

# Understanding the NPD Process

---

**Sandy Goonan**  
**Awarded Teacher Fellowship**

**August – December 2011**

**Learning Objective: To develop knowledge and understanding of the NPD process used in the food industry, the relationship between NPD and the classroom and the practices used within the food industry and their link to the Technology Curriculum.**

## CONTENTS

<b>Introduction</b>	<b>3</b>
<b>Stage 1: Define</b>	<b>4</b>
❖ Opportunity Identification	4
❖ Initial Brief	4
<b>Stage 2: Explore</b>	<b>5</b>
❖ Market Research	5
❖ Consumer Research	7
❖ Technical Research	8
❖ Idea Generation	9
❖ Revised Brief	9
❖ Screening	10
<b>Stage 3: Concept Design</b>	<b>10</b>
❖ Technical Research	10
❖ Final Product Idea Concepts	11
❖ Product Concept Idea Formulations	13
❖ Further Consumer Research - Focus Groups	14
❖ Final Concepts For Recommendation	26
❖ Final Concept for Development	28
<b>Stage 4: Prototype Design</b>	<b>29</b>
❖ Finalising the Formulation	29
❖ Sensory Testing	30
❖ Final Formulation	31
❖ Ingredient List	31
❖ Nutritional Information Panel	32
❖ Cost Analysis	32
❖ Summary	33
<b>References</b>	<b>34</b>
<b>Acknowledgements</b>	<b>34</b>
<b>Appendix</b>	<b>35</b>

## INTRODUCTION

*Kaua e rangiruatia te hāpai o te hoe;  
e kore tō tātou waka e ū ki uta.*

*Don't paddle out of unison;  
our canoe will never reach the shore.*

*Technology is intervention by design: the use of practical and intellectual resources to develop products and systems (technological outcomes) that expand human possibilities by addressing needs and realising opportunities. Adaptation and innovation are at the heart of technological practice. Quality outcomes result from thinking and practices that are informed, critical, and creative.*

*Technology makes enterprising use of its own particular knowledge and skills, together with those of other disciplines. Graphics and other forms of visual representation offer important tools for exploration and communication.*

*Technology is never static. It is influenced by and in turn impacts on the cultural, ethical, environmental, political, and economic conditions of the day.*

(<http://nzcurriculum.tki.org.nz/Curriculum-documents/The-New-Zealand-Curriculum/Learning-areas/Technology>)

Technology as a school subject generally involves developing an outcome that meets a need or opportunity to address an identified issue within a specific context. This requires students to follow the technological process while undertaking a series of activities, researching new skills, developing knowledge, selecting appropriate resources, trialling and experimenting with their ideas. This allows them to critically analyse and evaluate decisions as they work towards their final result whether it be a conceptual design or a final prototype solution.

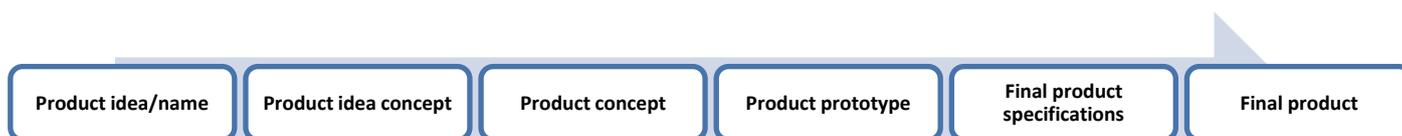
The process used in schools is not dissimilar to that undertaken by many product designers, food technologists or engineers. In general the following points can be summarized in relation to the NPD process:

- most organisations follow a 4 – 7 step decision process when developing new products
- a decision point is often referred to as a 'gate' or go/no go point
- stages are usually sequential but some steps may need to be repeated to modify ideas
- this may be in response to new materials, technologies, competition or production factors that emerge during the process
- the number of people who will be involved will vary depending on the size of the company
- a small company may have one person or a small group responsible
- a large one will have expert groups working co-operatively and concurrently on the project

On researching a number of different NPD models used in the industry, the following representation best reflects one that could be adapted to classroom practice.



During the process an initial product idea develops into a new product ready for release on the market. Product concepts are an evolving process – as the idea develops more detail is added.



(Schematic adapted from Industrial Innovation, lecture presentation, Massey University)

## STAGE 1: DEFINE

### ❖ Opportunity Identification

From small beginnings in a North Shore garage, EasiYo has grown to become one of the largest homemade yogurt companies in the world. Success in the UK market has allowed them to launch into Italy, China and Korea, which has brought about interest from other European and Asian countries.

Opportunities exist to expand the business further particularly in the area of nutrition, new flavours to meet specific market segments, drinking yoghurt and inclusions for the newly launched 'n bits' product range.

In particular, global trends highlight that consumer and company interest in natural and functional foods is growing rapidly. The natural health benefits of vegetables combined with the existing nutritional value of EasiYo yoghurt may provide a new area for research and development in the company.

### ❖ Initial Brief

To develop a vegetable flavour yoghurt base that has the potential to be marketed by EasiYo Products Ltd.

### Constraints

- must contain all dried ingredients
- must use ingredients that meet EasiYo Products Ltd. requirements
- must comply with company allergen policy
- if 'bits' are included, must be no larger than 1cm in size
- must comply with NZ Food Standards and regulations
- must comply with the EasiYo Products Ltd. company philosophy

## STAGE 2: EXPLORE

### ❖ Market Research

A wide variety of yoghurt based products are currently available on the market both locally and overseas. The dairy industry provides many opportunities for innovation in yoghurt products. In particular:

- taste and texture preferences for specific markets
- drinking yoghurt which has become the fastest growing yoghurt category in the last year
- the increased demand for functional foods

### Current Market Products

As EasiYo is a unique product, it was difficult to compare with other competitor's brands, however it did allow for research of products with similar characteristics for determining actual or perceived attributes that were likely to be acceptable to the consumer.

The following products have recently been launched on the local NZ market:

- **The Collective** -a range of drinking yoghurts, in 6 flavours, marketed as a convenient, speedy, healthy hit to a young adult market. Sold in selected supermarkets and priced at \$3.99 for 250ml serve.
- **Vocado Smoothie** – avocado and fruit/honey combination in 2 flavours aimed at busy health conscious people who may have dairy allergies. Also sold in selected supermarkets and priced at \$3.99 for 250ml serve.

Other existing products with vegetable/fruit combination flavours/ingredients include:

- **Simply Squeezed Fruit and Vegetable Juices** – a range of fruit and vegetable juices made with herbal extracts in 5 flavours. Produced in both 1L and 350ml sizes and themed to enhance mood and well being.
- **Just Juice Veges** - targeted at Kiwi families with 40% vegetables in 3 fruit/vegetable flavour combinations produced in 250ml and 1.8L sizes.

Products discovered on international markets included a limited range of set vegetable yoghurt mainly in fruit/vegetable flavour combinations. Those of particular interest were:

- **Yogurt Yomo Frutta & Verdura** – based on an original dairy recipe from Italy with unusual flavour associations such as: spinach and apple, strawberry and tomato, pineapple and fennel, blueberry and carrot, mango and pumpkin.
- **YoBaby Meals -Fruit and Vegetable Yoghurt** – a yoghurt product from Canada marketed especially for babies with fruit and vegetable purée on the bottom in 3 flavours: peach and squash, pear and green beans, apple and sweet potato.
- **Savera Indian Dairy Range** – by Arla foods comprising of: Paneer, Dahi, sweet Lassi, Alphonso Mango Lassi and Raita. The Raita consisting of cucumber, green chilli, cumin and dahi. The alphonso mango lassi of alphonso mangoes and cardamom and the sweet lassi

with a hint of cardamom. The range is aimed at capturing lovers of ethnic foods, along with Indian families in the UK.

- **Schmoo Yoghurt Lassi Drink** - a new yoghurt lassi drink designed to bring the authentic Indian lassi to the UK mainstream. Uses 100% pure ingredients with no preservatives and created using genuine Indian recipes
- **Made With Joy Indian Yoghurt Drink** - an Indian yoghurt drink in the UK market, positioning as the drink of choice for those looking for a healthier alternative to on-the-go snacking. Based on ancient Indian science it brings together traditional British tastes with some Indian ingenuity to produce three flavours combining yogurt with fruit and Indian spices: mango, strawberry and holy basil, cardamom and rose. Made with pro-biotic, low in fat and using agave nectar instead of sugar.
- **Silhouette's Limited Edition Yogurt** - inspired by wild, exotic spices and fruits of hot climates including Mexico and Africa. A fat-free, no added sugar yoghurt in 2 flavours: vanilla and cinnamon, vanilla and marula.

### **Current and Future Product Trends**

Some common themes that featured in a number of products included:

#### ***Mood Foods***

- calm/soothe/balance
- energy/power/charge/invigorate
- revive/survive/pick me up/refresh
- wake up/jump start/start up
- de-stress/relax/wind-down
- cleanse/detox

#### ***Flavour Trends***

- superfruits – berries are still strong with the addition of pomegranate , acai and gogi berries
- coconut
- green tea
- spices e.g. ginger, cardamom, holy basil
- curry, soya sauce, seaweed, fresh fried garlic, Indian massala
- poppy seed and sundried tomato
- hot 'n' spicy

#### ***Health Benefits and Wellbeing Trends***

- functional foods
- naturalness
- low sugar, fat, sodium
- sugar replacements e.g. stevia, agave nectar
- wheat and barley grass, ginseng, ginkgo and guarana
- herbal extracts e.g. dandelion
- superfruits - pomegranate , acai and gogi berries

#### ***Other (specific to the dairy industry)***

- DAIRY reporter states that there is still plenty of room for innovation in the dairy product sector
- **Euromonitor** reported that drinking yoghurt represents the fastest growing yoghurt category years, a trend which is set to continue in the future

## ❖ Consumer Research

Information for this part was gained mainly from talking to owners of retail outlets such as Espresso/Frappé Bar at the Millennium Sports Centre and Tank Juice Bar in Albany Mall along with observations of their customers.

