

# Palate matching

## A brewer's answer to 'provenance'?

**'Provenance' is a word that has been used by beer aficionados when breweries are closed or famous brands moved. Palate matching has been successfully achieved by some, some have failed. Paul Buttrick shares some thoughts and considerable experience on this topical subject.**

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Beer Dimensions

In the past few years many brands – Draught Bass, Youngs, Old Specked Hen, Gales, Boddingtons and most recently Courage have been moved from their original brewery to other sites. Some have moved more than once. The word 'provenance' has been used to justify – or not – whether a beer can move home without changing its taste and character. What were the provenance issues, say in the case of Draught Bass, when this beer was moved from the large, modern, mostly lager-brewing Coors plant in Burton, down the road to the smaller and more traditional Marstons brewery? It is not only ales where the debate is taking place, premium lagers such as Stella Artois, Kronenbourg, and A-B's Budweiser have all come under the spotlight for brewing beer away from the 'home' brewery.

With constant change and consolidation in the industry, there is a need to manage such brand transfers effectively. It is not just major brewers who are closing breweries or moving location, small and medium sized companies are also setting themselves up for the future whilst at the same time improving quality and cost.

In order to make the change, a handful of people, brewers and possibly sales and marketing get together and agree a plan. A number of trial brews are carried out and the group reconvene to taste the 'test' (trial), against the 'key' (reference) beer. The expectation from the trade is that the beers will taste exactly the same, because brewers have told them that they can achieve a match. The brewers think they can match the beers, but sometimes it's not always as straight forward as first thought.

A consensus is reached and the beer goes into the trade, where the 'it's not the same as it used to be' brigade will make their voices heard in all the wrong places – such as the Chairman's ear when he's going round his pubs.

### What can realistically be expected?

In my experience, there are ways to manage changes in production location or plant, which take much of the stress and emotion out of the process. The first is for brewers to manage the expectations of their sales and marketing colleagues, the second is to have objective criteria, where both parties can agree that the matching process has been successfully completed.

Whatever reason a beer company is moving a brand, a similar strategy should apply. In each case, customers will worry that 'their' beer might change – it is strange, but why is change so often perceived as negative? Companies do not intentionally move brands to make poorer beer, on the contrary, the reason for many investments is an improvement in quality.

Brewers have a dilemma; matching beers is a skilled job, people want to know it can be done successfully in a reasonable timescale, but it is not an exact science. I suppose brewers would like people to see it as 'a triumph of the brewer's art', but for themselves they would prefer a process with minimal risk!

### How close a match is required?

I have been involved in many matching processes, some sadly involving brewery closures, but others driven by expansion, logistics and marketing requirements. The first question for any brewer to ask sales and marketing is what they expect from a brand transfer. There are only really two answers, an 'exact match' or what I call a 'commercial' match. An 'exact' or perfect match means the beer will be identical to the original in every way. This type of match is usually required when a high profile brand is moved to another site.

A 'commercial' match may be agreed for smaller brands of lower volume, where the beer should have a similar taste and character as the original, but need not be identical. It can be quite difficult to get brand owners to accept anything but an 'exact match' but there has to be some realisation that striving for perfection can take a lot of time and resources. In some cases where a 'commercial match' has been agreed, the new beer has been preferred to the original, and I think this is a good way for brand owners to feel comfortable with agreeing what they may see as a reduced status for their beer.

Matching cask beers can be more difficult because of the changing flavour of cask beers during their shelf life. An 'exact match' can therefore be difficult to achieve, and the term 'fully matched' has been offered as a better description. The basic character of a cask beer at various ages should be similar, so a good match should be possible.

### Start Early

I would advise the process to start early, this can be difficult in sensitive brand moves perhaps involving a brewery closure, but it's no fun being up against a tight timetable which cannot change, when the beers are not matched properly.

