



## Quorn – the production of alternative first-class protein source for a balanced, sustainable diet.

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### Executive Summary

Changes in global diets, such as a shift from cereal-based diets to those focused on meat, fats and sugars<sup>1</sup>, are important not only for the impact on overall health, but also contribute to the environmental impact of food production. The widely discussed food trilemma, diet-environment-health, shows that dietary choices cannot be separated from impact on human health and the health of the planet.<sup>2</sup>

Protein-rich foods are an essential part of a varied, nutrient-full diet<sup>1</sup>. Adoption of alternative protein sources, such as Quorn, as part of a healthy eating plan provides a protein supply that's meat-free and sustainable, has the potential to improve global health and minimise the environmental impact of food simultaneously.

Quorn produces a wide range of food products made with high-quality meat-free protein ingredient, Mycoprotein. This paper will explore the history of the brand, the production process and the role of the product in providing an alternative protein source for a balanced, sustainable diet.

### Introduction

Following a balanced diet, one that is varied and provides all the nutrients a human body needs, is important, as advised by nutritionists and researchers. Protein-rich foods from animal and/or vegetable sources are an important part of a nutritious diet along with other foods that are good sources of fibre, vitamins and minerals and low in saturated fats, salt and sugar.

A recent Carbon Trust<sup>3</sup> report highlighted the need for more protein diversity in British diets after finding that the consumption of more diverse sources of protein would result in health benefits as well as reducing the environmental impact of food. The report made the case for a 'flexitarian' approach to meal choices, encouraging consumers to experiment with recipes that don't use meat as the main protein source. Furthermore, House of Commons International Development

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<sup>1</sup> Office for International Development (2014) *Future diets: implications for agriculture and food prices*. Available at: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8776.pdf>

<sup>2</sup> 2 Tilman, D. & Clark, C. (2014) *Global diets link environmental sustainability and human health*. Available at: <http://www.nature.com/nature/journal/v515/n7528/nature13959/metrics/news>

<sup>3</sup> Carbon Trust (2014) *Quorn, beef and chicken footprints*. [internal report]



Committee's<sup>4</sup> report on food security reinforced the need for a change of behaviour such that meat is seen as an occasional treat, rather than everyday staple.

Quorn is the brand name for a wide range of food products made with meat-free protein ingredient, Mycoprotein; Quorn is a no-cholesterol, low-fat, low-sat fat and high-fibre meat-free protein source that contributes to a balanced diet. Quorn has a low manufacturing impact compared to other protein-rich products, such as meat. It is a great addition, and an alternative sustainable option, for a varied and balanced diet.

## Quorn

Quorn has developed a wide range of food products made with meat-free protein ingredient, Mycoprotein. The range includes mince, chicken-style pieces, sausages, burgers and ready meals.

### Nutritional information

Quorn is a no-cholesterol, low-fat, low-sat fat and high-fibre meat-free protein source that contributes to a balanced diet. Quorn's main ingredient, Mycoprotein is made from a fungus called *Fusarium venenatum* which is grown in fermenters using glucose and minerals for food. To make Quorn products, egg white and flavouring is added to Mycoprotein. The structure of Mycoprotein means that the ingredient replicates the taste and texture of meat. Quorn provides an alternative protein option that's meat-free and nutritious for many years, which when enjoyed as part of a balanced diet can help improve health.

### Sustainability of Quorn

Quorn is a sustainable product that has a 90% lower carbon footprint than animal protein such as beef<sup>2</sup>. Quorn Foods was the first global meat-alternative brand to achieve third-party certification of its carbon footprint figures, achieving Carbon Trust certification back in 2012. Quorn achieved zero waste to landfill at its Stokesley site in 2015 and the Methwold site follows closely with 99% of waste avoiding landfill.

Quorn requires only 2 kg of wheat to make 1 kg of product, compared with 12-24 kg of wheat for 1 kg of beef<sup>5</sup>. Moreover, the product's fermentation process requires less land and water than meat-based protein sources. Quorn allows for consumption of a first-class protein source that is sustainable for the planet.

## History of Quorn

### The Origin

In the 1960s, scientists aimed to address the problem of providing enough food sources to feed the growing population of the world. Lord Rank, the founder of Quorn, aimed to find a micro-organism that converted carbohydrates into scarcer and more nutritionally valuable protein, without the use of animals as method of

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<sup>4</sup> House of Commons International Development Committee (2013) *Global Food Security*. Available at: <https://www.publications.parliament.uk/pa/cm201314/cmselect/cmintdev/176/176.pdf>

<sup>5</sup>Ramirez, CA., Patel, M and Blok, K. (2003) *How much energy to process one pound of meat? A comparison of energy use and specific energy consumption in the meat industry of four European countries'*. Energy 31 (2006) 2047-2063



conversion. Many years of R&D and investment resulted in the discovery of a certain member of the fungi family that could be converted into protein, allowing for the production of Mycoprotein. While 'vegetable' in origin, Mycoprotein contains all nine essential amino acids and so falls into the category of being a source of first-class protein, comparable with other protein sources such as meat and fish.

### Retail Introduction

Quorn was first produced in 1985 by Marlow Foods to provide a sustainably produced, healthy protein source for a balanced diet.

