



# Market Opportunities for Whole Grain and Multi-Grain Snacks

*By: Peter Cork, Chief Engineer, Cereal, Snack and Biscuit*



## Contents

1. Introduction
2. Synopsis
3. Market Background
4. Whole Grain benefits
5. Product Possibilities
6. The Potential of Extrusion
7. Innovation Centre
8. Contact details

## Introduction

This paper describes how established extrusion technology is being used to produce a new range of whole grain and multi-grain snacks. Health conscious consumers have already recognised the nutritional benefits of whole grain and multi-grain products in other sectors and, combined with the process technology to make snacks without frying; presents a clear market opportunity for snack manufacturers.

## Synopsis

The use of whole grains and multi-grains is well established in other food sectors, particularly bakery and breakfast cereals. They make a positive contribution to the taste and texture of the products and consumers readily accept the health benefits. Their use in snack product presents a clear market opportunity as manufacturers look for ways of responding to the need for products that are both more interesting and healthier.

Whole grain and multi-grain products are among a range of product concepts generated by Baker Perkins for the production of healthier snack foods. They can be processed using well established extrusion and toasting technology that allows the production of snacks that are both nutritious and low in fat.

The equipment and all the associated process technology and customer support are available from Baker Perkins as a complete solution.

## Market background

Via the media, consumers are placed under pressure on a daily basis by government, regulatory bodies and pressure groups to adopt a healthier diet and lifestyle. Consumption of savoury snacks is often cited as one of the main causes of obesity and other health problems, although it is often overlooked that the problem is not consumption per se but excessive consumption.

Nonetheless, snack manufacturers are reformulating their product ranges in order to improve the nutritional profile but this can be taken only so far before the most important characteristics of the snack – taste and texture – are seriously compromised. The race is on to develop new products that consumers will find satisfying but will sit comfortably in a healthy, balanced diet.

Even without health pressures it is likely that new snack product formats would be appearing on the shelves as consumers look for different snack experiences. The industry moved on from the simple potato chips and salted peanuts that once dominated the sector, and there are now snacks based on, or containing, a whole range of different ingredients such as grains, root vegetables, new nut varieties, seeds, pulses and fruits.

Manufacturers have to generate a steady stream of attention-grabbing new products to stimulate interest and satisfy consumer expectations, in order to retain market share. There has been a clear trend towards more complex products, with intriguing shapes, better colour definition, and innovative tastes and textures, to provide differentiation

## Whole grain benefits

The arguments for whole grain are compelling. According to the Whole Grains Council the benefits of whole grains include reduced risk of heart disease, stroke, cancer, diabetes and obesity – few foods can offer such diverse benefits.

Whole grain products retain, after processing, all three parts of the original grain – the germ, bran and endosperm – in their original proportions: refining normally removes the bran and germ, losing about 25% of a grain's protein along with at least 17 key nutrients.

People who eat whole grains, says the Council, have a lower risk of obesity, as measured by their body mass index and waist-to-hip ratios. They also have lower cholesterol levels.

Because of the phytochemicals and antioxidants, people who eat three daily servings of whole grain have been shown to reduce their risk of heart disease by 25-36%, stroke by 37%, Type 11 diabetes by 21-27%, digestive system cancers by 21-43% and hormone-related cancers by 10-40%

The USDA's 2005 dietary guidelines recommend that all adults eat at least three servings of whole grains each day, or at least 48g of whole grain ingredients. Active teenage boys need 5-10 servings of whole grains.

For products that are 100% whole grain, USDA considers a serving to be one slice of bread, or a cup of cold cereal, or half a cup of cooked cereal, pasta, rice or other cooked grains.

Multi-grain products feature a combination of grains such as wheat, rye, corn, barley or rice, and offer the opportunity for snack manufacturers to develop products with an imaginative appearance featuring new textures and colours, with a beneficial nutritional profile. Multi-grain products, of course, must be whole grain to offer maximum nutritional benefits.

(The Whole Grains Council is a non-profit consumer advocacy group working to increase consumption of whole grains for better health. Its initiatives encourage manufacturers to create delicious whole grain products; help consumers find whole grain products and understand their health benefits; and help the media write accurate, compelling stories about whole grains.)

## Product possibilities

Baker Perkins has already developed new product concepts for whole and multi-grain options, processed on well established, industry-standard extrusion technology. The products may be expanded directly by the extruder or by hot air in a toaster. No frying is needed. Oil and flavour are applied in a separate process that enables the final fat content to be closely controlled

The extruder – a highly versatile tool – can be configured to make a wide range of whole and multi-grain products. They include shredded, expanded and cracker snacks, all with greatly reduced levels of saturated fat, overall fat content, and salt. The end product potential is virtually unlimited, both for brand new concepts, and healthy adaptations of existing brands.

Two typical new products indicate the potential.

One is an extruded shredded whole grain snack. Baker Perkins was asked to formulate a shredded product on an existing extruder based production line. The solution was an existing cooker-extruder configured with screw parts and dies for a variety of applications.

By forming strands at the die, a great tasting and visually appealing product has been created, with the potential for cutting into a variety of interesting shapes. This is a highly attractive option from a capital cost viewpoint.



The second new product is a direct expanded extruded snack. Post extrusion processing produces the characteristic flat profile and a pleasing crispy texture. The products can be cut into range of different shapes and sizes. The large surface area of the one shown below is able to carry a lot of coating for an intense flavour hit



## The potential of extrusion

Throughout the snack industry, recent product development has involved twin-screw extrusion, a mainstay of the snacks industry for many years.

The inherent flexibility of extrusion equipment and processes means manufacturers can adapt, as new products and trends enter the market: lines installed now will be able to produce the latest style years into the future. For example, using ingredients based on vegetables, nuts, seeds, pulses or fruits, whole- and multi-grain snack products could be transformed into high-value foods for health conscious consumers.

Extrusion is being exploited to develop new textures and shapes to add interest and variety to the sector. While extrusion creates the basic product, downstream technology is used to create consumer appeal and add value. Here, die design is crucial in controlling shape, expansion and shell structure and provide a variety of end products from a single extruder – this ability is as valid for the new generation of healthy snacks as it is for traditional products.

Baker Perkins has a modular die format which allows shapes to be altered easily and cost effectively by changing a product-specific insert. Products are shaped by being forced through the die, and the 'library' of shapes is continually being expanded.

Extruders combine process flexibility with rapid changeover between products, and control benefits that improve performance and profitability. PLC control is standard, providing automatic start and stop sequences to reduce time, energy and waste. Recipe management, alarm handling, and monitoring and recording of key product and process parameters are also available.



## Innovation Centre

The versatility of the twin-screw extrusion process means that new products are continually being added to the portfolio. Many manufacturers from around the world visit the Baker Perkins Food Innovation Centre at Peterborough, which contains a range of production and laboratory scale equipment, including a twin-screw extruder that can be configured for a wide range of products. Customers use these facilities to develop new products and processes, produce samples for test marketing, or conduct feasibility trials – all in a confidential environment.

## Contact details

Further information is available from Keith Graham, Baker Perkins Limited, Manor Drive, Paston Parkway, Peterborough, PE4 7AP, United Kingdom Tel. +44 1733 283000  
Email. [keith.graham@bakerperkinsgroup.com](mailto:keith.graham@bakerperkinsgroup.com) [www.bakerperkinsgroup.com](http://www.bakerperkinsgroup.com)