

Centre for **Food Innovation**

a **fresh** perspective on food



British Frozen Food Federation

REPORT

Changing Consumer Perceptions
Supermarket shopping -
The nutritional difference between fresh & frozen

Commissioned by
Sheffield Hallam University

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FOREWORD

This report has been commissioned by British Frozen Food Federation (BFFF).

BFFF is the trade association of the frozen food industry. Its mission statement is '*to promote and protect the interests of the frozen food industry*'.

The report was managed and written by Charlotte Harden and Lorna Bell on behalf of the Centre for Food Innovation at Sheffield Hallam University.

EXECUTIVE SUMMARY

Frozen food is commonly perceived as nutritionally inferior to fresh. This may be one of the main reasons why some UK shoppers avoid its purchase. BFFF therefore commissioned an investigation to examine the nutritional differences between fresh and frozen food commonly purchased as part of a weekly household shop. A month's worth of till receipts was obtained from regular supermarket shoppers and the effect, on nutrients, of purchasing this food in a fresh compared to a frozen form was examined. Nutritional and statistical analysis showed no significant difference between fresh and frozen food for the thirty-seven nutrients tested.

These results contribute to the new consensus emerging on the nutritional value of frozen food; it can be an effective way of providing nutritious family meals. There are numerous other advantages of using frozen food in the home. Frozen food has improved price stability, can reduce food waste and allows convenient, year round availability of family favorites.

CONTENTS

Page
number

1.0 INTRODUCTION

5

2.0 METHODS

6 - 8

3.0 RESULTS

9

4.0 SUMMARY

10

1.0 INTRODUCTION

Frozen food is synonymous with convenience and value for money but has been perceived as nutritionally inferior to fresh. The frozen food industry has worked to address this issue by increasing the quality raw foods used for freezing and employing modern technologies to minimise nutrient losses. A number of recent industry and academic reports have highlighted the nutritional benefits of ‘freshly frozen’ food. This message is gradually becoming accepted but consumer perceptions could still be improved.

In December 2011, BFFF commissioned an investigation into the nutritional difference between fresh and frozen foods that had been purchased by regular supermarket shoppers. Twenty people, who were the main household shopper of a family of four and who shopped weekly at a national supermarket chain, provided a month’s worth of till receipts. These receipts were analysed to examine the types of food purchased and the nutritional differences of purchasing this food in a fresh compared to frozen form. The results of this investigation follow.

2.0 METHODS

2.1 Participants

Twenty people were recruited by email advertisement through Sheffield Hallam University. Eligible participants were the main household shopper of a family of four (consisting of two adults and two children), shopped weekly at a national supermarket chain and provided a month's worth of till receipts.

2.2 Identifying purchase type

An initial point of analysis was to categorise each purchase according to its provision type:

1. **Fresh.** This included all items sold at ambient temperature (such as fruit and vegetables, bread and bakery products) and refrigerated (such as chilled meat and fish, ready meals, yoghurts and desserts).
2. **Frozen.** This included all items sold in a frozen form, such as vegetables, meat, fish and ready meals.
3. **Dried.** This included all items sold in a dried form, such as dried fruit, flour, biscuits and breakfast cereals.
4. **Tinned/jarred.** This included all items sold in a tin or jar, such as baked beans, tinned fruit, sauces and condiments.
5. **Beverages.** This included items such as milk, juices, alcohol, fizzy drinks, tea and coffee.
6. **Non-food.** This included items such as household goods, clothes, toiletries and cleaning materials.

2.3 Identifying freezing potential

The freezing potential of each purchase was examined. Non-food items and dried products such as flour and breakfast cereals were excluded from further analysis but products that were readily available in both a fresh and frozen form (such as peas and chicken) were identified and included in subsequent nutritional analysis.

2.4 Nutritional analysis

NetWISP V3.0 (Tinuveil Software) dietary analysis software was used to analyse and convert the food into energy, macronutrient and micronutrients. The food composition databank is supplied from HMSO/OPSI, McCance and Widdowson's *The Composition of Foods* - 6th Edition (2002), 5th Edition plus supplements. In addition, NetWISP V3.0 contains data from the following; Tillery Valley Foods, 2008, Calypso Soft Drinks Ltd, 2008, Brakes, foodservice (catering) products, 2008, Nutricia, tube and sip feeds, 2008, Abbott, tube and sip feeds, 2006, Glycaemic index of foods, 2005, Better Hospital Food, 2005, Pasta & Pasta Sauces, Food Standards Agency (FSA), 2004, Catch-Up Project, FSA, 2004, AOAC fibre content of foods, USDA, 2004 and Non-milk extrinsic sugars content of foods, calculated by Registered Nutritionist, 2003.

The food composition database contains a total of about 6,000 food records and up to 125 nutrients. The Composition of Foods is widely acknowledged as the key reference tool for examining the nutritional value of foods consumed in the UK. There can however, be no guarantee that a particular item will have precisely the same composition as that described due to natural variability.

Analysis was conducted for the following thirty-seven nutrients:

Protein in g; Total fat in g; Carbohydrate in g; Energy in kcals; Energy in kJ; Saturated fat in g; Monounsaturated fat in g; Polyunsaturated fat in g; Cholesterol in mg; Sugars in g; Non milk extrinsic sugars in g; Starch in g; AOAC fibre in g; Englist fibre in g; Sodium in mg; Potassium in mg; Calcium in mg; Magnesium in mg; Phosphorous in mg; Iron in mg; Copper in mg; Zinc in mg; Chloride in mg; Manganese in mg; Selenium in µg; Iodine intake in µg; Vitamin A (r.e.) in µg; Carotene in µg; Vitamin D in µg; Vitamin E in mg; Thiamin in mg; Riboflavin in mg; Niacin in mg; Vitamin B6 in mg; Vitamin B12 in µg, Folate in µg; Pantothenic acid in mg; Biotin in mg; Vitamin C in mg.

2.5 Statistical analysis

Using the nutritional analysis data obtained from NetWISP V3.0, independent sample t-tests were performed in order to identify the effect of fresh versus frozen food classification (SPSS; version 15.0 for Windows, SPSS Inc., Chicago, IL, USA). This is a commonly used statistical procedure used to determine if there is a significant difference between the average values of the same measurement made under different conditions. Values of $P < .05$ were classed as significant.

3.0 RESULTS

3.1 Identifying purchase type

In total the participants purchased 3,534 items, of which, 1,703 were fresh, 64 were frozen, 621 were dried, 333 were tinned/jarred, 493 were drinks and 337 were non-food items. These are shown as a percentage in **FIGURE 1**.

FIGURE 1: Purchasing trends by category as a percentage of total items purchased

3.2 Identifying freezing potential

Of the 3,534 items purchased, 607 (17.2%) were readily available in a fresh or frozen form.

3.1 Nutritional analysis

An independent samples t-test was conducted to compare the macronutrient (fat, protein and carbohydrate) and micronutrient (vitamins and mineral) content of fresh and frozen versions of the foods purchased. There was no significant difference in the nutritional value of the fresh and frozen foods tested. This trend remained true when analysis was conducted by family, for fruit and vegetables and for meat and fish.

4.0 SUMMARY

The results of this investigation demonstrate that there would be no significant nutritional difference in providing a month's worth of family food using frozen compared to fresh food. It can therefore be concluded that frozen food is an effective way of providing nutritious family food. These results correlate well with findings by other researchers.

In addition to providing good nutrition, the use of frozen food for family meals could present an attractive alternative to the modern busy household for numerous other reasons. Frozen food can help to reduce food waste, is relatively price stable, convenient and labour saving and has an excellent food safety track record.