A taste for cheese

Modern day cultures are addressing demand for individual cheese flavour profiles, says Bob Savage

No one would disagree that the dairy industry has changed significantly over the past few decades. The cheese sector has been affected more than any other, from the sourcing of basic raw materials right through to manufacturing and the final packaging. Influences have come from many quarters – for example hygiene regulations, good manufacturing practice, ISO and the needs of supermarkets.

Significant change

One ingredient area that has experienced significant change is that of cultures and coagulants. In the UK, there was a swing away from animal rennet in the 1970s and '80s due to economic reasons and vegetarianism. In the 1990s, it experienced further demise due to the BSE crisis, and was largely replaced by fermentation produced chymosin (FPC) and microbial coagulants. Now more than 60% of cheese is made with FPC.

Lactic acid starter cultures too have seen a significant change in their make-up. Cultures, originally undefined blends of lactic bacteria, were sub-cultured day after day at the dairy. These were often variable in performance due to differences in activity, pH profile and the ratios of flavour/aroma strains.

But with cheese manufacturers under increasing commercial pressure to minimise losses, production of starter cultures became centralised. Over time came the development of defined strains and blends, supplied by culture houses. These were selected for consistent and comparable acidity profiles and phage resistance.

The situation has since changed again. Consumers are becoming more discerning, which has led to an increase in extra mature sales and in-store branding, as well as the strengthening of independent brands. Manufacturers are finding it more difficult to sell their cheese for a premium unless it is different from that of their competitors. The focus is now on culture suppliers to provide cheese manufacturers with the solution.

Much work has been done scientifically to pull cheese apart to find out how it ticks, identifying the chemicals within the cheese that contribute to flavour and texture. For example, experiments have been carried out to draw volatiles from the human nose during mastication.

This may well give an indication about which chemicals contribute to flavour for the production of cheese alternatives, but it does not provide a solution to creating a unique character that will appeal to both the commercial buyer and the consumer.

Culture suppliers know that individual groups of lactic acid bacteria contribute in certain ways to the flavour and texture of the final product and that some contribute more than others. They also know that if there is only one strain present, the flavour structure is very specific and one-dimensional, and that the more strains that are present the more complete the flavour experienced. What is uncertain is what those specific flavour 'notes' are.

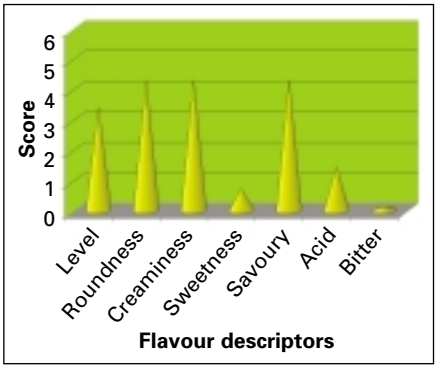

Figure 1. The acidifier selected (MT-53) showed a good balance of flavour

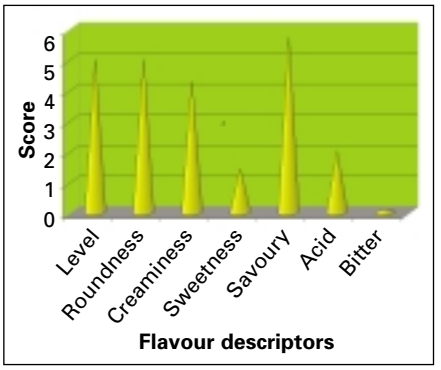

Figure 2. The acidifier combined with the adjunct (MT-53 + 100-X)

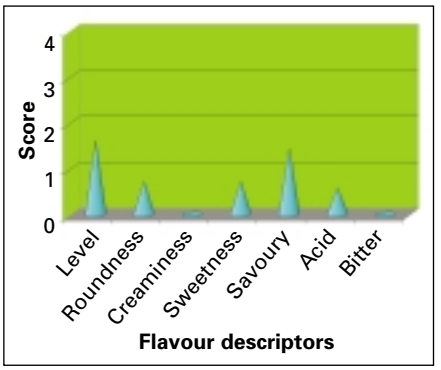

Figure 3. The effect of the adjunct (MT-53 - 100-X)

DSM carried out a study on Cheddar to produce cheeses made with the individual components, to analyse them organoleptically and then record the data pictorially. The cultures in the DSM Direct-Set range were ideally suited for this purpose,. They are divided neatly into the Delvo-Tec range, which includes high technology acidifiers, and the Delvo-Add range of specialised cultures, generating particular flavour profiles.

Cheddar controls

The Delvo-Tec acidifying cultures were first used to produce Cheddar controls. The Delvo-Add strains were then added independently to an acidifier. Firstly, all the acidifiers were profiled and then the most transparent was selected as the base for profiling the adjuncts. Figure 1 shows the acidifier selected, with a good balance of flavour.

The acidifier was then combined with each adjunct separately. Figure 2 shows the addition of 100-X, a heterfermentative complex including *Lactococcus lactis* sp, *lactis biovar diacetylactis* and *Leuconostoc* sp.

The acidifier profile in Figure 1 was then subtracted for the combination profile in Figure 2 to identify the contribution of the adjunct (see Figure 3). In this way, a library was created of the adjunct profiles.

As a result of this work, it is possible to develop cheeses with individual flavour profiles to satisfy a variety of needs – from emphasising and expanding on existing traits to producing new flavour profiles.

Once the combination of cultures has been finalised, and where volumes justify, it is possible to provide pre-blended, tailor-made cultures through the Delvo-Tam range, providing confidence of re-producability – an important factor within the modern cheesemaking environment. As new strains of adjuncts are identified, they can be profiled for addition into the Delvo-Add range, ready to contribute further to the complexity of cheese flavour. DII

Bob Savage is technical services manager at DSM Food Specialties. Tel: (+44) 1922 749600. Fax: (+44) 1922 749626.