Common attributes that consumers are currently looking for in products include:

### ***Health and/or nutritional benefits***

- gluten free
- low fat, low sugar
- low GI
- fortification - Omega 3, probiotics, antioxidants, high fibre
- added fruit and vegetable intake 5+ a day
- organic
- superfruits

### ***Sports and well being enhancement***

- added benefits such as wheatgrass, extra protein
- flu fighting/immune boosting properties
- detox

***Datamonitor*** also highlighted the following developments and key trends that are impacting on the dairy market in China which gave useful information about consumer preferences:

- in 2010, China ranked second globally in terms of the number of new product launches in the dairy market, next only to the US
- milk represented the top category in new product launches in the Chinese dairy market in 2010, offering considerable scope for experimentation in terms of flavours and functional ingredients
- strawberry was the top flavour in all new product launches in the Chinese dairy market, followed by chocolate and peach
- the top claim was "no preservatives," reflecting Chinese consumers' food safety concerns
- other top claims such as "no sugar" and "high calcium" reflect the growing health consciousness among consumers in China

EasiYo's target market is diverse with the main purchaser being women buying for families. The actual consumers of EasiYo yoghurt vary ranging from young to elderly, male and female. New products are usually released initially on to the UK market for trial before landing on NZ shelves. Company expansion and product popularity have meant that EasiYo yoghurt is now available in Europe and Asia giving opportunities for specific markets such as:

- cultural sectors of UK - Indian, Middle Eastern, Eastern European, African, Asian
- babies/toddlers
- children - specific novelty flavour combinations
- teenagers/young adults
- sports people
- health conscience people

Additional benefits consumers may desire include:

- on the go snacking
- meal replacement

- convenience
- an innovative twist to tradition
- everyday snacking escape
- exciting health food with confident sophistication
- specialist flavours introduced to mass market
- perfect choice for breakfast, meal-on-the-go, or anytime rejuvenation

## ❖ Technical Research

Technical constraints and factors for consideration during development of a new yoghurt product included:

### ***The EasiYo Manufacturing Process***

As EasiYo yoghurt bases are sold in a dried form only dehydrated ingredients must be used to ensure they function successfully on existing machinery and production line. New machinery has recently been purchased which allows 'bits' to be incorporated into yoghurt bases, this has seen the introduction of Coconut 'n' Bits with more flavours currently in development. The addition of 'bits' into the yoghurt base gives EasiYo products a taste/texture profile that is closer to existing fresh yoghurt products of competitors.

### ***Ingredients***

**Milk powder** - Westland Dairy New Zealand milk powder is sourced from free range cows. Both whole and skim milk powders are used in varying ratios depending on the type of yoghurt base being produced. Generally the higher the percentage of whole milk powder used the creamier the made up yoghurt will be.

**Sugar** – castor sugar is used as it is finer and will dissolve more readily. No more than 90gm of sugar/1000ml yoghurt should be used as this will exceed the saturation point and 'setting' is not likely to occur. A minimal amount of sugar is preferable for nutritional claims, cost savings and total weight.

**Culture** - several cultures are used and all yoghurt bases contain acidophilus with some also containing probiotic cultures. The type of culture used will have an effect on the flavour of the final yoghurt e.g. sweet, sour. The ratio of culture to milk powder will also influence the final made up yoghurt. The greater the % of culture the thicker the yoghurt is likely to be and the longer the shelf life. If the culture ratio is not high enough the yoghurt may not set and it will not last as long.

**Flavours and Bits** - EasiYo have a large number of different flavours in their existing range and using these in combinations along with newly sourced flavours had the potential to make formulations more cost effective. When sourcing new flavour samples the following specifications include:

- Natural rather than NI/artificial (under NZ/AUS and EU regulations)
- Powdered vegetable extracts or flavours
- Preferably Halal certified
- If possible Kosher certified but not essential
- Non GMO
- bits should be freeze or air dried fruit/vegetable/herb pieces or flakes less than 10mm but 5mm size is optimal

Other factors to consider that may affect ingredient selection:

- enzyme activity may interfere with yoghurt making process during fermentation so some flavours, powders, bits may not work, e.g. orange has not, as yet, been a successful flavour

- ingredient availability
- ingredient cost
- shelf life
- vegetable and fruit powders are often expensive but if enough is used it may be possible to make 'real fruit/vegetable' claims
- some suppliers will customise ingredients but this will increase costs

### ***Allergens***

The only allergens permitted at EasiYo are soy and dairy. This means any ingredients containing nuts or gluten are not to be included in formulations. This may be overcome in the future by cleaning procedures but is not an option at present.

### ***Price***

During early trials, flavour was regarded to be one of the most important factors to take into consideration. Sourcing alternative flavours for cost reasons could be done later when a chosen concept was in further development stage. Approximate costing should be calculated at a certain price per sachet to ensure the product remains within budget.

### ***Final Formulation Weight***

Final sachet weights fall between 140 – 240gms. If less than 140gm filling will be difficult with current machinery and production. If more than 240gm the ingredients won't fit in the foil packets.

## **❖ Idea Generation**

A large number of potential flavour ideas and possible concept themes were developed, determined by flavour combinations of existing products from market research.

A recipe search of fresh yoghurt smoothies was also conducted to gather interesting and innovative flavour combinations.

It was also decided at this stage that the initial idea of vegetable based yoghurt was unlikely to have wide consumer acceptance without the addition of fruit and/or other familiar flavouring. The opportunity also existed for further line extensions in both the 'n bits' range and drinking yoghurt/smoothie lines with the introduction of the vanilla bean smoothie to the EasiYo range.

## **❖ Revised Brief**

To develop a new yoghurt base that has the potential to be marketed by EasiYo Products Ltd. Possible options include:

- a vegetable flavour
- a vegetable/fruit combination
- a drinking yoghurt/smoothie
- a yoghurt with inclusions

### ❖ Screening:

Initial ideas were screened based on research findings and factors from the exploration stage. Flavour combinations for a possible starting point included:

Vegetables	Fruit	Herbs/Spices/Other	Inclusions
<ul style="list-style-type: none"> <li>pumpkin</li> <li>carrot</li> <li>beetroot</li> <li>spinach</li> <li>cucumber</li> <li>celery</li> </ul>	<ul style="list-style-type: none"> <li>berry</li> <li>banana</li> <li>coconut</li> <li>pomegranate</li> <li>lime</li> <li>lemon</li> </ul>	<ul style="list-style-type: none"> <li>mint</li> <li>cinnamon</li> <li>ginger</li> <li>vanilla</li> <li>honey</li> <li>parsley</li> </ul>	<ul style="list-style-type: none"> <li>vanilla bean</li> <li>herb flakes</li> <li>berry bits</li> <li>coconut</li> <li>vegetable flakes/bits</li> </ul>

## STAGE 3: CONCEPT DESIGN

### ❖ Technical Research:

Initial bench top trials were carried out using fresh ingredients and made up EasiYo natural or vanilla base. A natural base was chosen to compliment a fresher, fruity type formulation and the vanilla base for a sweeter, dessert type formulation. After informal sensory testing and further consideration of preliminary research the following flavour ideas were chosen for further development:

Product Idea Concept	Rationale
Pumpkin and spice	<ul style="list-style-type: none"> <li>pumpkin powder available</li> <li>pumpkin flake inclusion had been sourced</li> <li>cinnamon/nutmeg traditionally associated with pumpkin pie so more familiar</li> <li>set or drinking potential</li> </ul>
Carrot and berry	<ul style="list-style-type: none"> <li>refreshing image</li> <li>association with health/nutrition</li> <li>carrot bits inclusion had been sourced</li> <li>set or drinking potential</li> </ul>
Beetroot and fruit (berry, banana and/or pomegranate)	<ul style="list-style-type: none"> <li>beetroot powder available</li> <li>use of trendy flavour combinations</li> <li>association with health/nutrition</li> <li>set or drinking potential</li> </ul>
Honey, ginger and mint	<ul style="list-style-type: none"> <li>association with health/wellbeing</li> <li>potential for inclusions</li> <li>set or drinking potential</li> </ul>
Raspberry and citrus (lemon or lime)	<ul style="list-style-type: none"> <li>refreshing image</li> <li>potential for inclusions</li> <li>set or drinking potential</li> </ul>
Rose, vanilla and spice	<ul style="list-style-type: none"> <li>exotic/innovative image</li> <li>in line with newly released drinking yoghurt products onto UK market</li> <li>likely to appeal to specific market</li> <li>potential for inclusions</li> <li>set or drinking potential</li> </ul>

It may be usual in many NPD processes to proceed at this stage with consumer focus groups to refine the product idea concepts to a final product concept. It was recommended that further experimentation should be carried out at this point to see if the ideas would be feasible once adapted for a dried formulation yoghurt base. Main factors to determine whether the formulations would be viable were in terms of setting successfully, flavour and the addition of any inclusions. Further informal sensory testing was conducted and minor modifications were made to improve flavour acceptability and intensity, reduce or increase sweetness or thickness or substitute alternative ingredients when provided by suppliers. It was from these trials that six different flavour concepts were created.

### ❖ Final Product Idea Concepts:



#### **Pumpkin, Vanilla and Spice**

A convenient on-the-go drink based on traditional pumpkin pie flavour with a hint of vanilla, honey and cinnamon. Real pumpkin powder and pumpkin flakes to support vegetable concept. Great for busy people of all ages, quick and easy with the benefit of live cultures.



#### **Carrot and Berry**

A refreshing combination that can be eaten as set yoghurt, a convenient breakfast drink or any time snack. Real carrot bits enhance vegetable intake and support vegetable concept. Great for health conscious people, particularly the young adult market.



#### **Beetroot and Pomegranate**

A contemporary new taste with a distinctive and sophisticated touch of modern opulence. Can be eaten as set yoghurt, a convenient on-the-go drink or snack for anytime rejuvenation. Quick and easy for all ages with the benefit of live cultures, real beetroot powder and no artificial colouring.

**East Meets West - Rose and Cardamom**

Based on traditional Indian yoghurt lassi  
Unique taste  
Fragrant and aromatic  
The ultimate of sophistication  
A touch of the exotic

Great for busy people  
Quick and easy with the benefit of live cultures  
Convenient on-the-go drink  
Anytime rejuvenation

**Rose and Cardamom**

A unique taste based on a traditional Indian yoghurt lassi drink with fragrant and aromatic flavour notes. A touch of the exotic and the ultimate in sophistication. A convenient on-the-go drink or snack for anytime rejuvenation for the young adult female market.

**Honey, Ginger & Mint**

**Calm**  
**Soothe**  
**Balance**  
**Relax**

Quick and easy with the benefit of live cultures  
Snack or meal replacement  
Anytime rejuvenation

**Honey, Ginger and Mint**

A convenient on-the-go drink to enhance well being and restore balance to busy lifestyles. Quick and easy for all ages with the benefit of live cultures, honey and real mint flakes.

**Raspberry, Coconut & Lime**

**Everyday Snacking ESCAPE**

**Take ONE!**

**zesty**

**Raspberry, Coconut and Lime**

An everyday snacking escape that will refresh and revitalise. Can be eaten as a convenient snack for anytime rejuvenation. Quick and easy for all ages with the benefit of live cultures and real raspberry pieces.

## ❖ Product Concept Idea Formulations

<b>Pumpkin, Vanilla and Cinnamon</b>		
<b>Ingredients</b>	<b>gm</b>	<b>%</b>
milk solids (whole)		
sugar		
culture (sweet)		
honey powder		
pumpkin flavour		
pumpkin powder		
honey flavour		
vanilla flavour		
cinnamon		
pumpkin flakes		
<b>Beetroot and Pomegranate</b>		
<b>Ingredients</b>	<b>gm</b>	<b>%</b>
milk solids (whole)		
sugar		
culture (sour)		
beetroot flavour		
pomegranate flavour		
vanilla flavour		
ginger		
<b>Honey, Ginger and Mint</b>		
<b>Ingredients</b>	<b>gm</b>	<b>%</b>
milk solids (whole)		
milk solids (skim)		
sugar		
Culture (sour)		
honey powder		
honey flavour		
ginger		
mint flavour		
mint flakes		

<b>Carrot and Berry</b>		
<b>Ingredients</b>	<b>gm</b>	<b>%</b>
milk solids (whole)		
skim milk		
sugar		
culture (sour)		
carrot flavour		
vanilla flavour		
mixed berry flavour		
carrot flakes		
<b>Cardamom and Rose</b>		
<b>Ingredients</b>	<b>gm</b>	<b>%</b>
milk solids (whole)		
sugar		
culture (sweet/sour)		
rose flavour		
cardamom		
vanilla flavour		
<b>Raspberry, Coconut and Lime</b>		
<b>Ingredients</b>	<b>gm</b>	<b>%</b>
milk solids (whole)		
milk solids (skim)		
sugar		
culture (sour)		
honey powder		
honey flavour		
raspberry flavour		
coconut flavour		
lime flavour		
Berry bits		

## ❖ Further Consumer Research - Focus Groups

Two focus groups were conducted to determine the acceptability of the product concept ideas. Ages ranged from 20 to 55 with the majority of participants female.

Analysis is as follows.

### **General Discussion**

#### ***What do you think of the concept 'vegetable' yoghurt?***

Wouldn't label as a yoghurt

Seems weird

If the vegetable was sweet like carrot, may be more associated with yoghurt

#### ***Would you say this is a new concept?***

Definitely a new concept

#### ***In what types of situations do you see vegetable yoghurt as a marketable product?***

Added health benefits of the vegetable, or just as a new flavour?

#### ***What types of people do you think would buy or consume vegetable yoghurt?***

Good for health conscious people, into sports

Good for babies/children and the elderly

#### ***What do you think of vegetable/fruit yoghurt combinations?***

Might be nice, really nice

More acceptable than just a vegetable yoghurt

#### ***What types of vegetables?***

Sweet ones

Carrots, pumpkin, kumara

#### ***What types of fruit?***

Quite like the idea of banana, as you don't really get like a banana yoghurt with the chunks like in strawberry and berry yoghurt – that's what makes it more appealing, with the chunks

#### ***Do you see a different market or consumer for a fruit/vegetable yoghurt combination and what sort of market would this be?***

It could be more popular maybe as people aren't that familiar with the concept

More willing to try vegetable and fruit than just vegetables

Kids

#### ***What do you think that a consumer looks for in a yoghurt product?***

Don't you pick up the yoghurt and check that it's got the acidophilus

Calcium

If you did market the vegetable yoghurt you could market it as a good source of calcium and vitamin D, and the vegetable benefits

#### ***What gaps do you see on the market for yoghurt type products?***

Yoghurt with the cereal on top for breakfast

Mammoth ones as well – the 'man' yoghurts and they've got quite interesting things like pips and like grains in there as well. That could be quite cool but like the man ones are really huge and thick yoghurt – there's nothing like a normal yoghurt.

Nuts – that'd be nice

#### ***What do you see as the most important features for set type and smooth yoghurts?***

I quite like yoghurts as they're easier to take to lunch

I quite like the fruit chunks, as you said, in the set yoghurts as opposed to the drinking yoghurt that's completely smooth

#### ***What types of yoghurt flavours would you like be able to purchase that are not currently available?***

Banana – you only get the artificial kids flavour

### **Summary - General Discussion**

Participants in the focus groups all agreed that the concept of a vegetable based yoghurt product was a very new concept and that having a combination of vegetable and fruit in yoghurt may be more acceptable, and may be nicer than yoghurt containing only vegetables. If vegetables were to be included in a future yoghurt product, sweeter vegetables such as carrot, pumpkin and kumara were highlighted as possibly being acceptable to be included in such products. The initial reaction to producing vegetable, as opposed to fruit based yoghurt was that this would be 'weird' and that participants would not specifically label this as a yoghurt product – more of a dip, or savoury product.

The potential health benefits of adding vegetables to yoghurt were highlighted by the groups, with this being mentioned as a possible marketing strategy. The idea that such products may appeal to children and older adults when designed as a fruit/vegetable yoghurt combination was also mentioned by the groups – as well as being a good source of acidophilus cultures, calcium and additional vitamins found in vegetables rather than fruit.

The potential addition of 'chunks' of fruit and vegetable within the yoghurt products was mentioned throughout the group discussions, with chunks of fruit, vegetables and also cereals and nuts and grains being highlighted as particularly appealing in a yoghurt based product. Gender preferences within yoghurt products were also revealed, with some of the current products on the market specifically targeting a male audience, with these being both larger and thicker in composition. The 'chunks' in yoghurt was thought acceptable for the set type yoghurts, whereas the group preferred smooth yoghurt as a drink.

### **Concept Boards – Pumpkin, Vanilla & Spice**

#### ***What message or feeling are you getting from this concept?***

It's really healthy

I think it'd be quite popular with women wanting to lose weight

Maybe it's quite filling

Meal replacement

#### ***What do you think of the concept?***

I think it sounds nice

With spice as well, I think that's quite a nice idea

And that to me it sounds nice because the vegetable doesn't stand out heaps, it's sort of in combination with other more familiar flavours

#### ***How does it change your perception of vegetable based yoghurt?***

Yes

I was thinking like broccoli yoghurt

#### ***What might make the concept more appealing?***

I can't picture the taste

Yeah

Pumpkin and vanilla and spice all being together

### **Summary - Pumpkin, Vanilla & Spice Concept**

The initial reactions of the groups towards a pumpkin, vanilla and spice yoghurt were positive, with group members highlighting health benefits, the appeal to female consumers and its potential for a meal replacement due to sounding 'filling'. This combination of flavours appeared to change participants' initial reaction to vegetable yoghurt, due to the inclusion of vanilla and spice.

Familiarity with flavours and flavour combinations was highlighted as important, as the vegetable

did not immediately stand out. The addition of familiar flavours provoked a positive reaction from the group, with group members stating that they thought the combination of flavours sounded appealing.

### **Tasting – Pumpkin**

#### ***How would you describe the appearance of the product?***

I like how it's not just one colour. Lots of colours in there, like I can see a bit of pumpkin.

And it's not bright orange

Quite a traditional yoghurt colour

#### ***How would you describe the texture and flavour of the product?***

Is it being sold as a drink?

It's not as thick as normal yoghurt

It's quite good how you can eat it with a spoon or drink it, nice consistency

I quite like that you can drink it, it's really annoying when you're at uni and you don't have a spoon

I like the flavour

It's actually quite subtle

If I didn't know it was pumpkin, I probably wouldn't have guessed

It's actually quite nice – I was a bit scared

#### ***What do you think of the concept?***

Accept it a bit more – I think it would all depend on your marketing and what vegetables

#### ***How has your original perception of the concept changed?***

Yes

#### ***How could the product be improved?***

I prefer thicker

Is it like a specific spice in there like cinnamon or just general

If you said cinnamon it might be nicer

I can't actually taste the vanilla in the yoghurt, I think you know that the vegetable yoghurt is quite a good concept and I think the vanilla is there to make it more appealing, so I was expecting more sort of vanilla tasting so that makes the pumpkin taste nice - but I can't really taste any vanilla here.

Now that you've said it yeah, I can kind of taste the honey

### **Summary – Pumpkin Tasting**

After tasting the product, the groups had a positive reaction to the combination of flavours. Initial impressions of the appearance of the yoghurt suggested that the groups found this appealing due to the fact the yoghurt was not bright orange, traditionally associated with pumpkin but more subtle in hue, with flecks of colour making this appear a more natural product. After initially being wary of tasting the product, the groups found the taste subtle and pleasant – with no overpowering pumpkin flavour being present. The consistency was found to be appealing to most, as this product could either be used as drinking yoghurt or eaten with a spoon. Convenience was stated as an advantage of the product, due to not always having a spoon available.

