“Super - Kai” Fortified Rēwena (Māori) Bread Flour Mix

1. Research Team
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2. Name of Product
Super-Kai (Fortified dry mix for traditional New Zealand Māori sourdough-style bread)

3. Background and Rationale
In 2010, 15% of the New Zealand population was estimated to be suffering from poverty, (New Zealand Parliament, 2010) a status that is highly-correlated with food insecurity. Further estimates indicate that the proportion of Māori people facing material hardship may be as high as 20% (Ministry of Social Development, 2016). Māori are descendants of the original Polynesian settlers of New Zealand (NZ) and have a rich cultural heritage that includes food and its preparation. However, in modern day NZ, most Māori have limited access to their traditional foods. In combination with restricted income, this has resulted in a nutrient-poor diet that lacks connection with their cultural identity. The purpose of this project is to design an accessible, nutritious product that is relevant to the specific needs of the Māori community while being mindful of Māori food customs.

4. Keywords
New Zealand, Hunger, Food insecurity, Māori, Bread, Rēwena, Design Thinking, Food Product Development, Seafood processing by-product, Fortification, Dry mix

5. Objectives
1. Identify key nutrient deficiencies and suitable fortification solutions for our consumer
2. Understand the microbiological profile of Rēwena bread for flavour development
3. Develop a Rēwena-type dry mix product that aligns with the needs and values of our consumer that is fortified with seafood by-product
4. Produce successful prototypes that can be upscaled for commercial production of a final product that meets food safety, sensory, quality and packaging requirements

6. Scope
The scope of this project is centred around developing a food-based solution to meet nutritional requirements and traditional expectations of food for Māori communities in New Zealand, who place a large importance on the sharing of Kai (food) within their community (Teara, 2013). The product is expected to address current known population deficiencies of calcium, iodine and vitamin B12 in a food suitable for frequent consumption for the whole family while being affordable. Rēwena bread is suggested as a possible staple food product that meets these needs. By-products from seafood processing will be used for fortification to enhance the nutritional content. The product is expected to be sold for less than NZ$3 per 500 g unit, which can produce 1 loaf (~10 servings).
In addition, foods sold in NZ must meet the requirements set by the Australia and New Zealand food standards and be manufactured on a site that complies with the New Zealand Food Act 2014. A major constraint is market acceptability; different Māori communities may have slightly different Rēwena preferences. This project also faces a constraint from the possible limitation of suitable equipment.

7. Literature Review
Hunger is a complex problem globally (Bne Saad, 2013) and conventional approaches may not offer long-term sustainable solutions. Hunger in New Zealand Māori is different from hunger in less developed countries; Māori experiencing food insecurity also face high rates of obesity, diabetes and heart disease (Ministry of Health, 2012) as a result of what they can access and afford regularly: cheap, nutrient-poor but high calorie foods, such as white bread and instant noodles (Graham et al., 2018). The resulting burden of
poor health and disease causes families to lead a much lower quality life; the education of their children suffers and the poverty cycle continues.

The design thinking approach to solving complex problems such as hunger has become popular in recent years. Instead of relying on a few experts, design thinking is founded on a multi-level collaboration directly with consumers to match consumers needs with a realistic, sustainable solution (Olsen, 2015). As summarised in Figure 1, Phase 1 of this approach involved ‘discovering’ how hunger manifests in New Zealand Māori, before ‘defining’ the key food-related deficiencies in users that need to be resolved and key criteria for acceptance. An ideation followed this to ‘develop’ a range of possible solutions which were screened for suitability for solving the problem from end-user’s perspective.

The need was identified for a food which provides a culturally-aligned choice that is nutritious, filling, affordable while maintaining the dignity of the end consumer (Graham et al., 2018, Utter et al. 2012). Few commercially-available foods fit these criteria because the NZ food industry does not specifically target the needs of Māori. Authentic Māori cuisine is usually made by Māori themselves for special events such as celebrations and family gatherings, as the food is often time-consuming to make or it is difficult or expensive to source required materials such as seafood.