Quorn's main ingredient is Mycoprotein, which was developed in 1985, from a naturally occurring organism found in Buckinghamshire, UK. After success in the UK, the brand was launched in America in 2002.

### Production

The production process of Quorn is simple and efficient, requiring less wheat and water to produce, as well as resulting in lower carbon emissions<sup>6</sup>, compared with meat sourced proteins.

To make Quorn products, Mycoprotein is mixed with vegetable flavourings and a small amount of egg albumen.

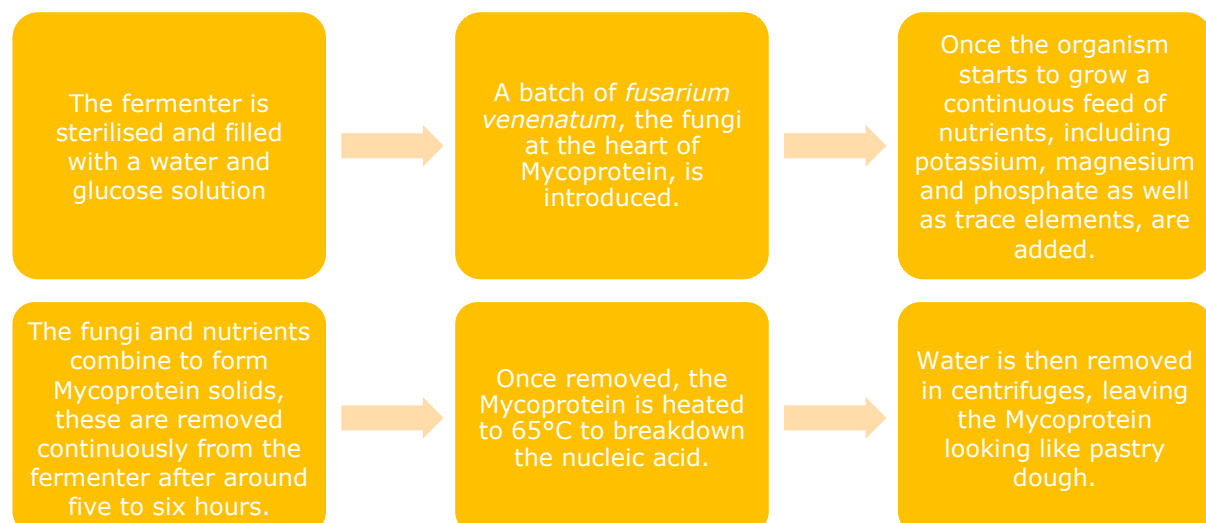
### Location

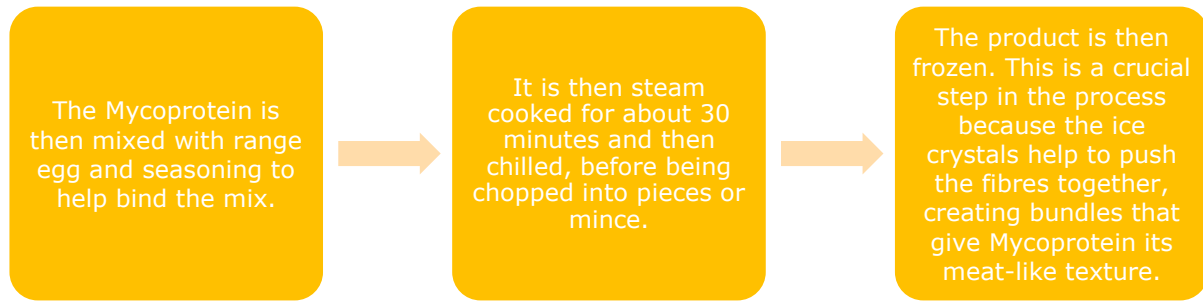
Production of Mycoprotein and its processing to make Quorn products takes place at Marlow Food's plants. Marlow Food's fermenters and processing plants have been designed specifically for Mycoprotein production and the manufacture of Quorn products, with some pieces of equipment being unique to the manufacturing process and to the company.

### Manufacturing

The manufacturing process involves a number of steps which in combination help to align and bind the tiny fibres of Mycoprotein together. To develop the characteristic texture of Quorn products a series of steaming, chilling and freezing processes help obtain the meat-like texture of Quorn products. Mycoprotein is made in 40 metre high fermenters which run continuously for five weeks at a time.

### Manufacturing process of Mycoprotein:





## Conclusion

By 2050 world population is set to increase to over 9 billion, 30% higher than today. In order to feed this larger, wealthier and more urban population, food production will need to rise by 70%<sup>6</sup>. Access to a healthy nutritious diet that is also sustainable will become more important than ever as the planet accommodates for increased population.

With that in mind, Quorn products present a viable opportunity for a first-class alternative protein with minimised environmental impact.

The manufacturing process of Quorn, as presented above, has minimal environmental impact, which along with the high nutritional value of the product present Quorn as a great addition to a modern diet that helps maintain the health of the planet.

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<sup>6</sup> Food and Agriculture Organisation of United Nations (2009) *How to feed the world in 2050*. Available at: [http://www.fao.org/fileadmin/templates/wsfs/docs/expert\\_paper/How\\_to\\_Feed\\_the\\_World\\_in\\_2050.pdf](http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf)