

Prototype Development of Avocado-Powder based Food Concepts

HUMMUS (DIPS & SPREADS)



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3.3 Hummus

3.3.1 Product Background

Hummus, being a versatile spread and dip, can benefit from the addition of avocado powder to add to its characteristic flavour profile and as a functional ingredient. The powder was used to enhance the flavour and creaminess, as well as serving as an alternative fat substitution in hummus.

3.3.2 Prototype Development

Two different routes were taken in developing avocado powder as a added value ingredient in hummus. Firstly, as a substitute to olive oil in the product. Secondly, to find the ideal addition rate to showcase avocado as a characterising ingredient in hummus.

Fat Substitution

A standard hummus recipe from (Kazim, 2014) was used to make the control formulation, which can be found in the Appendix C. The formulations were blended in a Magimix Cuisine System, 5200 Auto food processor for 1 min 30s, with avocado powder was solubilised in olive oil to ensure complete incorporation.

Flavour & Colour Combination

Commercial Hummus (Just Right® Garlic and Lemon) was combined with avocado powder at varying levels of (2%, 4.5% and 6%) to evaluate the changes in taste. 4.5% was found to be the most suitable amount, as it was not overly bitter and had a subtle avocado aftertaste. Once the avocado powder level was chosen, colour manipulation was tested. Spirulina powder and Naturex™ Mint Green were both added, to affect the appearance.

3.3.3 Effects of avocado powder in hummus

Fat substitution

Formulations and respective addition levels of avocado powder, replacing olive oil, were trialled at 1% and 2.5%.

The pH of the control was 5.43. Addition of avocado powder increased the pH to 5.73 and 5.78 respectively. During tasting, the bitter afternote increased with higher addition of avocado powder, subduing the intense flavours of garlic and lemon. There was little difference in spreadability of both formulations, with a slight dry and grainy texture. I

Formulation 1, with 1% avocado powder, was considered most suitable as it had no significant bitter afternote and had a smooth texture similar to the control. Table 1 below shows the ingredient composition suggested as a final product.

Table 1. Hummus formulation with avocado powder as a fat substitution

Ingredients	Composition (%)
Canned Chickpeas	82.24
Tahini	2.01
Garlic Powder	1.07
Iodised Salt	0.44
Olive Oil	3.90
Lemon Juice	2.30
Aquafaba from canned chickpeas	7.03
OVĀVO Avocado Powder	1.00

Flavour & Colour Combination

Formulations and respective addition levels of avocado powder, were trialled at 2%, 4.5% and 6%.

Increasing levels of avocado powder resulted in a drying and bitter product with no change to the strong garlic smell from the hummus. 4.5% of powder was the most suitable level of addition to commercial hummus as it had some adequate avocado powder flavour without the bitterness.

In order to showcase the characterising ingredient of avocado in the hummus, the addition of natural food colourings (including spirulina powder and Naturex™ Mint Green) were included to gauge consumer opinion during the focus group. Figure 14 below shows the comparison between different levels of spirulina powder and Naturex™ Mint Green.

Spirulina powder at 0.08% provided the most vibrant green colour, similar to an avocado hummus. No significant colour change due to oxidation was observed after 24 hours in chilled conditions at 4°C. Table 2 below shows the composition of avocado powder and spirulina powder that resulted in the final prototype, followed by the approximate NIP in Table 3. The pH of control was 5.4 while the final prototype pH had increased to 5.7.

Table 2. Composition of final hummus formulation used in the focus group

Ingredient	Composition (%)
Hummus, Garlic & lemon	95.42
Spirulina Powder	4.5
OVĀVO, Avocado Powder	0.08

Table 3. Nutritional Information Panel for final hummus formulation

Nutrient	Reference value (per 100g)
Energy (kJ)	787.9
Protein (g)	7.4
Total Fats (g)	10.2
- Saturated fats (g)	0.8
Carbohydrates (g)	13.8
Sodium (mg)	339.3

4.0 Focus Group Study

4.1 Objective

The objective of this element of project was to understand how well an avocado powder would be received by consumers by itself and in prepared applications. Prototype products were developed and presented to avocado consumers in focus group discussions to gather a broad range of consumer opinion on the prototypes, as well as further insights into potential avocado powder-containing products.

Twenty-four regular avocado consumers aged 18 to 65 were recruited from the Palmerston North community to participate in focus group discussions (5 to 7 per focus group) for one 90 minute discussion & tasting. This was conducted through FEAST, Massey’s sensory professional team.

4.3 Results

4.3.1 Participant avocado consumption habits

Consumption habit discussion summarised in detail in Table 4, which is ordered from left to right of most frequently mentioned to least frequently mentioned. Key themes included highest consumption of avocado during the season “when the price is low”, with most participants purchasing from the supermarket. Whilst some participants reported consuming avocado on its own “as a fruit”, the majority reported consuming avocado in combination with other foods, which included on toast, in sushi, or “as a smoothie”. Participants generally consumed avocado because it is healthy, with many mentioning “healthy fats”. Other important reasons were “good taste”, “good texture” and “satiating”. Another key insight was that purchase of NZ grown avocados was appealing to many participants due to the environmental impact of imported avocados and avocado plantations in South America.

Table 4. Participant avocado consumption habits based on all focus groups

Section	Individual terms used by participants
Frequency	1-2 times a week, when in season, once in 2 weeks, once a month,
Purchase Location	Supermarket, Fruit and vegetable shop, farmers market, own garden
Usage occasion	Guacamole, toast with eggs, bacon, tomatoes, on its own, with honey/sugar/salt/soy sauce/vinegar/wasabi/sesame oil, in salad, as a smoothie, kebab, sushi, avocado oil

Reasons for consumption	Healthy, healthy fats, tasty, satiating, mild flavour, locally produced, substitute for dairy/butter, in sandwich, good protein, neutralises strong flavours
When	Breakfast, Snack, Lunch, Dinner

4.3.2.4 Hummus

Hummus was blended in a Magimix Cuisine System, 5200 Auto food processor (**Error! Reference source not found.**), with avocado powder and spirulina powder, for 2.5 minutes. 20g samples were placed in 35g serving cups, labelled and kept chilled at 4°C before serving.

Participants evaluated the hummus to appear a little grainy, porous with a vibrant green colour similar to avocados. The texture was said to be spreadable and stiff but not as creamy as they were expecting, and with only subtle hints of avocado flavour. Participants suggested combining various strong flavours such as sun-dried tomatoes and feta, with avocado as a sub ingredient.

5.0 Recommendations

5.3 Hummus

Use of avocado powder as a partial fat substitution with olive oil needs considerably more experimentation as the combination at higher levels yielded a dry and grainy product. The replacement of olive oil with avocado powder at 1% achieved a product comparable to the control sample.

The powder works better as a flavour rather than as a functional ingredient. 4.5% avocado powder and 0.08% spirulina powder resulted in a vibrant green colour with a mild avocado taste. The pH achieved was 5.7 which was higher than the control at 5.4.

The exact ratio of powder to garlic flavour requires further trial, to establish a pleasant combination of garlic and avocado hummus. Spirulina powder at 0.08% caused green colour similar to an avocado. Both spirulina and avocado powders should be added into the food processor, before mixing to warrant complete incorporation.

Methodology of Development for Hummus

Fat Replacement

Table 5. Formulation for hummus with avocado powder as a fat substitution

Ingredients	Composition (%)
Canned Chickpeas	82.24
Tahini	2.01
Garlic Powder	1.07
Iodised Salt	0.44
Olive Oil	3.90

Lemon Juice	2.30
Aquafaba from Canned chickpease	7.03
OVĀVO, Avocado Powder	1.00

Table 6. Recipe for hummus using avocado powder as a fat substitute

1.	Rinse chickpeas in cold water and tip into food processer
2.	Add tahini, garlic powder, salt and lemon juice and aquafaba
3.	Turn the food processer and slowly pour in oil while it runs
4.	When mixture is fully combined and smooth, tip it into a serving dish

Flavour & Colour Combination

Table 7. Ingredients for hummus

Ingredients	Composition (%)
Hummus, Garlic & lemon	95.42
Spirulina Powder	4.5
OVĀVO Avocado Powder	0.08

Table 8. Recipe for hummus

1.	Blend avocado powder, spirulina powder and commercial hummus for 1 min 30s in a Magimix Cuisine System, 5200 Auto
2.	Chill product at 4°C, before serving