The perceived easiest way to move a brand, is to brew it in exactly the same way as the original. This means the plant, raw materials and processes used are identical. Malt and hops are quite easy to manage, but what about the yeast? The discussion about using the original yeast or a different one already in use at the new brewery is always a lively one. Having had this discussion a few times, I come to the conclusion that there is no right answer. What must be taken into consideration is the flavour produced by the yeast in the original beer and the flavour produced by an alternative yeast in the new brewery. An 'exact' match can only be achieved if the original yeast strain is used, but a very good 'commercial match' is often attainable using a different strain.

From a process control, continuity and capital investment perspective using a yeast already in use in the new brewery will normally be preferred. In some cases this is a more sensible option than trying to introduce a new strain and process into a new environment. My advice would be – if time permits, do a couple of trial brews early on and make an educated decision on whether using a different yeast is likely to produce a good match. If time is tight, there is really no other option but to use the original yeast strain unless a 'commercial match' is acceptable. In the matching processes I have been involved with, all the major brand moves have involved retaining the original yeast strain. Even then, considerable skill and invention was required to get the required result, especially when beer was moved from conical fermenters to squares and *vice versa*.

It is not just taste that consumers will notice, I have successfully matched beers for flavour, but have run into trouble because the head of the beer was not as it was – this can be a particular problem north of Watford Gap!

How do we go about setting and agreeing criteria for a palate matching exercise? An aim must be for any criteria to be objective and give an unequivocal result. This means that the brewery must have objective tasting schemes in place, or should consider introducing them. Depending on resources, there are a number of techniques available to large and smaller companies. Larger companies can afford more sophisticated and statistically accurate techniques, but smaller companies can have quite simple systems that give very objective results, that are far more beneficial than what I

call 'ad hoc' individual judgements.

**The sophisticated panel**

Many years ago, brewers agreed on a common terminology for beer flavour terms. There are 122 of these which have been formed into what is known as the beer flavour wheel. These flavour terms have been cleverly formed into a wheel with simple descriptors as well as more detailed descriptions, which can be used for flavour recognition and training. The 'flavour wheel' adorns the walls and tasting tables of many breweries.

Many brewing companies have sophisticated well-trained tasting panels based on the flavour-wheel characters. Beers are tasted – sometimes against as many as 20-30 flavours and an intensity score is given to each flavour. Scores can range from 0 (absent) to 10 (extreme) with full scales ranging from 0-5 to 0-10 depending on the brewery. The results are plotted on a graph, with the average scores of the original beer plotted as a comparison (Fig 1). Statistical analysis of the results can indicate where key differences are and if a beer is 'true to profile' This is the most objective method for analysing beer flavour, and goes into a lot of detail, but it does rely

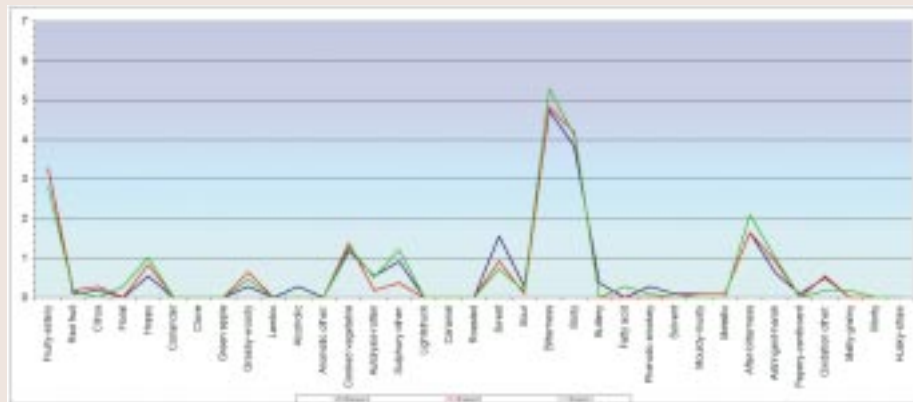


Fig 1: A global lager showing one brand at three breweries in different countries.

heavily on expert tasters and is often carried out away from where the action is. Only breweries with ample sophisticated resources can use these techniques.

