

Ullage and Spillage

by J.Random

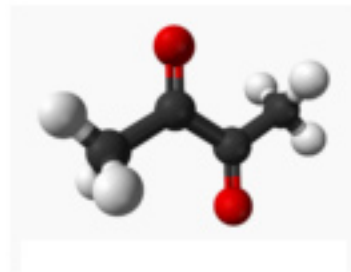
Enough with the butterscotchy beers already! I blame Keith Lembke of the Siebel Institute, an early CAMRA Vancouver supporter. Not that he is causing butterscotch flavour, but it was Keith's beer education session many years ago that taught me to recognize its cause and become less tolerant of its presence. Diacetyl is variously described as tasting of butter, butterscotch or artificial butter-substitute-flavoured popcorn oil.

For those who have not had the benefit of a lecture from Keith, diacetyl has for many years been the predominant flavour of a certain popular pale ale brewed on Vancouver Island. At low levels it can be mistaken for caramel and enhances maltiness. At these levels, professional tasters regard it as an acceptable component in Scottish ales and it contributes to the character in certain British biters. It seems I have been happily quaffing ales with low level of diacetyl for years. Now I am tasting diacetyl at relatively high levels in far too many B.C. beers and it is starting to spoil my drinking enjoyment

It got to the point where I decided to do some research on the topic and educate myself a bit further. A couple of excellent articles on the subject are readily found on the internet (<http://beerme.com/diacetyl.php> <http://beerdiva.com/pdf/Diacetyl.pdf>) I found out a lot by talking to a few of the brewers that I respect. The majority knew diacetyl is an intermediate in the brewing process but I also got the impression that it was an off-flavour. Turns out it can be both. Yeast naturally produces diacetyl (or 2, 3 Butane dione, $\text{CH}_3\text{COCOCH}_3$) as a byproduct of its metabolism of the sugars in the wort. Some yeast strains seem to produce more than others. As the sugars get used up towards the end of fermentation, yeast reabsorbs diacetyl and metabolizes it still further to end-products that do not contribute as much to flavour. This is a very important point that I shall return to later.

Diacetyl is also produced by a contaminant by the name of pediococcus, which my high school Latin would roughly translate as football. This is

truly ironic, unlike Alanis Morissette's examples, as Russell Brewing's beers have much less diacetyl since they expanded their capacity to supply beer at B.C. Lions games. There has been a distinct improvement to the cream ale in particular. Because contaminants usually multiply rapidly in the beer after the end of the fermentation, the diacetyl they produce builds up, rather than decreasing with time. Since contamination is usually not a pure culture, diacetyl caused by contamination is usually accompanied by acetic and lactic acids.



Diacetyl- $\text{CH}_3\text{COCOCH}_3$

UNWANTED

Based on my review of the literature and discussions with brewers I am convinced most of the diacetyl I am detecting is the metabolic intermediate, not the contaminant. Fermenting ales at too low a temperature and not using a diacetyl rest (a short period of higher temperature towards the end of fermentation) is one possibility. While there are many other factors contributing to residual diacetyl, in the articles referenced above, premature termination of fermentation is my best guess for the primary cause in the beers I have been drinking. I suspect some breweries are chilling and/or filtering the fermenting beer at an early stage, whether to hit a desired flavour profile, leave residual sweetness, meet production deadlines or allow more time for drinking. CAMRA Vancouver members can probably figure out which brewery is motivated by which reason. Since yeast uses up diacetyl when given the chance, there is one obvious solution: leave some yeast in the beer, naturally carbonate it and serve it as REAL ALE.