

# Development of Pulse-Based, Gluten-Free, Shelf-Stable and Ready-to-Eat Meals using Retort Technology

Ten pulse-based, gluten-free, meal prototype products packaged in shelf-stable, ready-to-eat retort pouches are ready for commercialization.

**READY-TO-EAT (RTE) MEALS** are individually packaged foods that require minimal to no preparation before consumption. These meals are convenient and appeal strongly to consumers with busy lifestyles. It is important that these quick and convenient meals are nutritious. Regular pulse consumption has been shown to have positive health benefits, but it is difficult to incorporate into daily meals due to long cook times. The inclusion of pulses into RTE meals offers consumers a convenient and nutritious choice. Additionally, pulses are gluten-free, making them an excellent choice for people with celiac disease or gluten intolerance. RTE meals are also considered a field ration and an essential nutrient supply in emergency situations.

The most widely used method for preserving food and extending shelf life is thermal processing by the application of heat. Retorting (or canning) has been the technology of choice for commercial sterilization of shelf-stable, low-acid foods, which can be stored for more than twelve months without preservatives. Most of the commercially available low-acid, shelf-stable products in the market are retort processed.

The objective of this project was to develop an innovative, gluten-free, shelf-stable and ready-to-eat meal with a variety of pulses that will

deliver a balanced nutritional value, great taste profile, multiple health benefits and convenience to the consumer.

A variety of edible beans, soybeans, chickpeas, quinoa and wild rice were sourced from local growers and suppliers. Non-GMO soybeans, black beans, navy beans, pinto beans and wild rice were deemed suitable ingredients for RTE meal formulations based on their availability and their ability to undergo retort processing while retaining quality. Bean blends, with or without seasonings, wild rice, and water (or tomato juice) were filled into retort pouches and sealed. The pouches were retort processed using high temperatures and pressures to achieve commercial sterility.

Ten prototype products containing a mixture of edible beans, soybeans, and wild rice along with other natural food ingredients were developed through this project (Figures 1 and 2).

Overall, sensory panellists preferred the soybean blends over the black bean blends with respect to colour, flavour, and texture. All the prototype products



*Alphonsus Utioh examining retort packaging.*

developed from this project boast excellent nutrient profiles, being high in fibre, protein, vitamins and minerals and low in fat and sodium. These products can be served as a full vegan meal or as a side dish and boast a shelf life greater than twelve months at room temperature.

The technical information developed from this project will allow for scaling up to commercial production. These results suggest that there is great potential in the marketplace if these new products can be commercialized, which would increase local demand for pulses and soybeans. ▶



*The appearance of RTE prototype products (left). Packaged RTE prototype products in retort pouch (right).*