When talking about the combination of flavours in the product, the groups thought that a specific spice – such as cinnamon may be more appealing from a marketing perspective. This was due to cinnamon being a familiar flavour, with 'spice' being more ambiguous in terms of what to expect from the taste. Some members of the groups found the vanilla flavour to be too subtle to carry the pumpkin in the product. It was thought that the vanilla content needed to be increased to make the addition of the vegetable in the yoghurt more appealing to consumers. Honey was also mentioned as being present in the product, with group members highlighting that this could also be included in

the marketing of the product as an ingredient. Over all, the concept of including pumpkin in a yoghurt product was found to be more acceptable after tasting the flavour combination.

### **Concept Board – Carrot & Berry**

#### ***What message or feeling are you getting from this concept?***

I like how this one is marketed like really fun

It's targeting young people

I like the whole healthy concept as well

It's quite an interesting flavour combination, carrot and berry

#### ***What do you think of the concept?***

Like I'm struggling to picture normally eating carrots and berries together – and the same with the pumpkin and vanilla, but when you, I imagine like when you try it you change your perception. It's just hard like seeing the berries and the carrots on the same page and then thinking of eating it together.

#### ***How does it change your perception of vegetable based yoghurt?***

The pumpkin one when I saw the flavours I straight away thought of like pumpkin pie like a desert type thing and I wasn't sure with this if this would be more of a dessert type yoghurt or whether it's targeting healthy people and you're getting real pumpkin in there. This one is quite different; it's more sort of like it is more of a healthy thing rather than like a dessert.

It could be changed to more like carrot cake which has more like a vanilla-y...

And nuts

Yeah because the other one was neat how it had the spice which was unexpected and it took you away from the fact that it was like pumpkin – I was like ooh spice, you know.

#### ***What might make the concept more appealing?***

Maybe like another one more ingredient.

It would be quite nice the carrot with nuts

That would be good

It would be a bit different

Carrot, vanilla and walnuts I reckon

Or carrot and pineapple and walnuts as they're often like together in carrot cake

What about like a lot of health conscious people are into superfoods and stuff at the moment so even like chia seeds or ummm, you know like, ummm wheatgrass – I mean maybe not wheatgrass but things could be added to a yoghurt

Yeah because quite often at like those juice bars or smoothie bars you can get added shots of different things like wheatgrass

Yeah and barleygrass, spirulina

There's a lot of people making those types of things themselves and if they could buy it premade so that could work

### **Summary - Carrot & Berry Concept**

Participants liked that this yoghurt product was marketed in a way that way both healthy and fun – and thought that this would be aimed at health conscious, younger consumers. In terms of the concept of the flavour combination, this was more difficult for the groups to accept. The idea of eating carrots and berries in the same product appeared a difficult concept for some of the group members, with some participants stating that like the pumpkin, vanilla and spice combination it was difficult to picture how this would actually taste. This suggests that the groups didn't have a familiar reference point for the flavours of the product and therefore that familiarity in terms of texture and taste are important in the marketing of a new food product.

The groups also referred to the pumpkin, vanilla and spice yoghurt when thinking about the concept of a carrot and berry yoghurt. Whereas an implicit association between the yoghurt flavours in the pumpkin concept were paired with the idea of pumpkin pie, and dessert style yoghurt; the carrot and berry yoghurt was thought to be healthier style yoghurt. The groups referred to carrot cake when thinking about this concept, and felt that the addition of vanilla and nuts may make this concept more appealing to a wider audience, with the emphasis again being on a dessert as opposed to drinking style yoghurt.

The idea that this yoghurt was a health-oriented product then highlighted the current 'superfoods' trend – with the addition of ingredients specifically used for their health benefits such as wheatgrass and chia seeds being suggested as other potential ingredients for this vegetable and fruit yoghurt flavour combination. Again, convenience was highlighted as important for this concept as it was suggested that many individuals make products with added 'superfoods' at home, with none being readily available in the supermarket as premade products.

### **Carrot & Berry – Tasting**

#### ***How would you describe the appearance of the product?***

I wouldn't even know it was carrot, but yeah, I wouldn't want it bright orange either  
I like how it's got the little chunks in it

#### ***How would you describe the texture and flavour of the product?***

That's nice, it adds to the flavour with like a burst of flavour  
I know some people like bits and some people don't, but I really like – it feels like I'm actually eating a yoghurt  
I quite like how it still sort of has that like that nice sort of tangy taste that yoghurt has. Yeah it still has that too it, whereas the other one was quite sweet – that yoghurt sour taste wasn't as obvious.  
And I think the berry flavour is kind of subtle

#### ***What do you think of the concept?***

Mmm yeah  
You can't taste the carrot – I don't know if that's just me  
Definitely I can taste bits of carrot  
The flakes  
(The dried carrot is actual bits of carrot) – ohh, mmmm it's really nice  
Mmm yeah when you eat the actual chunks by themselves

#### ***How has your original perception of the concept changed?***

I dunno – maybe not have the berries in it?

#### ***How could the product be improved?***

That could be like a vanilla-y yoghurt with carrot chunks in it  
I like that it didn't have the one thing I don't like about berries, are the seeds. I was thinking oh berries and seeds.

### **Summary - Carrot & Berry Tasting**

After tasting the product, the groups found the appearance to be very much like traditional yoghurt products, with the addition of the carrot bits being favourable. The groups commented that this made it feel like you were actually eating a yoghurt, and that the bits of dried carrot added a burst of flavour to the product. The subtlety of the berry flavour was highlighted and the groups found this yoghurt to be less sweet than the previous sample. This was found to be positive, with the groups finding the more tart yoghurt taste being beneficial to the product. Some group members

mentioned that they could not taste the carrot in the yoghurt – however found that when tasting the bits of dried carrot, this did taste of carrot and was reported as being pleasant by the groups. When asked how the concept could be changed or improved, the groups felt that the yoghurt may be nicer with vanilla as opposed to berries, in-keeping with the idea of a dessert or carrot cake style yoghurt. It was also noted that the seeds in berries are sometimes unpleasant, so changing the berries for another ingredient may be beneficial to the marketing of the product.

#### **Concept Board - Beetroot & Pomegranate**

##### ***What message or feeling are you getting from this concept?***

Oh yum

I really like the ideas of those two real red fruits, it just really appeals

Sounds really like luxurious, kind of pomegranate and beetroot

I like the pictures on this one

##### ***What do you think of the concept?***

I dunno I can just picture them together, because they're the same colour so then I can accept it more I guess.

They're two quite different flavours, like the other ones with the berry I'm quite used to but these are two quite unusual flavours

(Do you see it as quite 'trendy'?) Yeah definitely with the pomegranate

Definitely for females

It's quite pinky and quite girly

##### ***How does it change your perception of vegetable based yoghurt?***

I don't think of the vegetable so much

That combination is more subtle and I can, I wouldn't mind trying that and seeing what it's like

#### **Summary - Beetroot & Pomegranate Concept**

The initial reaction of the groups to this concept was positive – with colour being particularly appealing with both the beetroot and pomegranate. The two ingredients being the same colour appeared to provoke a particularly positive reaction, with group members stating that as the fruit and vegetable were both the same colour, this made the overall concept more acceptable and they were able to picture the two ingredients in one yoghurt product. The colours were also thought to make the product more feminine and 'girly', with the target consumer group thought to be females. The flavours were highlighted as being unusual, but were thought to be modern and 'trendy' flavours in line with the current 'superfoods' trend. The combination of two ingredients with the same colours, together with yoghurt products commonly being pink colours in berry yoghurt seemed to make this more familiar and acceptable to the group; with the colour detracting from the addition of the vegetable component.

#### **Tasting – Beetroot & Pomegranate**

##### ***How would you describe the appearance of the product?***

It's more pink than I pictured

Yeah – it looks more like berry, like strawberry or something

##### ***How would you describe the texture and flavour of the product?***

Mmm it's nice

It's a good texture

Yeah it's nice

It's quite different to any yoghurt that I've ever tasted but I think it really works

I like it

Yeah

There's something different about it

It's sweet but not overpowering

I think that this is the best so far

It is sweet, but I cannot taste any beetroot flavour

I find this the strongest of the flavours

I can taste the beetroot

Yeah – I can taste the beetroot

I really like it

Me too

***What do you think of the concept?***

You could actually put the pomegranate bits in it so there's little red bits or would that not work?

Definitely mention that (reference to the all-natural beetroot powder)

Yeah there's little point trying to make it dark just by adding like the artificial colours to it

***How has your original perception of the concept changed?***

Definitely would appeal to people who want to steer clear of things with like things added to the yoghurt

***How could the product be improved?***

Yeah I guess that although the bits in it could be nice sometimes the smooth one is probably more versatile

Is it more to avoid being high in sugar?

### **Summary - Beetroot & Pomegranate Tasting**

This yoghurt received a particularly favourable reaction from the group members, with initial reactions focusing on the colour of the product. This was found to be pinker than the anticipated red colour, but was strongly associated with strawberry and other berry flavoured yoghurts.

The groups reported liking the texture of the yoghurt and that it was different to any other yoghurt product that they've tasted before, and that they liked this. The taste was found to be sweet, but not too overpowering – with some group members finding the beetroot taste to be very subtle and others stronger. However all group members agreed that this was a particularly nice tasting yoghurt product.

When asked about the overall concept, the groups liked that the colouring was 100% natural and felt that this should be used when marketing the product. It was suggested that this would particularly appeal to consumers avoiding any artificial colours or flavours added to food products, so the health benefits and naturalness of this yoghurt product were found to be appealing to the groups.

### **Concept Board – Rose & Cardamom**

***What message or feeling are you getting from this concept?***

It sounds like it would make a really nice yoghurt

Yeah I almost want to use it for like baking or something

Sounds beautiful

Definitely girly

This one does seem to me as though it would be more of a kind of drink. Maybe because I imagine it being smooth or anything like rose water.

***What do you think of the concept?***

Do you think many people would know what cardamom is?