**The use of experts**

There are organisations and companies that specifically help companies set up training systems and train staff. FlavorActiV is probably the best known, and after ten years is

a world leading supplier of tasting systems to over 800 breweries in more than 160 countries worldwide. Originally only the larger companies were involved, but more smaller companies are now taking a more professional approach to maintaining the flavour of their beer. FlavorActiV's philosophy is based on training people from all areas of a beer company to recognise beer flavours – both good, not so good, and flavours that should

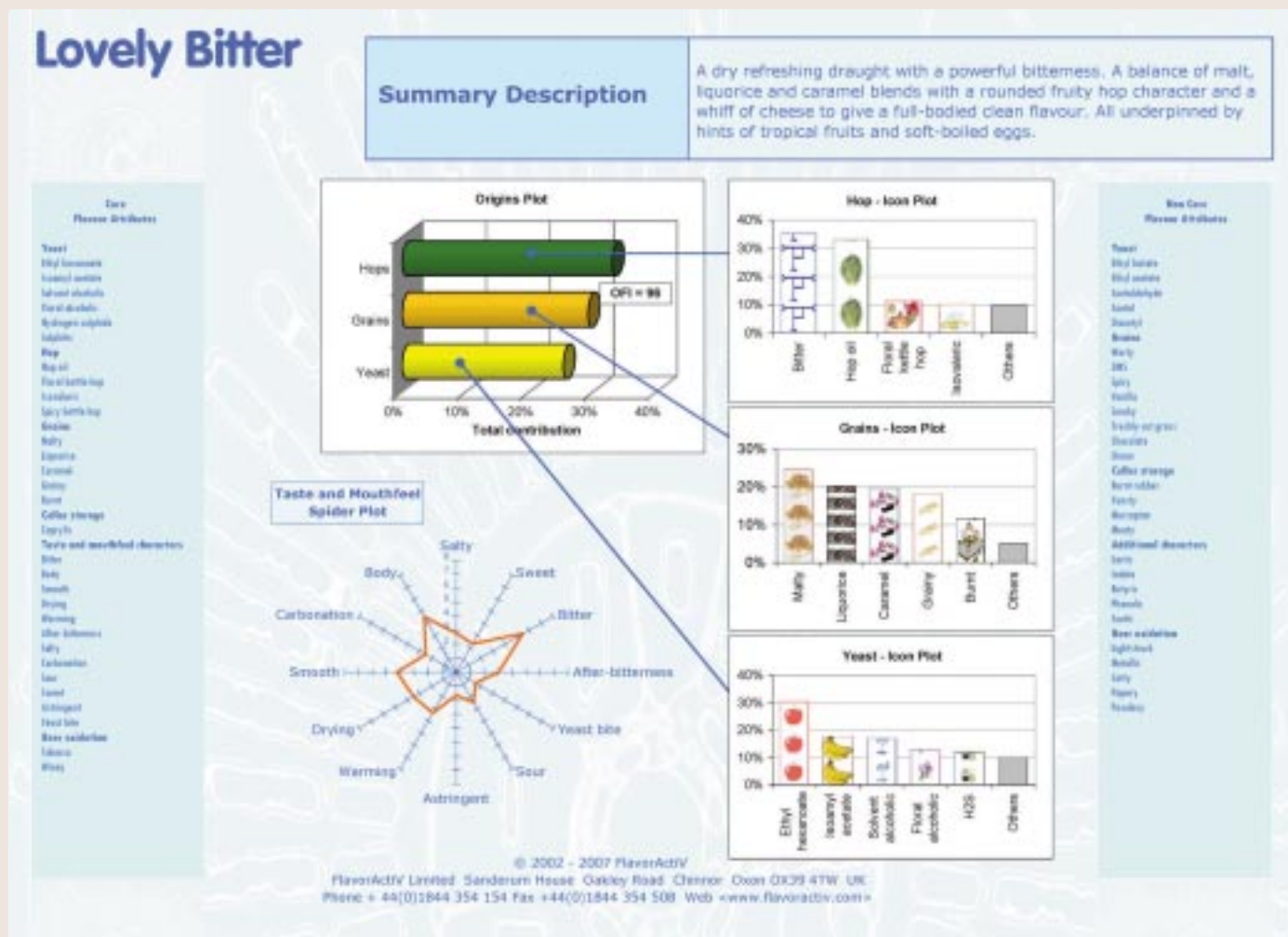


Fig 2: A typical brand profile produced by FlavorActiV. A narrative describes the main brand attributes, it shows the beer descriptors that are present, those which should be absent. A 12-parameter spider diagram is supported by an 'origins' plot which details the contributions from grain, yeast and hops. Each origin is split further into specific flavour characteristics altogether giving a very comprehensive finger print for the brand.

### Lovely Ale Profiles

FLAVOUR DESCRIPTION	Best Bitter	Special Bitter	Dark Ale
Body / Fullness	3	4	2.5
Alcohol	3	3.5	2.5
Fruity/Estery	3	4	2.5
Hoppy/Floral	2.5	3.5	2.5
Malty	3	4	3
Burnt /Roast	1.5	1.5	3.5
Sweet	2	2.5	3.5
Bitter	3	4	2
Condition	3	3	3

Flavour intensity scores	
0	no taste
1	very slight
2	slight
3	evident
4	strong
5	very strong



Fig 3 above: The key brand attributes for the Lovely ale range in tabular and spider diagram formats.

Fig 4 below right: A completed trueness to type form for Lovely Bitter in cask showing there is a way to go before matching is complete.

not be in a beer. The company also supply flavour 'spikes' in the form of capsules which are specifically made to be used in taste training and brand comparisons. There are currently about 40 flavours available, which are constantly being added to.

