Flavours: A versatile, cost-effective solution

Flavours in feed serve various functions. They can help cover off-notes and simultaneously also promote a stable aromatic profile of feed or premix. In both cases, the results are beneficial to the animals as well as pork producers, as confirmed by recent Chinese trials.

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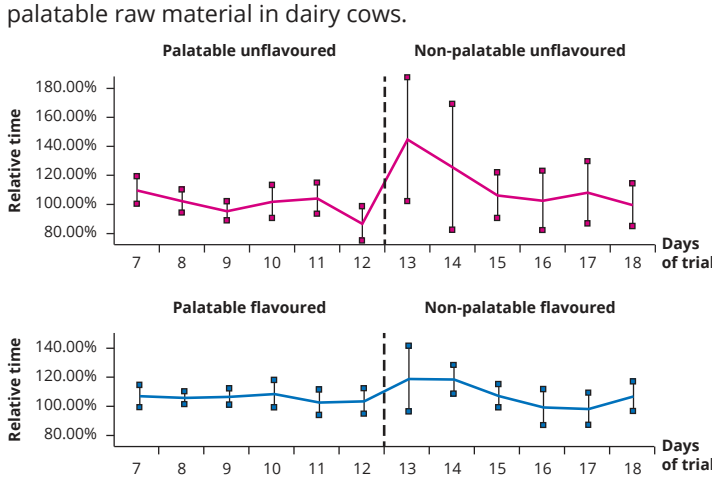
Some raw materials used in feed are excellent from a nutritional standpoint but present less-than-desirable olfactory notes. Those off-putting smells can not only be detrimental to feed intake, but may also discourage farmers from using certain materials, no matter how nutritious they are. A carefully selected flavour can mask unwanted smells, improving the overall feed experience.

In addition, some raw materials (e.g. molasses) have highly fluctuating price and quality, creating both financial and feed quality issues. Substituting an expensive material by mixing in a flavour with a similar aromatic profile – combined eventually with a sweetener – promotes constant feed attractiveness while saving costs. The doses of flavour can be adjusted to find just the right balance between savings and sensory perception.

Figure 1 - Use of a flavour to limit the negative effect of a non-palatable raw material in dairy cows.



Attract and stimulate

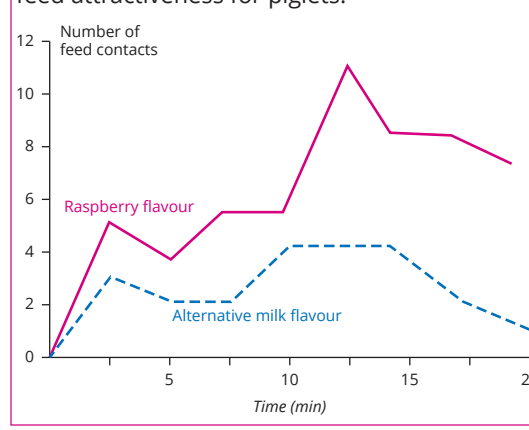
Apart from "covering up" olfactory notes, improving feed attraction to stimulate intake is another major reason farmers prefer flavoured feed. Animals are extremely sensitive to odours, sometimes much more so than humans. Any change in their feed, however subtle, is noticed and may lead to lower intake or even refusal. Unfortunately, feed formulation changes constantly depending on raw material availability, quality and prices. Even the profile can change from one crop to another. Flavours can counter these changes by smoothing over batch-to-batch discrepancies (see *Figure 1*), giving formulators more flexibility and securing feed acceptance by farm animals.

Both humans and animals possess strong odour-emotional connections. For humans, an odour can bring back long-forgotten memories, while in animals, environmental odour memory regulates many behaviours crucial for survival. Those memories, inherited through evolution or conditioned by experience, can trigger preferences for specific tonalities. When the feed experience integrates a well-chosen tonality, it stimulates curiosity and motivates consumption.

