

# PLEASE MAY I HAVE SOME MORE?

Oliver Twist's request notwithstanding, the brewing industry's conceptualisation of drinkability is a bit hazy. Does it have to do with moreishness, a sessionable beer? Does it relate to the beer's thirst-quenching qualities? Or perhaps it comes down to satiety, a filling of the senses? UC Davis professor *Charlie Bamforth* surveys the recent scientific evidence to shed some light on the debate

**T**he drinkability sessions in Burton were indeed popular. From around 5pm, you'd start with half-pint glasses of three beers and the instruction to comment on them before choosing the one you would like to continue with. Having made your selection, you would be given a further half pint and off you went to do your thing – play cards, throw darts, or just talk. Whenever the need took you, off you headed for a re-fill of whichever of the three beers you wanted. Each time, your choice was noted down and a tally kept of the pints devoured from each keg or cask.

At the end of the evening you were poured into a cab, clutching a questionnaire for your spouse or partner to fill in concerning the impact that your evening's drinking had had in various behavioural categories that we need not go into here.

We were looking for 'Factor M', the moreishness or drinkability component of beers that we believed might fairly explain why it is that some beers are inherently more quaffable than are others. Alas, we never found it.

Several of us were variously convinced that the factor was a nucleotide, or salt levels, or an amino acid such as glutamate (a thought triggered, no doubt, by the well known role of MSG in making Chinese food impossible to stop nibbling at).

Nothing we tried seemed to pan out. Yet we had fun looking, both in terms of the conviviality of the sessions but also instances like the time a certain head brewer told us that we couldn't kid him and that the three beers were Carling, Carlsberg and Foster's (in fact, they were Carling with different levels of salt addition).

Just about the only firm conclusions I ever drew from debating drinkability whilst I was wearing red triangles on my ties were that excessively bitter and aromatic brews are less drinkable than their more modestly hopped counterparts and that cask Stones Bitter was

vastly more drinkable than its kegged variant. The latter I ascribed to the lower carbonation level of the "traditional" ale, but as we will see I may have been wrong.

## What is drinkability?

My on-line Merriam-Webster dictionary defines drinkable as meaning "suitable or safe for drinking." Most brewers don't think of drinkability that way at all. Actually, it is different things to different folks.

For we at Bass it was the sense of "that was a good pint; you know I could really drink another of those."

For others it is all to do with satiety. "I really couldn't take in another of those", perhaps because they are filled (with fluid or carbon dioxide). Perhaps it's a case of "mmm, that is so fully flavoured that my senses are saturated", a situation that pertains with some of the ludicrously bitter and hoppy aromatic North American microbrews. Take a few sips, belch and you will easily offend the neighbours with a not-so-subtle blast of essential oils.

Depending on how we interpret drinkability, there is a significant social and responsibility issue at play. Do we really want to put into the market beers that are so tempting and moreish that people will feel compelled to quaff pint after pint? Surely we should content ourselves with having beers that leave the customer able to stay within their limits, both in terms of alcohol and calorie intake, whilst having them think "hey, nice beer, I'll have one or two more of those tomorrow."

## Satiety

Mark Conner, of the Centre for Decision Research at the University of Leeds, describes four separate components of satiety (in *Measurement of*

*Food Preferences*, edited by MacFie and Thomson, Chapman & Hall).

"Specific sensory satiety" is the first component, the sensory response per se: how do the characteristics of a beer – its flavour, mouthfeel (in which carbonation and nitrogenation have key roles to play) and temperature - impinge upon one's feeling of fullness?

Appearance may also have a psychological impact. How hard is it to savour a cloudy beer if you know that it is one that is supposed to be bright?

The visual appeal may literally get our digestive juices flowing and thirst response activated. Just



look at the imagery of beer in advertisements. Depending on your conditioning, what does the appearance of a cold one do for you? A beer with foam is inherently more appealing than is one without. We must not discount either the other components of the sensory experience. This includes lighting, locale, and the other stuff that we are consuming, whether another food-stuff or cigarettes.

Connors' second component pertains to an individual's belief about a beer. I well recall one of our beers at Bass being labelled by some as prone to give headaches. The fact that the complainants drank 10 pints nightly of the highly drinkable stuff didn't register in their consciousness.

It's exactly the same phenomenon for me with a certain brand of ale. When I was a university student a year or two ago (1970), I made rather an idiot of myself one evening on this particular product with some rather unpleasant after effects. There is no way I can drink that beer these days, despite the fact that my brain tells me that it could have been any brand that led to the effects endured.

In this category we might also include other psychological issues – such as messages about a beer's healthfulness, or the imagery associated with it. Is it good to be seen with this bottle of beer? Am I a sex magnet? (You will realise I ask the question rhetorically.)

The third component of the satiety effect (with beers consumed in moderation) is bodily responses, such as distension of the stomach wall and the rate with which the stomach empties. And we cannot avoid the thirst-quenching element.