BRI is another organisation which is often used by companies for flavour analysis and training. These services, sit alongside its other activities which include brewing research, information services, and consultancy services to member companies and other customers.

### Is there a difference?

#### Triangular taste test

This is the classic method to assess whether tasters can tell the difference between two beers. A number of tasters are asked to pick out a different beer from three glasses, two contain the same beer, and the third a different one. Statistical analysis is used to say whether there is a difference between the two beers. Brewers use a 1\*, 2\* and 3\* difference which relates to a 5%, 1% and 0.1% probability of the result being due to random variation. For this test 7 or 8 tasters may be used, but greater than 15 is ideal.

The test can also go on to ascertain why the beers are different and which is preferred. However, as only a small sip is taken, results must be guarded and only used in conjunction with tests involving larger volumes. These tests do not require any special training and can be undertaken by people other than the breweries' trained tasters.

#### Trueness to Type

In this test, beer is tasted against an agreed brand profile. Each brand has a basic description and a list of flavour characteristics with a known intensity. There can be a list of flavours but from experience, it is easier to introduce if there are only about ten of the more easily recognised flavours. The process

### TRUENESS TO TYPE ASSESSMENT

#### Cask Lovely Special Bitter

Tasted by	A Taster
DATE TASTED	4/1/07
WHERE TASTED	Lovely Brewery

CODE	2/28/07
PACK	9 gal cask

APPEARANCE						On freshly poured beer, assess and add totals for clarity, head/foam and lacing/cling	
	Score	3	2	1	0		
CLARITY		Brill 3	Clear	Hazy	Cloudy	TOTAL Clarity, head, cling =	7
HEAD/FOAM		V.good	Good	Thin	Poor		
LACING/CLING		V.good	Good	Fair	None		
						Very good = 7- 9 Good = 5 - 6 Fair = 4 Unacceptable = <4	

#### A - Standard Flavours

Please taste the beer & score the following flavours. Put a mark in the appropriate column.