Or be able to identify like a particular flavour with it, maybe not

It sounds nice

***How does it change your perception of current yoghurts on the market?***

They're quite boring

Yeah it kind of fits in with like the newer yoghurts that have been produced, like the dessert type yoghurts

***What might make the concept more appealing?***

I guess you could advertise it as a different alternative to a dessert, like a healthy dessert. That would be... I mean a lot of people are trying to eat more healthily etc

**Summary - Rose & Cardamom Concept**

The initial reaction to the concept of a rose and cardamom flavoured yoghurt was positive across the groups, with participants stating that they thought the concept was a feminine and 'girly' oriented product. This product was perceived as being more of a drink from the concept board, although concerns were highlighted about potential understanding what cardamom is, or what it would actually taste like.

When comparing to yoghurt products currently available on the market, the concept of rose and cardamom yoghurt was found to make other yoghurts appear boring; and that this product would fit with the newer dessert-type yoghurts available on the market. The idea that this yoghurt may be a healthy alternative to a dessert was raised, with the groups stating that individuals are now taking more notice and care about what they eat, with consumers having more health and nutritional awareness than previously.

**Tasting – Rose & Cardamom**

***How would you describe the appearance of the product?***

It looks thinner

More like a drinking yoghurt

***How would you describe the texture and flavour of the product?***

It's got a very distinct flavour to it

Kind of like Turkish delight

Yeah – I like it

Yeah it is like Turkish delight

It's a lot runnier this one as well, isn't it?

***What do you think of the concept?***

I can definitely picture this as like a dessert

I think that it might appeal to a narrower target group as opposed to some of the other ones like the pumpkin and that one might appeal to more... yeah.

***How has your original perception of the concept changed?***

I reckon this would appeal to females again, and sort of in their twenties onwards – sort of like that middle age group as opposed to older people or young children. The pumpkin one was quite sweet so I think children might like that one as well.

***How could the product be improved?***

I'd probably make it thicker

Yeah

Because if it's like a dessert yoghurt you'd want it thicker

Well on here there's a picture of lassi, or however you say it, so that's more of a drink aye – is it marketed as more of a drink or?

**Summary - Rose & Cardamom Tasting**

After tasting the product sample, the groups found the texture of this yoghurt to differ from others as it was runnier in consistency – however in terms of flavour, the groups generally likened this to a dessert style product. The flavour combination of the rose and cardamom was found to be very

distinct, with group members comparing this to Turkish delight. The overall reaction to the product was positive from the group, with favourable reactions to the texture and flavour combination of the yoghurt.

After tasting the product, the groups thought that this flavour combination would appeal to a narrower consumer group in comparison to the previous samples tasted such as pumpkin, vanilla and spice. The groups preferred the concept of the flavours for a more healthy dessert, luxury style yoghurt product – again particularly targeting female consumers. Although the potential target market was thought to be narrower in scope, the group found the product to be appealing to this groups, with the product being improved by being made thicker as dessert yoghurt as opposed to a drinking style yoghurt or lassi drink.

#### **Concept Board - Honey, Ginger & Mint**

##### ***What message or feeling are you getting from this concept?***

I'd buy it if I had a cold, like really healthy, looking after my body type product

The mint is a surprise for me, when you see honey and ginger it sounds familiar but then mint I'm like trying to imagine how that would fit with honey and ginger

##### ***What do you think of the concept?***

Interesting

I think it sounds therapeutic rather than a normal food, you know so I'm not sure how people would perceive the yoghurt as yoghurt but maybe consider it as a supplement or you know...

Like herbal tea

...yeah

##### ***How does it change your perception of current yoghurts on the market?***

Only if I wanted to pick something more looking after, not just as a source of calcium but more of a source of other things that...

##### ***What might make the concept more appealing?***

Can't tell until I try it

The mint being there is a bit hard

The mint is a bit hard to picture – I think also it's like a colour thing I my head. The honey and the ginger is the same colour, but the mint is green and it's just like

#### **Summary - Honey, Ginger & Mint**

The concept of a honey, ginger and mint yoghurt product was found to be of a therapeutic, as opposed to regularly consumed food product – with the ingredients primarily being associated with health, healing and dietary supplementation rather than as part of a daily food routine. The initial reaction to this flavour combination as a yoghurt product was tentative, with 'interesting' being used to describe the overall concept.

The concept was perceived as being a product included in the diet for health and potential supplementation from therapeutic ingredients, in addition to regular dietary behaviour. This concept was not perceived to be a replacement for existing products on the market, or the concepts behind their marketing and/or flavour combinations.

The groups found the concept hard to imagine in the first instance, with group members stating that the inclusion of mint and the idea of it being paired with honey and ginger made the concept difficult to picture. Again, colour was found to be a major factor in the acceptability of the concept, with ingredients of the same or similar colours being more readily accepted (as in the beetroot and pomegranate combination) than yoghurts containing ingredients of complementary colours (such as the green mint and yellow honey and ginger). The idea that colour also impacts upon the potential

acceptability of a new product concept was therefore highlighted by the groups. The groups also had difficulty in finding ways that the concept may be made more appealing, finding the initial concept hard to grasp in terms of the colour and flavour combinations.

#### **Tasting – Honey, Ginger & Mint**

##### ***How would you describe the appearance of the product?***

That's strong

The little bits with mint

Are they like little mint flakes?

I think that's quite cool

##### ***How would you describe the texture and flavour of the product?***

It's very strong

After a few spoonfuls... I don't think I could have a full jar of it

Mmm just heaps of flavours

It tastes like mint sauce to me

It looks like mint sauce to me

##### ***What do you think of the concept?***

Yeah maybe that's what it is as well – I was actually almost picturing it to have bits of ginger in it, like little bits of ginger so I was quite surprised to see the mint

Just honey and ginger could be nice, maybe without the mint

It's pretty smooth

Definitely it hit me the least liked so far

##### ***How could the product be improved?***

Not so strong

Maybe drop, like, the mint

I couldn't taste the mint because it was all so strong... so

Maybe add a bit more sweet

#### **Summary - Honey, Ginger & Mint Tasting**

This flavour combination received the least favourable reaction from the focus groups, with group members finding the overall flavour intensity too strong for a yoghurt product. Although the addition of the mint flakes provoked a favourable reaction in terms of the appearance of the product, after tasting the sample, participants found the flavours too strong and too complex – with a number of flavours competing with each other in the product. The colour was found to be similar to that of mint sauce, and group members found the taste to be similar.

The concept of this flavour combination of honey, ginger and mint was found to be unappealing to the group, as group members reported expecting to see pieces of ginger in the yoghurt as opposed to the mint flakes included. The texture was found to be smooth, which was positively received within the group – however the mint flavour was found to be too strong for a yoghurt product.

When asked how the product could be improved, all group members agreed that mint should be removed from the yoghurt, as this flavour was too strong. The yoghurt was also found to be too savoury in flavour, with the group suggesting that this product needed to be sweeter to keep it as a yoghurt style product as opposed to a savoury dip.

#### **Concept Board – Raspberry, Coconut & Lime**

##### ***What message or feeling are you getting from this concept?***

I really like the idea of that one

Really fun, like vibrant colours as well, quite beachy

Yeah I quite like the tropical coconut

***What do you think of the concept?***

Yeah definitely

I think that combination of flavours is most appealing to me, like, yum that sounds really yum

I think the name is more close to the normal like fruit combination rather than vegetable

I think this is more likely to appeal to a wide range of consumers

***How does it change your perception of current yoghurts on the market?***

The name itself sounds so flavoursome so you already sort of expect what you're going to taste – it sounds really tasty

Yeah with some of the other ones you had no idea what to expect

***What might make the concept more appealing?***

Maybe as a drink

I was going to say this one sounds like a dessert to me but it could go either way

**Summary – Raspberry, Coconut & Lime Concept**

The concept of raspberry, coconut and lime yoghurt immediately received a positive reaction from the group, with group members stating that they found the initial concept fun, tropical and associated the product with beaches and holidays. This was also found to be a more familiar concept in terms of the flavour combinations. All group members agreed that this was a particularly appealing concept in terms of the marketing and the combination of the flavours, and much more familiar and similar to the fruit-based yoghurts currently available on the market. Group members also agreed that this yoghurt product was much more likely to appeal to a wider consumer base than the previous yoghurt flavour combinations – potentially due to the familiarity of the ingredients in the product.

The familiarity with the ingredients also allowed consumers to be able to imagine what the final product would taste like, with group members finding the combination of flavour particularly appealing. It was also highlighted that in previous yoghurt samples the group did not know what to expect when given the concept of some of the flavour combinations – however with this product the group found it easy to anticipate the final product. In contrast to other products, the group had no preference as to whether this product would be marketed as a drink or a set, dessert-style yoghurt, stating that with the combination of flavours, this product would work in either style.

**Tasting – Raspberry, Coconut & Lime**

***How would you describe the appearance of the product?***

I like the colour of it

Smells really nice too

Yeah it does, it smells quite nice

And like the look of the raspberry in there

***How would you describe the texture and flavour of the product?***

It's really yum

I like that it's got bits in it as well

I quite like it though, with the seeds

They're not like big

I think all the flavours combine well together, the ratio of flavours is right

And with the seeds it feels like you're eating an actual berry rather than just food

Tastes really fresh

***What do you think of the concept?***

I mean that would definitely sell

I think it would be really popular  
 Especially with the colours that you've used  
**How could the product be improved?**  
 Not really  
 I thought it was really good

### **Summary – Raspberry, Coconut & Lime Tasting**

This yoghurt product received a positive reaction from the group – with the appearance being noted as particularly appealing, in addition to the smell of the product. The group liked the fact that the product had the fruit 'bits' in it and upon tasting the product found it particularly nice. The group thought that the balance of the raspberry, coconut and lime were in equal proportion and that the flavour ratios were right for the product. The freshness of the product was commented on, with group members finding the product refreshing and pleasant to taste.

The consensus of the group was that this product would definitely sell and be popular if introduced to the market. The group particularly liked the initial concept board, and commented on the use of colours in the marketing of the concept as particularly appealing. No improvements were suggested for the product, with all group members stating that the yoghurt product was really good, and that the flavour, texture and marketing all appealed to them.