One possibility was identified to be Rēwena bread. Rēwena bread is a traditional Māori sourdough bread made from inexpensive ingredients (flour, water, potatoes, sugar) and is well-accepted by most Māori. It is considered a healthy, nourishing recipe but one that requires long periods of time along with great skill and effort to prepare. Traditionally, the recipe uses a potato-based ‘starter bug’ that requires feeding every 1-2 days to maintain the starter; starting a recipe from scratch therefore requires at least 2 days under ideal conditions (Olsen, 2007). Super-Kai is a dry-mix concept that only requires water to be added greatly reducing the time and effort components.

Of similar importance in Māori tradition is Kaimoana (seafood), which has been an essential part of Māori diets since their arrival to NZ. Fortifying Super-Kai with Kaimoana by-products will increase both the actual nutritional and perceived value of a food solution by the consumer and reduce the 600,000 tonnes of fish waste (e.g. heads, viscera and skeletons) New Zealand produces annually (Elenio, 2014). Fortification will make Super-Kai a good source of nutrients such as calcium, iodine and vitamin B12 that are deficient in the Māori population (Ministry of Health, 2012).

8. Product Idea Concept Statement
Super-Kai is a dry flour mix based on the traditional Māori Rēwena bread, a sourdough bread product containing potato. Consumers will be required to add a specified amount of water to a pack of Super-Kai before kneading, proofing, and baking. Super-Kai will be fortified with modified fish by-products to provide calcium, iodine and vitamin B12. Super-Kai will have a dense and chewy texture, along with a golden-brown outer crust followed by a delicate sweet aftertaste. It will include a lactobacillus culture to provide the characteristic tanginess of sourdough (Scott & Sullivan, 2008). It will be sold in local supermarkets in suitable packaging with 500g of mix that will be enough for 1 loaf of bread with ~10 servings. Super-Kai packs can be distributed and stored in dry, cool conditions with a target shelf life of at least 12 months. Baked Super-Kai Rēwena bread may be consumed alone or to be complemented by other dishes. This bread invites all New Zealanders to experience the Māori heritage.

9. Expected Output and Outcome
The expected output of this project is a ready-to-use, easily-identifiable, high quality, fortified but affordable baking mix that is convenient for families to make traditional-style Rēwena bread.
The expected outcome is that Māori consumers will choose to purchase Super-Kai regularly over carbohydrate sources with lower nutrient quality due to the cultural relevance of Super-Kai, its affordability and extra nutrient content. This could be of help to resolving both hunger and the current nutritionally-deficient diets of some Māori.

10. Methodology
Based on the product idea of Super-Kai as a ready-to-use flour-based dry mix inspired by traditional Māori potato sourdough and containing additional nutrients from fortification with seafood by-products, the following methodology for developing this product is suggested:

![Methodology of Product Development Diagram]

- **Step 1. Consumer Research**
  - Define and understand the target consumer’s needs and values
  - Problem Statement

- **Step 2. Idea Generation**
  - Product ideas for target population

- **Step 3. Screening**
  - Product idea concept
  - Product strengths and weaknesses

- **Step 4. Development of Prototype**
  - Viable formulation for fortified dry mix of Rewena bread
  - Suitable packaging identified
  - Estimation of shelf life
  - Cost estimate of Super-Kai
  - Sensory comparison with existing Rewena bread on the market

- **Step 5. Consumer Testing**
  - Final formulation with satisfactory acceptability and price from our target consumers

- **Step 6. Commercial Scale Feasibility**
  - Feasible commercial plan
  - Final selling price

- **Step 7. Commercial Scale-up Production**
  - Product launch
  - Post launch evaluation
  - Further improvements of Super-Kai
11. References


Elenio, P. (2014). Fish waste can transform our farm environment. *Seafood New Zealand*, 22(6)


