

Campden BRI  
Centenary Hall  
Coopers Hill Road  
Nutfield  
Surrey  
RH1 4HY



Tel: +44 (0)1737 822272  
[www.campdenbri.co.uk](http://www.campdenbri.co.uk)

## Technical challenges with novel alcoholic beverages

There has been an explosion of product development in the alcoholic beverages industry, around a category that can be broadly described as: 0-5% ABV, single serve bottles, sweet and often fruity, refreshing, coloured, bright or cloudy. Many of these products have a beer or cider base, but may not be marketed as such.

With the demand for these beverage styles, we have been answering an increasing number of technical questions on this topic and assisting in overcoming various pinch points. This white paper highlights some of these technical issues, and outlines some approaches that may help as you develop these novel products.

Contact:

Trevor Cowley  
Head of Brewing Services  
+44 (0)1737 824228  
[trevor.cowley@campdenbri.co.uk](mailto:trevor.cowley@campdenbri.co.uk)

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## **Microbiological stability**

This is essentially the burning issue, since failure to ensure microbial stability could result in exploding bottles and danger to the consumer. These novel beverages are more vulnerable to spoilage than traditional alcoholic beverages since they often have added sugar, may have a lower (or zero) alcohol content and may have virtually no hops. As such, the pasteurisation protocol must be adapted for each product in order to mitigate this risk. In-house challenge tests can be adapted to check that the pasteurisation is sufficient, ensuring that a suitably resistant test organism is selected. When creating a range of products, a useful approach is to categorise them by microbial risk in order to ensure that they go through the correct pasteurisation procedure. Finally, some producers add preservatives, to avoid excessive heat treatments and to improve colour and flavour. This year, we have conducted a member funded project to produce guidelines on pasteurisation procedures for these beverages, and so we can provide further information and guidance on this key issue.

## **Sweetening the products**

The most common sweetener used in these products is sucrose, which has the advantage of being natural with a pleasant taste, but has the disadvantage in that it is expensive. Fructose is also natural, can actually boost fruity flavours, but it is also expensive. From a technological viewpoint, both sucrose and fructose are water soluble, colourless, and heat stable, but their usage requires significant investment in dispensing, dosing and mixing technology. Added sugars also add calories, and so an alternative is to consider using artificial sweeteners. Again these tend to be water soluble and colourless, can be cost effective and have the advantage that dosing equipment is not required and pasteurisation may be avoided. On the other hand, be aware that sweeteners can have a significant aftertaste, and that it may be necessary to explore adjusting the product composition to mask these.

## **Understanding the regulatory background**

Before starting product development, we advise checking the regulatory background of the materials that will be used in the beverage. Additives such as Stevia have maximum levels set for their usage and restrictions placed on the alcohol content in beverages. Some ingredients may also trigger issues if they fall under the Novel Food Regulations, which may occur if the ingredient is not on the permitted list or was not in common use in the EU before 15<sup>th</sup> May 1997. Finally, be aware that for products under 1.2% ABV a full ingredient listing will be required on the label as well as nutrition information. We also advise double checking that claims such as 'natural' or 'low calorie' can be substantiated and are permitted on your beverage, ones such as 'low carbohydrate' are not allowed in the EU.

## **Cloudy or bright?**

A significant challenge with these products is colloidal stability - either keeping a product bright or keeping a product hazy, depending on the style. As soon as a beer base is mixed with any fruit substance, a haze is guaranteed to form as the proteins and polyphenols interact. This is a complex process and unfortunately the best strategy to get the correct haze level seems to be trial and error, and potentially the use of a good filtration system! For many products, such as Radlers, a cloudy product is required and an understanding of the composition of the fruit mix which may contain cloudifiers (oils) or stabilisers (gums, pectin) is valuable to optimise the product development process.

To ensure colloidal stability over the lifetime of the product, we advise adapting the in-house forcing tests; we have a member project on this topic which is investigating the best methods to identify and predict haze, which will be able to offer further detailed support

### **Retraining the sensory panel**

For each product, a new set of descriptors will be required, as well as a standard profile that the panel can assess against, and Quantitative Descriptive Analysis (QDA) is a suitable method to achieve this. The panel will also need to be trained on new flavour and aroma notes such that they can assign values to the intensity and also can identify a new range of taints that may form in these products. As such, a significant investment in panel training will be required, whether by an internal or external trainer. In addition, visual assessment of colour presents a challenge and is very reliant on individual skill – so while colour could be assessed by the panel, we advise considering investing in colorimetry equipment to be more robust.

### **Due diligence and quality control**

Using new raw materials means new risks, and expansion of the due diligence food safety testing programme will be required with these novel products. Each raw material needs to be considered by risk likelihood and also in relation to any legal limits, and integrated into the testing plan. It is useful for the first few due diligence rounds to increase the sampling frequency to establish a baseline; it may then be justifiable to reduce the frequency if no issues have occurred. In the lab, there is also a challenge around standard QC methods, which will need to be adapted to take into account the new matrix. For example, the use of matrix matched standards and spiked samples can be useful for validating methods, and sending duplicate samples to a specialist laboratory to get an external corroboration of your new method is advisable.

### **New packaging formats**

Finally, these novel drinks are often presented in flint glass bottles, but the marketing teams are driving new small pack formats that can create additional technical challenges. We would suggest checking the packaging before starting the NPD process – for example, if the pack cannot be pasteurised, the use of preservatives or sweeteners may be need to be considered.

### **Here to help**

Our experts can advise you on all aspects of developing these products and assist you with everything from panel training to product development – so please feel free to contact us if you need further support.

Contact:

Trevor Cowley

Head of Brewing Services

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