### **Favourite**

That one

And the beetroot

That's quite good as well because one is sort of like smooth, and the other one does have like chunky bits in. One's got the vegetable in and one's just more fruity.

### **Any flavour combinations that would like to see?**

Rhubarb, berry and apple – I don't know if there's already one like that

That would be quite nice

I think the carrot one would be quite nice if it had like spices in as well and maybe like nuts or something

And like as said with the bits of mint, I was expecting bits of ginger – that could be quite cool as well, as opposed to the mint.

So ditch the mint

Banana – you could have like a smoothie

Or even like a spice or something

### **Summary - Overall**

The overall consensus of the group was that the raspberry, coconut and lime yoghurt was a particular favourite of the group, with the beetroot and pomegranate yoghurt concept also being a favourite. The reasons for this were that the texture of one was smooth (beetroot and pomegranate) and the other had fruit bits in it (raspberry, coconut and lime) and that one of the yoghurts had the vegetable component and the other was more of a traditional fruit style yoghurt. In addition to this, the impact of colour upon the acceptability of the vegetable yoghurt concept was also highlighted in the tasting session, which is potentially one factor to be aware of in new product development. The similarity of colour between the fruit and vegetable components appeared to make the product more cognitively acceptable for the consumers than fruits and vegetables of very disparate colouring.

In terms of other potential flavour combinations, rhubarb was mentioned as being a flavour currently unavailable in many yoghurt based products, together with banana yoghurt. The addition of other ingredients such as superfoods and nuts were also highlighted as potentially being appealing in new yoghurt products. The group were all in agreement that mint should not be a component in sweet yoghurt based products, however liked the idea of spices such as cinnamon, cardamom and ginger added to such products.

**(Transcribed by Heather Bunting)**

### ❖ Final Concepts For Recommendation

Based on the feedback from the focus groups the most popular product concept ideas fell into 3 separate yoghurt types:

- Vegetable/fruit based yoghurt – Beetroot and Pomegranate
- Drinking yoghurt – Rose and Cardamom
- Yoghurt with inclusions – Raspberry, Coconut and Lime

***Beetroot and Pomegranate*** - a contemporary new taste with a distinctive and sophisticated touch of modern opulence. Can be eaten as set yoghurt, a convenient on-the-go drink or snack for anytime rejuvenation. Quick and easy for all ages with the benefit of live cultures, real beetroot powder and no artificial colouring.

From the focus group:

- received a particularly favourable reaction from the group members, with initial reactions focusing on the colour of the product
- group liked the texture of the yoghurt
- different to any other yoghurt product tasted before
- found to be sweet, but not too overpowering
- group liked that the colouring was 100% natural and felt that this should be used when marketing the product

This concept meets the initial brief of being a vegetable based yoghurt, the flavour combinations are in line with current flavour trends with both beetroot and pomegranate featuring in many new food products, recipe books and restaurant menus.

The product has an interesting flavour combination and is unique to other yoghurts on the market. The concept could be produced as an extension of the drinking yoghurt range or as a new range consisting of fruit/vegetable combinations in a thicker set type yoghurt.

Pomegranate is sought after by many consumers, the global market from August 2009 until July 2010 rates it top at 51.2%, followed by Acai and Goji. (Source: **Innova Market Insights**).

Beetroot is known for its health benefits particularly its effect on blood pressure and is also often referred to as nature's powerhouse.

Other feedback that has been gained from people who have lived in or visited the UK indicates that both beetroot and pomegranate are widely recognised and consumed fruit and vegetables (in comparison to pumpkin which is often referred to as cattle fodder).

Recently released fruit/vegetable juices (overseas and in NZ) include either or both beetroot and pomegranate.

**'The Collective'** have released a cherry and pomegranate fruit flavoured yoghurt.

**Activa** have just launched beetroot flavoured yoghurt in Russia!

***Rose and Cardamom*** - a unique taste based on a traditional Indian yoghurt lassi drink with fragrant and aromatic flavour notes. A touch of the exotic and the ultimate in sophistication. A convenient on-the-go drink or snack for anytime rejuvenation for the young adult female market.

From the focus group:

- the texture of this yoghurt differed as it was runnier in consistency
- in terms of flavour, it was likened to similar dairy dessert style products
- flavour combination of rose and cardamom distinct, with group members comparing this to Turkish delight
- overall reaction to the product positive
- favourable reactions to the texture and flavour combination

This concept meets the revised brief of a new smoothie yoghurt drink. Alternatively a thicker yoghurt in this flavour combination would fit well into a new dessert style range.

The flavour combinations are in line with current flavour trends with cardamom in particular featuring in many new food products, recipe books, and restaurant menus.

The introduction of this flavour combination on the UK market would coincide well with recently released competitors' products e.g. ***Savera Indian Dairy Range*** by Arla foods, ***Schmoo Yoghurt Lassi Drink, Made With Joy Indian Yoghurt Drink***.

On the New Zealand market, Bliss yoghurt by Cyclops, has released a Cardamom and Mango yoghurt.

***Raspberry, Coconut and Lime*** – an everyday snacking escape that will refresh and revitalise. Can be eaten as a convenient snack for anytime rejuvenation. Quick and easy for all ages with the benefit of live cultures and real raspberry pieces.

From the focus group:

- received a positive reaction from the group
- appearance being particularly appealing, in addition to the smell of the product
- group liked the fruit 'bits' in it and upon tasting the product found it particularly nice
- balance of the raspberry, coconut and lime were in equal proportion and that the flavour ratios were right for the product
- refreshing and pleasant to taste
- consensus of the group was that this product would definitely sell and be popular if introduced to the market

This concept meets the revised brief of a new smoothie yoghurt drink or a yoghurt for the 'n' Bits range, or both.

The flavour combinations are in line with current flavour trends in particular coconut and continuing popularity of raspberries in many food products.

The lime gives a refreshing contrast to the other flavours. The coconut provides opportunity for line extension to add to the popular Coconut 'n' Bits range and the raspberry bits for additional products with inclusions.

Competitor's products include ***Actimel***, a new generation of probiotic drinks by Danone, in 10 flavours including Coconut and Bliss yoghurt by Cyclops have Coconut and Pineapple Yoghurt.

## ❖ Final Concept for Development

Over discussion with Bon, Tracy and Zhara it was determined that all three concepts would fit well alongside EasiYo's existing product range.

The Raspberry, Coconut and Lime within the 'n' Bits line, the Rose and Cardamom as an addition to the Smoothie yoghurt drink as a complimentary addition to the Vanilla Bean Smoothie. The Beetroot and Pomegranate would require a new range and more than likely clever marketing to attract potential customers to 'buy in' to the concept.

All three concepts needed little if any modification for flavour and texture if they were to be selected for the end product that had been proposed apart from the Raspberry, Coconut and Lime required a slightly thicker texture to be served as a set yoghurt.

As the original brief asked for the development of a vegetable flavour yoghurt it was decided to use that concept as the final idea for final sensory. The decision to swap the names of ingredients was also thought to be beneficial as a way of making the idea more acceptable to consumers.



### ***Pomegranate and Beetroot Drinking Yoghurt***

***A contemporary new taste with a distinctive and sophisticated touch of modern opulence.***

***A convenient on-the-go drink or snack for anytime rejuvenation.***

***Creamy texture with the unique taste of pomegranate and naturality of beetroot, enhanced by hints of vanilla and ginger.***

***Quick and easy for all ages with the benefit of live cultures, source of calcium and protein, real beetroot powder and no artificial colouring.***

## STAGE 4: PROTOTYPE DESIGN

### ❖ Finalising the Formulation

While calculating the nutritional panel it was observed that the Calcium content would not meet the necessary Recommended Daily Intake percentage. This required extensive reformulation to replace the whole milk powder with a whole milk powder and skim milk powder combination to reach a minimum target of 120mg Calcium per 100g made up yoghurt.

It was decided to produce both the original formulation and the modified one for sensory testing using a just about right scale.

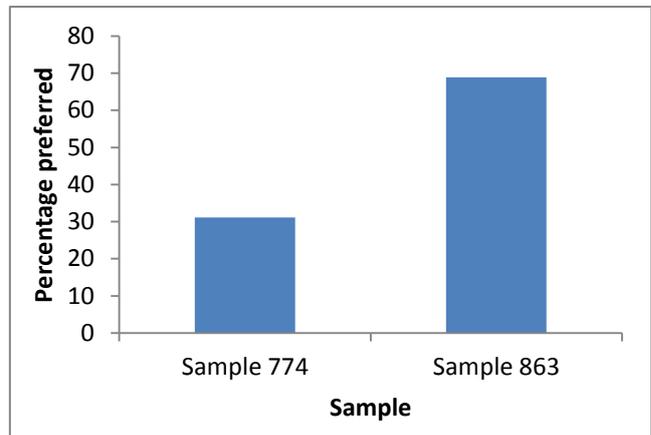
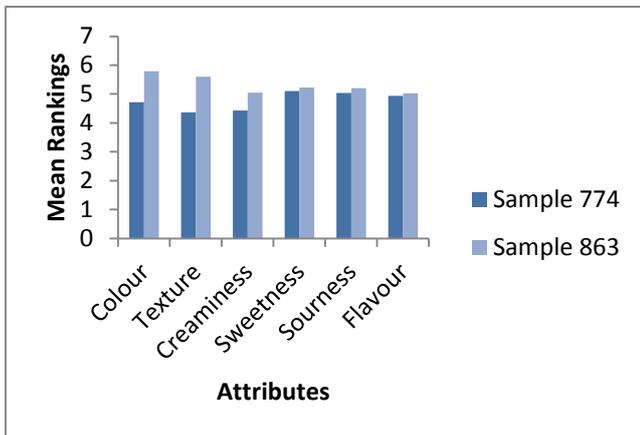
In-house sensory would be conducted at EasiYo and further testing in the sensory lab at Massey using staff and student participants from the Albany campus.

