

Prototype Development of Avocado-Powder based Food Concepts

MUESLI BAR (BAKED SNACKS)



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3.5 Muesli Bar

3.5.1 Product Background

Use of butter or oils in muesli bars can be replaced with avocado powder due to its high fat content. It provides a plant-based alternative fat source to snack bar products.

3.5.2 Prototype Development

The dry ingredients were blended to ensure complete incorporation. Larger sized ingredients such as pumpkin seeds and dried cranberries were cut into 2mm sized pieces, to evenly distribute all ingredients throughout the mixture. Exact method for development can be found in Appendix E.

To replace butter, an avocado slurry of 10g:25g of avocado powder to room temperature water was used for the final prototype. This ratio was used to replicate the fat phase, using similar fat and water compositions of butter. The product was fan baked at 140°C for 20 minutes.

Table 1 shows the exact ingredient composition used for the final prototype. Quality specification aimed for was water activity below 0.65 and achieved water activity was 0.58.

Table 1. Final formulation for muesli bar

Ingredient	Composition (%)
Maple Syrup	10.6
White Sugar	7.0
OVĀVO Avocado Powder	3.9
Rolled oats	40.5
Loose Sweetened Cranberries	21.0
Sunflower Seeds	4.8
Pumpkin Seeds	5.8
Ground Cinnamon	0.3
Water	5.9

Table 2. Nutritional Information Panel of muesli bar

Nutrient	Reference value (per 100g)
Energy (kJ)	1465.5
Protein (g)	7.6
Total Fats (g)	10.8
- Saturated fats (g)	1.4
Carbohydrates (g)	51.6
Sodium (mg)	6.1

3.5.3 Effects of avocado powder in muesli bar

Replacing butter with avocado powder slurry resulted in a crunchy and soft bar with no significant bitter afternotes. It was quite satiating and there was no noticeable grittiness, dryness and dull colouring. Figure 2 shows the final prototype developed with muesli bars, before and

after baking. Compared to control sample in Figure 1, made with butter, the avocado powder samples had no significant difference in blending, baking, texture or flavour.



Figure 1. Muesli bar baked with butter before (left) and after (right) fan baked at 140°C



Figure 2. Muesli bar with 10g Powder 2 and 15g of water mixture as butter substitute, before(left) and after(right) baked at 140°C

Any browning of powder, due to high temperature conditions were masked by caramelisation of sugars and other ingredients. The final product bound well and retained its shape. Furthermore, the appearance was similar to a standard baked muesli bar with no noticeable difference in colour or texture after 24 hours. The browning observed in Figure 2, was due to high temperature fluctuations and were not an accurate reflection of sugar caramelisation. Thus, avocado powder worked well as a fat replacer in muesli bars.

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 3, 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 3. 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

4.3.2.2 Muesli Bar

Serving sizes for the muesli bar were 25g and were sealed in plastic bags. The water activity of the final product was 0.58, therefore no microbial testing was required. Bars were stored at room temperature before serving.

Participants evaluated the product as a healthy and appealing snack based on appearance, with some acknowledging it to be ‘homemade’ and ‘having less binders such as honey or sugars’. Regarding product texture, some participants reported it to be ‘chewy’ and ‘not drying’, some reported it to be hard and crumbly. In terms of flavour, they mentioned the lack of avocado flavour and varying levels of sweetness, some saying it was too sweet and some appreciating it as an appealing ‘caramel flavour’. Participants suggested that reducing the sweetness levels, while making it appear greener with an increased avocado flavour was preferred.

Participants thought of it as a healthy snack between meals a meal and as part of a balanced diet. The overall minimally processed or homemade look was very appealing and mentioned by many participants.

5.0 Recommendations

5.5 Muesli Bar

The powder slurry should be made just after the melted sugar is added into the dry products and immediately poured into the final mixture to avoid any surface browning.

Various different ranges such as a nut bar or a fruit bar can be developed. The amount of sugar can be reduced and replaced with invert sugar or glucose syrup as they are a cheaper alternative. Sugar alternatives and shelf-life extension should be reformulated, ensuring the product holds freshness without completely drying out. Reduction of ingredient size, such as cranberries and seeds, will evenly distribute ingredients throughout the muesli bar, and ensure products are baked thoroughly. Temperature trials using a conventional oven should also be tested to observe the colours produced during caramelisation.

Methodology of Development for Muesli Bar

Table 4. Ingredients for muesli bar

Ingredient	Composition (%)
Maple Syrup	10.6
White Sugar	7.0
OVAVO Avocado Powder	3.9
Rolled oats	40.5
Loose Sweetened Cranberries	21.0
Sunflower Seeds	4.8
Pumpkin Seeds	5.8
Ground Cinnamon	0.3
Water	5.9

Table 5. Recipe for muesli bars

1.	Preheat oven to 140°C. Line tray with baking parchment.
2.	Combine sugar and maple syrup in a pot. Hold mixture at approximately 93-95°C for 5 minutes
3.	Bring to boil and hold at 112°C for 2 minutes.
4.	Remove from heat and immediately pour dry ingredients into hot syrup immediately and stir well to combine.
5.	Measure out room temperature water and add avocado powder, forming a slurry. * Do this only while mixing the melted sugar and dry ingredients, to avoid oxidation. Add slurry immediately into mixture and combine well
6.	Spoon 45g of product into forming blocks
7.	Press firmly and form muesli bar shapes. Place individual bars onto lined trays

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8. Bake in oven for 20 minutes at 140°C (fan bake). Cover product and let it cool