If you think the beer is a little too bitter, mark the '1 - A little too much column'

If you think the beer is 'just right' for bitterness, mark the '0 - just right column'

Description	Less Intense			Standard	More intense			
	-3	-2	-1	0	-1	-2	-3	
Weighting								
Description	Much too little	Clearly too little	A little too little	JUST RIGHT	A little too much	Clearly too much	Much too much	
Body / Fullness								-1
Alcohol				X				
Fruity/Estery		X						-2
Hoppy/Floral				X				
Malty				X				
Burnt /Roast				X				
Sweet					X			-1
Bitter			X					-1
Condition				X				-5

#### B - 'Off' and non-standard flavours

OFF/other flavours you have noticed that you think changes the overall beer flavour - these are to be deducted from the score

These flavours are normally something extra to the flavour of the beer and must score 1 to 5 according to intensity

#### Slightly sulphury nose

TOTAL B - 'Off' flavours & non-standard flavours	-1
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#### HOW TO WORK OUT THE % TRUENESS TO TYPE

1. ADD UP THE TOTAL STANDARD FLAVOURS (A) and TOTAL OFF FLAVOURS (B)	=	-6
3. LOOK UP THE SCORE ON THE ATTACHED LIST TO GET THE % TTT SCORE	=	78%

TOTAL OF A and B	0	-1	-2	-3	-4	-5	-6
TRUENESS TO TYPE %	100	96	92	89	85	81	78
TOTAL OF A and B	-7	-8	-9	-10	-11	-12	
TRUENESS TO TYPE %	74	70	66	63	59	55	

A score of 80% is considered as True to Type, a score of > 85% is considered a very good example of this brand

## OVERALL OPINION

A score of 6 and over is acceptable,

A score of 5 is borderline

A score of < 5 is not acceptable

Score	Description - how much do I like this beer ?	
10	The best beer	The best beer I've ever tasted
9	An excellent beer	An excellent beer
8	A very good beer	A very good beer
7	A good beer	A good beer - typical of the style
6	Satisfactory beer	Some minor defects
5	Acceptable	A few noticeable defects
4	Poor	A poor example of this beer - but style is recognisable
3	Not good - some "off" flavours	Some significant "off" flavours - style just recognisable
2	Very poor	Very poor - style not recognisable
1	Undrinkable	Very poor/undrinkable

Fig 5: Scoring guidance for a simple numerical beer assessment.

involves comparing a beer with the standard profile and saying whether it has more or less of each attribute.

Although a 'brewing scientist' may disagree, it is also possible to include other characteristics of the beer like 'condition' for a cask beer, or maybe 'smoothness' for a nitrogenated ale. Since trueness to type tasting is set against a brand profile, results can be handled to produce a 'spider' diagram where key differences are easily identified (Fig 3). A simple calculation can also be used to give a Trueness to Type score, often quoted as a percentage. The test can also include appearance (colour, clarity and foam) and aroma. Many people would separate aroma from taste, but they are very much linked – especially when tastes such as hoppiness and sulphury are present (Fig 4) If there are any undesirable or 'off' flavours, these can be noted and will count against a beer and reduce the overall Trueness to Type score.

### Overall Opinion

Another useful assessment is an 'overall opinion', normally set on a 1–10 scale where 1

is a very poor beer, 10 is superb. Scores and descriptions vary but a beer with a score of 7 could be considered a good beer. If the beers are tasted by a team of regular tasters, it is surprising how consistent they become in assessing their beers (Fig 5). In my opinion tasters don't have to be 'brewers', but I think they do have to have a good palate and enjoy tasting beer. Again, 'brewing scientists' may disagree, and say that tasters do not necessarily have to enjoy the product. I think we ought to have more passion about beer – we are not tasting dog food!

### Preference Testing – the 'two glass test'

Sometimes there is a requirement to see if one beer is preferred to another. Two glasses of beer are tasted alongside each other, and the taster says which beer they like most and then goes on to say which characteristics are preferred. Statistical analysis can be carried out, but just collating results can be very informative. In this test it is preferable to have larger volumes (say half a pint) to sample. 'Sip tests' such as triangular taste tests are fine for testing to see if there is a difference between

the beers, but sweeter beers are often preferred.