Original Formulation		
Ingredients	Pack weight (g)	% ingredients
WMP		
SMP		
Sugar		
Beetroot powder		
Pomegranate flavour		
Culture		
Vanilla flavour		
Ginger powder		
<b>TOTAL</b>		

Modified Formulation		
Ingredients	Pack weight (g)	% ingredients
WMP		
SMP		
Sugar		
Beetroot powder		
Pomegranate flavour		
Culture		
Vanilla flavour		
Ginger powder		
<b>TOTAL</b>		

## ❖ Sensory Testing

A just about right sensory test was carried out to determine the acceptance of the following characteristics of the two formulations. The following attributes were evaluated: colour, texture, creaminess, sweetness, sourness and flavour.



Sample size consisted of 45 participants. Final mean rankings ranged from 4.3 – 5.1 for the original formulation (Sample 774) and 5 – 5.7 for the modified formula (Sample 863). With Sample 863 being the overall preferred formulation.

Comments varied greatly between both samples, with only one participant commenting that they didn't really like either sample.

### General observations:

**Colour** – although Sample 863 scored on average closer to the just about right scale, Sample 774 received more positive comments; many participants thought Sample 863 was more artificial looking even though the colour was only contributed to by the beetroot powder.

**Texture** – received a lot of comment for both samples, ranging from perfect consistency for a drinking yoghurt to too thin or too thick. Sample 863 scored better although many commented that it was slightly too thick for a drinking yoghurt whereas Sample 774 was better for this purpose.

**Creaminess** – generally comments for Sample 774 were that it was creamier which would be expected for the formulation although it scored slightly lower.

**Sweetness** – generally a good balance for both samples.

**Sourness** – most participants liked the degree of sourness in both samples.

**Flavour** – several participants had problems identifying flavours, others likened it to berry taste, many thought the combination went well together and thought the combination interesting and new.

**Overall** – most participants found the combination unique and interesting and feedback was favourable. Sample 863 was the preferred sample by 69% compared to Sample 774 at 31%.

Sample 863 would be recommended for the final formulation as it scored a total mean of 5.3 on the just about right scale. The nutritional analysis calculated the calcium to 120.5g per 100g of yoghurt therefore meeting the target of 120g per 100g yoghurt (15% RDI).

#### ❖ Final Formulation

Ingredients	Pack weight (g)	% ingredients
WMP		
SMP		
Sugar		
Beetroot powder		
Pomegranate flavour		
Culture		
Vanilla flavour		
Ginger powder		
<b>TOTAL</b>		

#### ❖ Ingredient List

Pasteurised whole and skim milk powder (53%), sugar, beetroot powder, flavouring substances, live lactic cultures, ground ginger.

Contains milk products and soy.

❖ **Nutritional Information Panel**

<b>NUTRITIONAL INFORMATION</b>		
Servings per package:4		
Serving size:250g		
Average quantity per:	<b>Serving</b>	<b>100g/ml</b>
Energy	749kJ	300kJ
	178.90kcal	71.65kcal
Protein	8.8g	3.5g
Carbohydrate, total	32.7g	13.1g
of which – sugars	32.5g	13.0g
Fat, total	1.2g	0.5g
of which – saturated	0.8g	0.3g
Fibre	0g	0g
Sodium	103mg	41mg
Calcium ( 15 % RDI*)	241mg	120.5mg

\*Recommended Daily Intake based on an average adult diet requirement of 800 mg Calcium.

❖ **Cost Analysis**

**Sachet size: 190g**

<b>Supplier</b>	<b>Ingredient</b>	<b>Ingredient percent factor</b>	<b>Ingredient cost/kg</b>	<b>Weight/sachet (g)</b>	<b>Ingredient cost/sachet</b>
	Skim milk powder				
	Whole milk powder				
	Sugar				
	Beetroot powder				
	Pomegranate flavour				
	Culture				
	Vanilla flavour				
	Ginger powder				
<b>TOTAL</b>					
				<b>SUB TOTAL</b>	
	<b>Wastage</b>				
				<b>TOTAL</b>	

## SUMMARY

Throughout my Teaching Fellowship I have worked through the NPD process to develop a new yoghurt product that has the potential to be marketed by EasiYo Products Ltd. The research carried out and experiences I had provided me with valuable insight and knowledge that underpins the development of new products and a wider view of product development in the food industry.

As NPD models can vary from company to company I chose to use one that I thought would provide the most relevant example for teaching colleagues and students to follow.

The initial opportunity identified was to develop a vegetable flavour yoghurt base. However as my project progressed it was determined that the initial idea of vegetable based yoghurt was unlikely to have wide consumer acceptance without the addition of fruit and/or other familiar flavouring. The opportunity also existed for further line extensions in both the 'n bits' range and drinking yoghurt/smoothie lines with the recent introduction of the vanilla bean smoothie to the EasiYo range.

After conducting consumer and market research and generating a range of ideas six flavour combinations were developed:

- Pumpkin, Vanilla and Spice
- Carrot and Berry
- Beetroot and Pomegranate
- Rose and Cardamom
- Honey, Ginger and Mint
- Raspberry, Coconut and Lime

These were evaluated by two focus groups which determined the final product concept to take to the next stage.

The Beetroot and Pomegranate sample taken to focus groups was met with acceptance, however, it still required further modification to meet the necessary calcium allowance. It was also decided that changing the name to Pomegranate and Beetroot maybe more attractive to the consumer.

Sensory testing was carried out on both samples with the modified formula obtaining the most favourable results. If the product is to be produced as a drinking yoghurt minor adjustments may still be required to improve texture as many participants commented that it was slightly too thick for this purpose. A number of participants considered the colour too dark and the beetroot powder could be reduced slightly to reduce the intensity. Interestingly the original formula using all whole milk powder was paler than the second formulation using the skim/whole milk combination.

To summarise, Pomegranate and Beetroot Drinking Yoghurt has met the initial brief of developing a vegetable flavoured yoghurt base. In general, the idea has met with wide acceptance and appeal by many people. This can be concluded by the discussion with existing and potential EasiYo customers and also those who have had the opportunity to taste test the product at some stage of its development. Both beetroot and pomegranate are well recognised in the UK, they are associated with the current food trends of health and well being, as well as being seen as 'in' foods. A final piece of information that came to light in the last two weeks is that **Activa** have just launched beetroot flavoured yoghurt in Russia!

## REFERENCES

Unpublished lecture notes, Massey University, NZ.

Earle, M.D. & Earle, R.L. (2009). *Creating New Foods. The Product Developer's Guide, the Web Edition*. Retrieved from **The New Zealand Institute of Food Science & Technology (Inc.)**

Bailey, B., Major, G., Reilly, R. (2000). VCE Food and Technology Units 1-4. Australia: Macmillan Education.

## ACKNOWLEDGEMENTS

I would like to acknowledge and thank the **New Zealand Science, Mathematics and Technology Teacher Fellowship** Scheme for giving me the opportunity to undertake this rewarding experience. Sincere thanks also go to Associate Professor Marie Wong, Dr. John Grigor, Helen Matthews, Sue Pearce and Heather Bunting from Massey University, Paul O'Brien, Bon Koo and Tracy Zhao from EasiYo Products Ltd. for their guidance, support and encouragement.

**APPENDIX:****1. Ingredient Specification Sheets**

(See attached sheets as follows)

## 2. Consumer Sensory Test Example

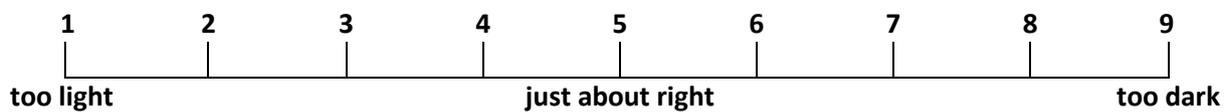
### CONSUMER ACCEPTABILITY TEST

There are 2 samples of Pomegranate and Beetroot Drinking Yoghurt for you to trial. I am interested in knowing how you rank the specific qualities of Colour, Texture, Creaminess, Sweetness, Sourness, and Flavour for this product.

Please taste the following samples and rank them by circling the description that best fits your opinion.