Transition from liquid to solid feed

In weaning piglets, the switch from liquid to solid feed is a stressful period when they tend to reduce their feed intake. That can impair their gut structure, which in turn impacts health and performance. Luckily, piglets are curious, highly

Figure 2 - Effect of a well selected flavour on feed attractiveness for piglets.



sensitive to smell and love sweet flavours. Mixing fresh fruity flavours through the feed stimulates their curiosity, increases their interest in solid feed and encourages them to try it. By triggering further feed intake, flavoured feed promotes a smooth transition from liquids to solids.

To determine to which extent flavours stimulate exploratory behaviour in piglets, trials were carried out (see *Figure 2*). Confirming those results, a series of three trials was performed on weaning piglets at a pig farm in Jifa, Shaanxi province, China, early in 2017 to compare their behaviour when fed with raspberry-flavoured feed (by Pancosma) versus a more common milk-flavoured feed, sold on the Chinese market. In the first phase, the piglets' respective interest in both flavours was evaluated while the second and third phases provided results for intake and performance (see *Box*).

The trials determined that raspberry flavour increased piglet feed intake and improved performance. That can be explained by the fact that fruity flavours contain molecules that are generally more volatile than the heavier ones used in milky flavours. The raspberry smell spreads more easily into the air, attracting the animals' interest first.

Flavours with more volatile molecules can provide incentive to encourage exploratory behaviour in piglets. Raspberry flavour improves feed intake compared to milk-flavoured feed in both free-choice trials and imposed-choice trials. The higher feed intake obtained with the raspberry flavour leads to better performance of the piglets, with higher body weight gain as well as higher final body weight.

PHOTO: PETER BAKKER

Piglets are curious, highly sensitive to smell and love sweet flavours.

Three trials confirm: Piglets prefer raspberry

A first preference trial was performed on 40 weaned piglets, randomly allocated to four pens of 10 piglets. The animals were weaned at 21–23 days and weighed 6–7 kg. They were given free access to two different feeds: one containing milk flavour and the other raspberry flavour, both dosed at 300 g/tonne. During the four-day trial, the number of contacts between piglets and each feed were counted every five minutes over a 20-minute period. Results showed significantly more contacts with the raspberry-flavoured treatment than with the milk-flavoured one throughout the 20-minute periods and from day to day. While exploratory behaviour was constant for the milk-flavoured feed throughout the trial, the number of contacts increased each day for the treatment with raspberry flavour.

A second trial was set up to confirm the hypothesis that increasing piglets' exploratory behaviour would increase feed intake. The set-up was similar to the first preference trial: 40 animals randomly allocated to four pens. During the seven-day free-choice trial, animals had access to the same feed choices as for the first trial. Piglets were fed *ad libitum* and water was freely available. Daily feed intake was weighed and recorded per treatment and per pen. Feed intake followed the same trend as preference in the previous trial: intake was higher for the raspberry-flavoured feed than for the milk-flavoured feed. Intake also increased throughout the trial, in line with previous observations; that is, piglets became increasingly curious about the raspberry flavour. The results are consistent with the first trial regarding preference, and they validate the hypothesis that stimulating exploratory behaviour is a good way to increase feed intake.

A third trial was performed to validate the effect of higher intake on piglet performance. During the 14-day trial, an imposed-choice set-up of 96 piglets were randomly divided into two groups, with each group having access to only one feed (either milk-flavoured or raspberry-flavoured). Each group was then subdivided into four different pens of 12 animals each. The researchers recorded the piglets' initial and final weights; they measured feed intake and average daily weight gain and calculated feed conversion ratio (FCR). Results on feed intake were similar to the previous free-choice trial: average cumulated feed intake was higher for the raspberry-flavoured feed than for the milk-flavoured feed. Piglets once again showed a preference for the raspberry-flavoured feed with an improvement in feed consumption.

This significantly higher feed intake was associated with a significantly higher average body weight gain and a significantly higher final body weight in the case of raspberry-flavoured feed. FCR was statistically improved with the raspberry-flavoured feed.

References available upon request.