FOOD TECHNICAL SERVICES

PROJECT: GEL AND YIELD ISSUE ON FRUIT INFUSED SPIRIT DRINK

Use of Enzyme/Biotechnology to increase extraction and improve yield and quality

The Issue:

A drinks business producing Soft fruit infused spirit drinks from local Spirit & Strawberries requested support in order to resolve a processing problem. The business had experienced yield/quality losses thought to be caused by gel formation during the process.

After discussions as to the processes used and the occurrence of issues – it seemed apparent that Pectin formation was probably the main issue to address.

Fruit cell walls consist of cellulose (polysaccharides) bound by other materials such as pectins (also polysaccharides).

- Both Cellulose and Pectins can be degraded by the native enzymes in the fruit (eg during ripening) or by microbial enzymes eg from moulds that utilise the simple sugar by-products.
- During ripening, many changes take place – but important in this case is softening by native (and microbial) enzymes:
    - Insoluble Pectins are converted to water soluble pectins which results in softer flesh.
    - The water soluble Pectins then become part of the resultant juice which becomes more viscous-gel like & opaque.
    - The increased viscosity/pectin gel then makes it harder to extract more juice thus affecting yield, clogging up filters, and spoiling the juice quality.
    - These quality losses include cloudiness, gel/sediments, loss of eg flavour/sugar/colour.
    - Fruit cell cellulose walls can also restrict extraction and are also degraded by the native and microbial enzymes.

It was evident that Enzyme technology was the way to solve this issue and at that point calling in a Biotech-Enzyme specialist was key to getting an optimum result. A phone around our associates in the industry lead us to Enzyme Specialists - Biocatalysts Ltd.

Solution:

After conversations about the process/raw material qualities/ pH / ethanol content / temperatures used, Biocatalysts provided advice and some sample Enzyme blends suitable for the process that could provide the desired functions ie:

- Cellulases - to break down cellulose cell walls, ie release more of the juice but more pectin too.
- Pectinases- to break down the existing and newly released pectin structures into soluble sugars

Thus in combination they'd reduce pectin viscosity, aid extraction and reduce filter blockage/gel.

A blend of fungal-Aspergillus sourced: Endogalacturonase, Polygalacturonase, Arabanase & Pectin lyase would provide these functions. Here In the EU, processing aids such as enzymes do not need to be declared on the food/drink product label.

Result

Trials showed that a simple change to the process: dosing ambient temp fruit mix for a defined period before filtering then adding spirit (ethanol denatures enzymes so it's added last) provided good results.

** Photos don't all relate to actual product/location