Within that effect are the hormone release patterns, in turn leading to the fourth element, namely the impact of the components of the beer and of its digestion products as they course through the blood and hit the brain.

### Thirst quenching

Another way to view drinkability of a beer is in the context of the extent to which it is thirst-quenching. My colleague Jean-Xavier Guinard had a 12-judge team scoring "thirst quenching", "refreshing" and "drinkability" of 18 beers (*Appetite*, volume 31, page 101, 1998). These three attributes were evaluated on sipping of 60ml servings. So it was all about *impression* of drinkability – to what extent do I expect this beer to be "thirst quenching."

Guinard found a positive correlation with carbonation and bubble density (which flies in the face of my dogmatic belief regarding Stones bitter stated earlier). Negative determinants were foam, overall aroma and flavour, colour, viscosity, malty, hoppy, burnt, bitterness, acidic, metallic, astringency and aftertaste. In other words, and entirely as one might expect, the beers pre-

dicted to be the easiest to drink were those of "gentlest" flavour. If surprised about this, then consider the beers worldwide that sell the largest volumes.

Jan Hlaváček, from the Pilsner Urquell brewery, compared rats with humans as far as their preference for different beers goes (EBC Congress, 1999). The humans were given twenty-four 330ml bottles of beer to drink (now we're talking). There was good agreement between the rodents and the people, both preferring drinking lager to water, I am pleased to report.

It seems that a beer with a higher residual level of maltose was preferred. This was not on account of sweetness – saccharin did not recreate the effect. Rather, Hlaváček ascribed the effect to rats and people going for beers with greater nutritive value. Thus there was a positive correlation between volume consumed and calorific value. Hmm, surely this is a concern in these obesity-conscious days.

There was no correlation with content of polyphenols or free amino nitrogen – but in this study there did seem to be a positive link between volume consumed and bitterness in the range 25 to 40 BU. However, if a much lower bitterness product was included the correlation was thrown out.

Surely it is all about balance? A relatively bland beer can be just as drinkable as a deeply flavoured one, as long as they are both in balance. No overt hoppiness, unless tempered with malt and alcohol.

Studies from Brewing Research International (IGB Convention, Victoria Falls, 2003) classified untrained consumers into different categories for their preferences - one size does not fit all, seemingly. One group studied preferred full bodied "sticky" beers (with high alcohol and glycerol contents) but another group pretty much liked anything, except unusually low carbonation products. (There we go again.)

### Assessing drinkability

Testing for drinkability is a real challenge, on the grounds of relevance but also ethics.

Ferkl (*MBAA TQ*, volume 16, page 214, 1979) asked people to rank beers at different stages of drinking: after the first sip and then after finishing half, one, and one-and-a-half litres. In this way it was possible to see if opinions of a product's acceptability changed as more was consumed.

Stephen French and colleagues (*British Food Journal*, volume 95, page 19, 1993) measured people's thirst after consumption of beer by totting up how much water was sipped between taking a drink of beer every 15 minutes.

Fushiki and colleagues from Kyoto University (*Bioscience, Biotechnology and Biochemistry*,

volume 62, page 846, 1998) measured stomach volume and correlated it with sensory attributes of beer. After a controlled rate of beer intake, the subjects were told to urinate every half hour over a period of three hours and some unfortunate lab technician was charged with the task of measuring the volume collected. The subjects were also asked to give an opinion on how tasty they found the beers, whether they were keen on drinking them, how full they felt their stomachs were, etcetera.

The conclusion was that the least drinkable beer was the one that resided in the stomach the longest. They later showed (*Bioscience, Biotechnology and Biochemistry*, volume 63, page 468, 1999) that the less fresh the beer, the less drinkable it is and the less is its tendency to make you want to urinate. It stays in the stomach longer. Incidentally, smoking also reduces the rate of stomach emptying.

### So is there any magic?

Before a recent television appearance, the anchor told me that his wife doesn't like beer.

"Too much fizz" he said.

"Gas?" I offered.

"Yes, but that's the sausages," he replied.

I would suggest that it really is excess of any component, including carbonation, which induces satiety. Remember that in Jean-Xavier Guinard's work they were judging thirst quenching (and drinkability) on the basis of sipping small quantities. Of course, a high carbonation, with its attack on the trigeminal pain response, is an exquisite sensation when you are thirsty. Try it: next time you are thirsty have some warm tap water or some cold carbonated spring water and see which one scrapes the back of your throat and livens up your taste buds more effectively.

So it is for beer, too: a cold highly carbonated canned lager works better to refresh your palate than does a pint of traditional ale drawn straight from the barrel. But which one is the more drinkable, in terms of moreishness? Provided it has not turned to vinegar, is not over-hopped and does not have unappealing lumps that have evaded the fining process, then for me it is the ale.

### Beer & Society concludes in the December/January issue with a look at the relationship between beer & sex.

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