



Enabling Food Innovation Project

STARKEY'S FRUIT LTD

John R Starkey MP planted a Bramley Apple orchard at Norwood Park over 100 years ago. The original Bramley apple tree is now 204 years old. In the early 1990's biologists from the University of Nottingham produced clones of this tree when the original was threatened by Honey Fungus. Starkey's now have a thriving orchard of original Bramley clones which they sell as top fruits, and also process into juices and compotes marketed under the brand 'The Extraordinary John Starkey'. Other single variety apple juices are also produced. John Starkey's Bramley apples can be enjoyed as fruit or as juice without any additional sugar. The apples are only harvested when they have reached their peak of maturity on the tree in October thus allowing them to develop their own natural sugars to the maximum. The result is fresh juice with a perfect balance of Bramley acidic flavour and sweetness.

Project Brief: 13 Dec 2016

1. Investigate if there is a flavour or taste difference between the juice of their original Bramley's versus regular grafted Bramley apple trees, which are widely available.
2. Advice is required on nutritional labelling legislation.
3. Problem-solve a gel formation issue in apple juice and suggest means of prevention.
4. Longer term there is an interest in receiving product development support for the creation of other new Bramley apple food and drink products to expand the range.

The Response:

From Dec 2016 – Part of the standard ERDF support:

1. Advice on current Nutritional Labelling Legislation was provided to enable the company to update their labels according to recent changes in legislation.
2. A number of chemical analyses were run in the lab to identify the likely cause of the gel formation, and a review of literature was also provided into preventative measures.
3. A pre-liminary sensory difference test was carried out at the March 2017 Farmer's Market, with 95 respondents, in which a significant difference was found



in the sweetness:sourness balance of juices from Starkey original Bramley's vs. generic Bramley apples.

From Sept 2017 – Hermes Fellowship Funded Research Project:

4. Given the interesting result of March 2017 study, the company wished to investigate further. The Enabling Innovation team successfully won internal University funding to carry out a larger scale research study to investigate flavour differences in different types of Bramley juices in more depth. A collaboration was set up between the Enabling Innovation team and academics from:

- i) The Sensory Science Centre
- ii) The Flavour Laboratory

Together they repeated the flavour difference study but in the apple harvest season, when ripeness of apples from the two treatments could be controlled, and that involved serving 200 people at the Southwell Bramley Apple Festival, samples of juice as part of the sensory study. Additionally, brix, titratable acidity and headspace aroma were analysed so that sensory and chemical data could be considered together.

From Feb 2018 – Undergraduate Student NPD projects (Food Science):

5. A group of undergraduates have been paired up with Starkey's to work on a product development brief to design a Bramley apple crisp with a 12 month shelf life. The result is expected in May 2018.

Benefit to Business:

- The larger research study confirmed to the company that the Original Bramley apple has significantly different quantities of aroma compounds in its headspace than Bramley's from a Kent orchard, which could be useful for their marketing.
- Running the sensory test at the Bramley Apple Festival allowed the public to see how much they care about the flavour of their juices and allowed them to be associated with the UoN brand and the company received media exposure as a result of the research project.
- The company gained the knowledge of the extent to which brix:acid ratio differences can impact the consumers ability to detect differences in products.
- The company gained knowledge from a literature review on apple juice, flavour and sensory properties as part of the research studies.



- The company is getting some product development support to create other



Bramley apples for free.