### Drinkability Testing

This should be the most definitive test, after all, the aim of a brewing company is to be profitable by selling beers that people are willing to pay for. A perfectly-brewed beer is no good if it does not have drinkability – that is 'moreishness' or 'balance'. I firmly believe that balance is a characteristic of most successful beers. Bitterness and fruity hoppiness, balanced off against maltiness and subtle sweetness is a characteristic of many of Britain's finest ales. Similarly character and balance is also evident in many of the world's best appreciated lagers.

Drinkability testing in its true sense can be an interesting exercise. In one test – nearly ten years ago now, I was involved in some hopping changes in Boddingtons Bitter. The test involved 300 regular Boddingtons drinkers having: a triangular test, a two glass preference test and a four pint drinkability test which involved the participants giving their opinions after each pint to a lady armed with a clipboard. Half the participants tasted the original beer, the others the trial beer. They were asked how they rated each beer against the previous one they had tasted. Participants were sent home in a taxi and as the incumbent Head Brewer I was obliged to attend over all three nights of the test – life can be very hard can't it? The same young lady rang participants the following morning to check for any ill effects and the answers were collated and a graph showed that the drinkability of the new hopping regime was equal to the previous one (Fig 6)

### The value of Market Hall tests

In an ideal world, consumer or 'market hall testing' would be carried out whenever a significant brand change is made. They are normally carried out by the larger companies, where the outlay for the test (£10–30,000 is not unusual) can be justified by the value of

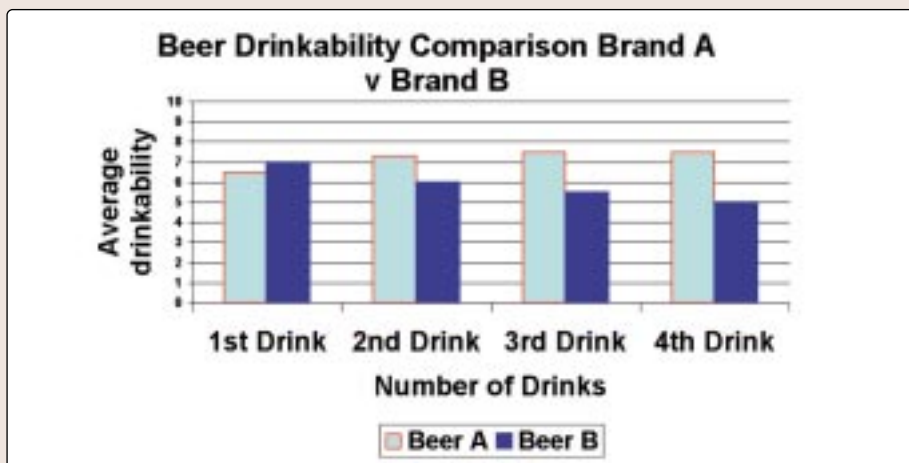


Fig 6: The results from a drinkability test where one beer was initially preferred but after one than one glass that preference changed.

Palate Matching Tracking								
BRAND BREWERY MATCH REQUIRED			Special A Exact	MATCHING CRITERIA				EXACT MATCH
				TRUENESS TO TYPE TRIANGULAR TEST Overall score	85% Nil significant difference 7 or >7			COMMERCIAL MATCH
				Overall score	7 or >7			NO MATCH
Trial No.	Brew Date	Yeast	Brewery	Triangular Taste Results	Trueness to type	Overall Score	Taste comments	Process change
1	2-Jan	G1	Brewery A	3*	63%	4	Harsh, thin, bitterness high	Reduce hopping by 15%
2	2-Jan	G1	Brewery A	3*	74%	5	Harsh and thin	Bitterness now in spec, fermentation slow
3	14-Jan	G2	Brewery A	2*	72	6	Woody/aldehydic	Slow fermentation, increase O2 to 13 ppm
4	14-Jan	G2	Brewery A	2*	82%	6	Lacking estery/fruity, sulphury	End fermentation slow
5	25-Jan	G3	Brewery A	1*	81%	7	Yeasty/estery/sulphury	Reduced mash temp & increased skim gravity
6	25-Jan	G3	Brewery A	Not done	Rough beer		No off/yeasty off flavours	Fermentation and other parameters all in spec
7	7-Feb	G4	Brewery A	1*	85%	7	Slightly up on sulphury, harsh	Reduce gypsum from 15kg to 5kg next brew
8	18-Feb	G4	Brewery A	Nil Sig	85%	8		Good result - no changes
9	18-Feb	G4	Brewery A	Nil Sig	87%	8	MATCH ACHIEVED	Good result - no changes

