy beans, lentils, kidney beans and chickpeas in various meat replacement formulations, soups, stews, etc. calls for a touch of smoke flavouring. Not to impart a smoky flavour as such, but to give a meaty note or simply to improve the overall flavour. There are also numerous recipes for non-meat bacon based on texturized soy proteins, rice paper, slices of carrot or coconut available on the internet. In all of them smoke flavours are added to give the perception of meat.

Smoke flavourings are labelled as smoke flavourings or natural smoke flavourings, depending on local regulations. These flavourings are here to stay and getting increasingly used in the food industry. Some has expressed the smoke flavourings to be a new taste direction just like the umami taste. We are only skimming the surface of what a smoke flavouring can do in the industry and in our kitchens to flavour and colour our foods. [FP](#)



Dry fish with some help from a smoky flavour tailored to your requirements



Dr Peter Henriksen, International Business Manager at Azelis clears the air about smoke flavours, and answers questions as to the safety of these food and beverage enhancers to health