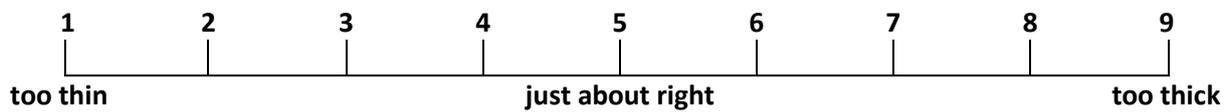
**SAMPLE**

#### Colour



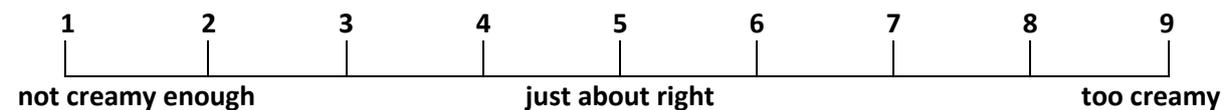
Comment: \_\_\_\_\_  
 \_\_\_\_\_

#### Texture

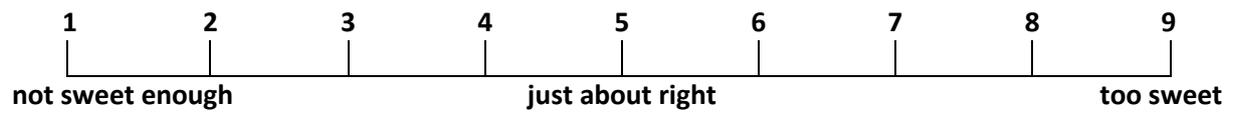


Comment: \_\_\_\_\_  
 \_\_\_\_\_

#### Creaminess

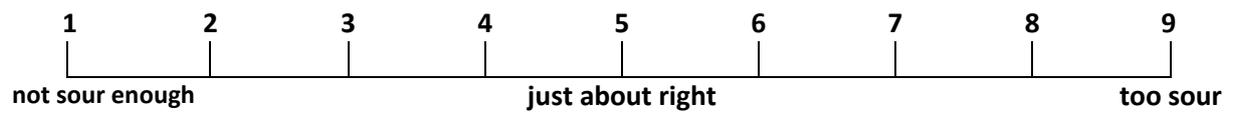


Comment: \_\_\_\_\_  
 \_\_\_\_\_

**Sweetness**

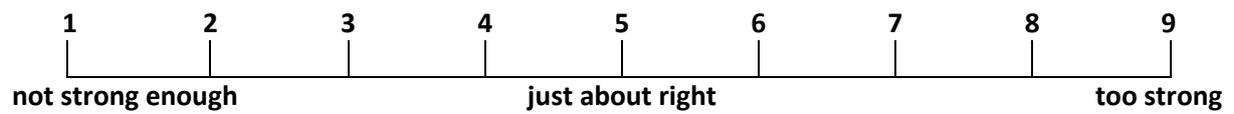
Comment: \_\_\_\_\_

\_\_\_\_\_

**Sourness**

Comment: \_\_\_\_\_

\_\_\_\_\_

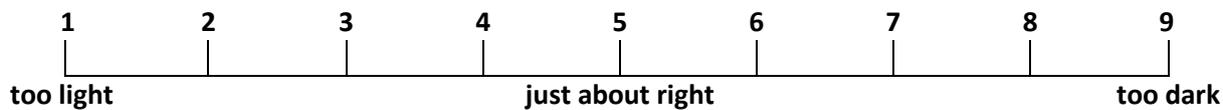
**Flavour**

Comment: \_\_\_\_\_

\_\_\_\_\_

**SAMPLE**

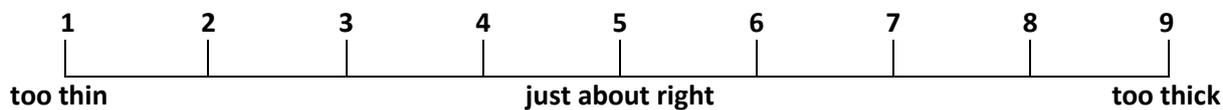
**Colour**



Comment: \_\_\_\_\_

\_\_\_\_\_

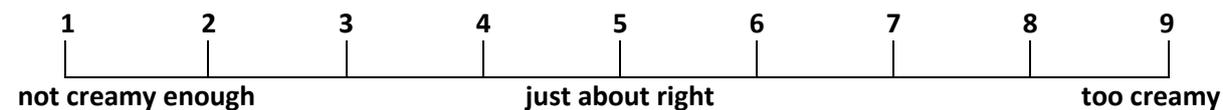
**Texture**



Comment: \_\_\_\_\_

\_\_\_\_\_

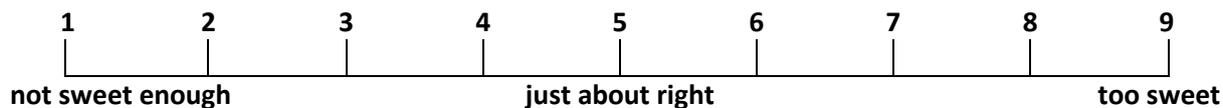
**Creaminess**



Comment: \_\_\_\_\_

\_\_\_\_\_

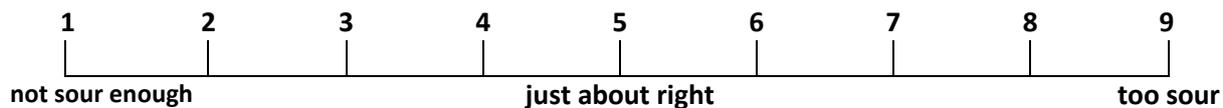
**Sweetness**



Comment: \_\_\_\_\_

\_\_\_\_\_

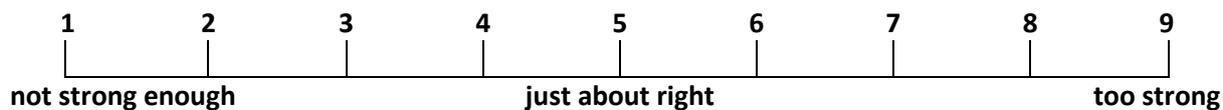
**Sourness**



Comment: \_\_\_\_\_

\_\_\_\_\_

**Flavour**



Comment: \_\_\_\_\_

\_\_\_\_\_

**Please indicate your preferred sample:**

**SAMPLE:**

Comment: \_\_\_\_\_

\_\_\_\_\_

**Thank you for taking part, your feedback is appreciated.**

### Comments from Sensory

Attribute	Sample 774 (26.2% preferred)	Sample 863 (73.8% preferred)
<b>Colour</b>	<p>Too pale Looks fine but I like it a bit darker Artificial look Light pink is a nice colour Colour made it appealing to taste Marginally on the light side Could be darker Beetroot should make it darker, looks like strawberry or weak raspberry Quite vibrant which makes it appear artificial Like the colour, not so beetrooty</p>	<p>About right – looks natural Looks nice Not too light as to seem insipid but colour could still be a bit stronger Just a little dark Slightly too bright and fake looking Lighter would be more aesthetically pleasing to me Would have thought beetroot would be darker colour Just a bit on the dark side Colour about right The right colour for pomegranate/beetroot combination Would customers expect it to be darker based on beetroot content? Quite strong/dark Prefer the colour of this sample as a richer pink which is related more closely to beetroot. Not familiar with pomegranate.</p>
<b>Texture</b>	<p>Texture – prefer other sample, this easier to drink but feels a bit weird Very liquid Perfect texture, not too thin Lovely creaminess, just right A little gritty A little thin Liquid consistency Watery Slightly too runny Texture good – not as thick as some drinking yoghurts on market A bit thin Not too much thicker for drinking Could be slightly thicker Too thin, needs to match thickness of others drinking yoghurts in range Good for a drinking yoghurt but too thin for yoghurt Nice texture Good drinking texture, could get through 1 – 2 glasses</p>	<p>Very smooth too drink Haven't tried drinking yoghurt before but this seems a bit thick but not horribly so Smooth and sweet A little gritty Better texture Perfect texture for drinking yoghurt Texture as would be expected from a yoghurt drink Difficult to consume as a drinking yoghurt Getting difficult to drink, more like a spoonable yoghurt Could be a little thicker Could be a little thinner for a drinking yoghurt Good texture for drinking yoghurt Too thick for drinking easily Bit too runny, almost the consistency of milk</p>
<b>Creaminess</b>	<p>Not enough milky/creamy texture A bit milky Too creamy Nice creaminess Could be a bit creamier Needs to be smooth on the tongue Nice level of creaminess Good creaminess</p>	<p>Nice creaminess Very creamy and enjoyable to drink Seems a bit richer than Sample 774 Could be a little creamier Does not taste creamy – skim milk base? A little chalky</p>
<b>Sweetness</b>	<p>Perfect balance between sweet and sour Good sweetness Good balance of sweetness Quite sweet but not unpleasantly so No problem with sweetness</p>	<p>Perfect balance between sweet and sour Some yoghurt drinks are too sweet Slightly sweet however I tend to like slightly less food and drink Could be a bit sweeter but not too much for</p>

	Perfect sweetness but still a little tart Sweetness good	flavour combination Like sweetness – pleasantly surprised
<b>Sourness</b>	Too sour Could be a little more tart (not much) Nice balance of sourness	Sourness could be slightly more tart but ok as is Sourness very nice Not too sour A bit too sour Much too sour for me
<b>Flavour</b>	Really interesting flavour Slight off flavour Doesn't taste of beetroot or pomegranate Seemed to have strong aftertaste More like berry rather than beetroot Flavour slightly too strong Bitter aftertaste Nice flavour, possibly a bit too sweet but I don't really like sweet drinks. Nice flavour Can taste milk powder in this one Confusing with other flavour like strawberry and raspberry Could have more flavour Can taste milk powder flavour in this one Has a little aftertaste, not quite right Fine flavour Lovely taste Can't identify any flavour Nice level of flavour but couldn't identify if wasn't told Like flavour Very unusual taste, nothing to compare against	Flavour not as nice Good taste Doesn't taste of beetroot or pomegranate – tastes of generic strawberry Tasted nice Flavours aren't distinct enough Unusual taste which I couldn't relate to beetroot but I liked it Lovely flavour Flavour very nice Prefer taste to sample 774 Just tasted like sweet berry yoghurt Just a little too strong Very nice taste and flavour is good Good balance of flavour Nice balance flavour Can't understand the mention of beetroot because cant taste any beetroot Couldn't tell it was beetroot and pomegranate Not sure about flavour as never tasted a pomegranate
<b>Overall</b>	Dial down strength and I'd buy it More pleasant than Sample 863 Didn't like taste as much as Sample 863 Like both but Sample 774 final preference Didn't really like either Loved flavour and Sample 774 Didn't have the tang of the other sample Nice flavour and texture but not sure if I would buy it unless particular health benefits Liked this sample, nice flavour/texture	Like texture and creaminess but not too keen on sweetness and colour Nice balance between sweet and tart Preferred sample because visual colour and flavour are good Best texture, sourness/sweetness and creaminess but Sample 774 seemed to have a nicer fruitier flavour Other than colour this one has good mouthfeel and just about there Both pleasant but prefer 863 overall, overall better flavour and consistency Was slightly astringent, needs more creaminess Other than flavour and colour being a bit strong it was very nice, tangy aftertaste pleasant Has a nice tang, slightly less sweet and a bit more tart which I like, just a bit too thick for drinking Not too sour but not as sweet as Sample 774 More sour and tangy taste to Sample 774 The flavour is vivid and just right for me, I also like the colour, and texture could be thinner Very nice and tasty and right consistency Better colour and texture than other sample Has quite a refreshing kick to it, still find it strange to combine a vegetable and fruit Preferred overall taste of sample 863 Prefer Sample 863 as a normal yoghurt as too thick to drink