Fig 7: A completed tracking chart for matching. The colour coding shows the progress towards an exact match.

the brand. There are very good companies experienced in the drinks industry which do a very professional job like MMR Research. The format of the tests is agreed between the test company and usually the marketing department.

The test usually involves a carefully selected pool of tasters which fit the demographics of the brand and the location and conditions are set up to be ideal for the brand. The environment for the testing is also very important, I remember a market test for a well known lager during a very cold winter being carried out in an ambient temperature which was below that of the beer being served! The reports from the tests include detailed statistical analysis, with an interpretation on their significance and recommendations.

There are some things to be wary about consumer testing – it is beneficial to have experienced beer people as well as marketeers involved in the tests in order to get the best interpretation and follow up action. If consumers are to be asked for a preference, it is important that the test is more than just a sip test, where sweeter blander beers tend to be preferred. Preference tests should include at least half a litre of beer. Four pints as in the Boddington's case above is not mandatory! Because the cost of these tests is so high, there can be a tendency to overcomplicate them and make results more difficult to interpret. Tests which involve many beers for preference testing need to be very carefully setup and results treated carefully; too often these tests involve just sipping a number of beers, and the results can be misleading. In setting the test criteria, it is important to state

the primary aim of the test – is it a 'can you tell the difference' test? or 'which beer do you prefer' test?

There are other less formal approaches. Without preliminary sip tests, it is possible to mark two dispense heads 'A' and 'B' and allow drinkers to sample whichever taps they like. At the end of the evening it is a simple matter of checking which beer container had the most taken out of it to see which beer was preferred. When one cask beer moved breweries, the company gave a cask to 'friendly' landlords to sell blind. They noted consumer reactions. Then a second cask of the trial beer was put on sale but the licensee was told to say it was a test brew and again note the reactions. This method helps involves the trade and seeks comment from those who sell the beer.

#### Managing the brewing trials

The trial brewing and tasting programme has to be systematically managed and documented. Appointing one person to coordinate within a small team is important, as well as having the success criteria agreed and set. Details of the trials and changes to the recipe should be collated alongside the taste results (Fig 7). An example of a success criteria for an 'exact' match could be >85% scored on a Trueness to Type test, and 'No significant difference' on a triangular taste test. In order to prove consistency, it is recommended to achieve three consecutive positive results. For a 'commercial match', a Trueness to Type of >80% and a 1\* (95%) significant difference might be acceptable. A simple table showing progress towards the matching criteria gives confidence about how well the programme is

going against the set criteria and timescale. Once the agreed success criteria have been achieved, the matching process has been completed and the brand transfer can be take place as required.

#### Managing the transfer and afterwards

Palate matching is only the first part of the process. Ideally the transfer of the brand should take place over a number of weeks involving a blending programme with 25–33% of trial beer being sent to trade, with this rising to 50–66% over the next few weeks until 100% new beer is in full production. A close eye should be kept on how the new beer is performing in a number of key accounts, and Trueness to Type taste tests must continue to confirm that the new beer is consistent. Also to be considered is continuity and sustainability. I've known breweries which have succeeded in achieving an 'exact match' during trials, but have had considerable problems managing the yeast and maintaining the palate afterwards. Also remember that as the transfer of product from one brewery to the next takes place, the availability of the original beer reduces significantly. Eventually there will be no beer with which to compare the new beer, therefore, a trueness to type assessment backed up by a good memory is the best and only objective way of checking continuity. ■

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