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 business producing Spirit based drinks from local Neutral Spirit & soft fruit (Strawberry in this case), had requested assistance with resolving processing issues. They'd experienced yield/quality losses thought to be caused by gel formation during manufacture.

After discussions as to the processing methods and nature of the issues, it seemed apparent that in insoluble Pectins were the main issues to address.

Fruit cell walls consist of celluloses bound by other materials such as pectins.

- Both celluloses and pectins are polysaccharides which can be degraded into simpler saccharides by native enzymes in the fruit (eg during ripening) and by microbial enzymes such as those used by moulds.
- During ripening, many changes take place; important in this case is the softening activity by 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 can include cloudiness/gel/sediments, loss of eg flavour/sugar/colour.
    - Fruit cell cellulose walls act as barriers and can restrict extraction, these too can be degraded by 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 and thus release more of the juice, but more pectins too.
- Pectinases - to break down the existing and newly released soluble and insoluble pectin structures into soluble sugars.

Thus, in combination they'd reduce pectin viscosity, increase sugars, aid juice extraction, and result in improved colour and flavour. A blend of fungal-Aspergillus sourced: Endogalacturonase, Polygalacturonase, Arabanase & Pectin lyase would provide these functions.

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 that met with expectations. No changes were needed to packaging as for Europe - Processing aids such as enzymes don't need declaring; for US markets however they must be declared.

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