



Cost, waste and taste comparison of frozen food versus fresh food in a consumer market

Project carried out by the Manchester Food Research Centre on behalf of British Frozen Food Federation.

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1.EXECUTIVE SUMMARY

The British Frozen Food Federation (BFFF) has launched a consumer campaign, which aims to highlight a case for using frozen food. As part of this, BFFF commissioned the Manchester Food Research Centre to conduct a study which looked at whether cooking from frozen food creates less wastage and reduces costs whilst tasting as good if not better than fresh.

BFFF instructed the Manchester Food Research Centre (MFRC) to compare costs, waste and taste of fresh meals with equivalent frozen meals over a two week period, one week for the fresh meals and then one week for frozen meals. The comparison of costs and waste was to be based mostly on quantitative data and on qualitative data for taste only where respondents commented on taste of meals they cooked, both for fresh and frozen.

The families selected normally cooked fresh food and were asked to try out the frozen equivalent of their choice. Each family bought their own food, both fresh and frozen. They were asked to complete diaries to record information on the main meal of each day, 7 days for fresh and 7 for frozen.

On the whole the findings from the study showed that cooking frozen food by the selected nine families created considerably less wastage and it was better value than cooking from fresh food. The costs were also reduced by more than a third when cooking from frozen food as best described by one example by a family who bought branded Chicken Tikka Masala: "This was half the price of the fresh version and just as nice"

The findings on the taste of frozen food produced a mixture of positive and slightly less positive comments. Out of the frozen meals selected by the families, there were many frozen dishes that participating families liked with some being described as good as freshly made.

Now that the families have tried new frozen food, some of them are keen to buy more frozen options as quoted by one participant: "My son who is 10 loved the frozen options and I think I would now have a supply of certain foods in the freezer".

2.DEFINITIONS

For the purpose of this study the following were defined:

Food is defined as one evening/main meal taken by the family for each day over seven days for fresh food and seven for frozen food.

Waste consists of the following:

1. Any food not eaten cooked or uncooked to be thrown away (not scrapings from plate)
2. Any food cooked or uncooked that had to be thrown away during or by the end of the week.

COST represents the purchase price of food bought.

3. METHODOLOGY OF THE PROJECT

Nine families were recruited from the Greater Manchester Region as illustrated in the table 1. To enable a fair comparison, only families with 2 adults and 1 to 3 children were recruited, minimum age 2 years old. The selection was based on families who would normally cook from fresh food rather than frozen.

Age of adults: Spread of ages between 25-60

Socio-economic group: C2DE

Table 1: Profile of families taking part in the study

Family	No. of children	Occupation of Chief wage earner	Residence
A	1	Plasterer	Stockport
B	2	Roofer	Stockport
C	1	Technician	Burnage
D	1	Builder	Oldham
E	1	Telescopic handler	Newton Heath
F	1	Airport handler	Norris Bank
G	2	Painter and decorator	Heaton Chapel
H	2	Builder	Reddish
I	1	Joiner	Bolton

The Diaries

Families were required to purchase their own food as they would for their usual week and were given a list of suggested meals to avoid too many non-replaceable products being consumed in the week 2 (when cooking from frozen food).

The study took place over a 2 week period. In the 1st week families were cooking from fresh food, in the 2nd week from frozen. Families were supplied with a diary to chart details on 7 evening meals eaten during each week and were briefed on how the data was to be collected. The evening meal was self-monitored daily using a format that enabled respondents to record required information on cost, waste and taste of each meal and to note any additional comments on costs, wastage, taste, perceived nutritional value and convenience of cooking.

A lead respondent was nominated i.e. the household's chief food purchaser/food preparer to ensure that the views of all family members were included in the diary and that the diary was completed according to instructions.

Data from diaries

Mostly qualitative data collection was used but in addition some quantitative data was collected in respect to costs and waste. The following data was collected:

- The cost of main/evening meal where cost was defined as the price paid for each component of the meal.

- Waste. Quantity of food uneaten/disposed of at the end of day and end of week (see definitions section). Each family was given a set of scales to measure waste in grams.

- The name of food prepared and served for the evening meal including each ingredient when the food was being prepared from a few ingredients

- Place of purchase and/or brand name

- Comments on taste of the meal. Each family member contributed to the overall comments

- Comments on waste, cost of each meal as well as perception of nutritional value and convenience. All members of family were encouraged to comment.

The Focus Group

A focus group was held at the end of 2nd week attended by a member of each family. Each attendee was the main cook and shopper in the family.

Attendees were required to provide their views on the experience of cooking from fresh and frozen food. To encourage expression of opinion they were asked questions relating to the following topics:

1. The cost and value for money of cooking from frozen food compared to cooking from fresh.
2. Wastage of frozen food compared to wastage in fresh food and reasons for wastage.
3. Taste of food, comparing fresh and frozen including appearance of food and smell.
4. Convenience of food preparation between frozen and fresh.
5. Perception of how healthy fresh and frozen were.

4.FINDINGS OF THE STUDY

The results are shown under 3 main headings: cost comparison, waste comparison and taste comparison. The comparison of cost and waste are based on both quantitative and qualitative analysis (cost being measured in pounds and waste in grams). Quantitative measures are also shown in charts. The comparison of taste is made purely from qualitative data.

Cost Comparison

The table below shows an actual family cost of the main meal for one week for fresh food and for one week for frozen food. It highlights the difference in cost as well as percentage of saving for frozen food for each family.

Table 2: Comparison cost of fresh food and frozen food cooked and consumed during the study week

family	Size of Family (3 or 4)	Cost		variance £
		frozen food cost £	fresh food cost £	
A	3	22.42	37.03	14.61
B	4	27	39.87	12.87
C	3	25.95	43.75	17.8
D	3	22.5	51.64	29.14
E	3	31.49	37.44	5.95
F	3	27.7	39.02	11.32
G	4	31.97	37.69	5.72
H	4	30.57	35.03	4.46
I	3	28.91	50.13	21.22
Total	30	248.51	371.6	123.09

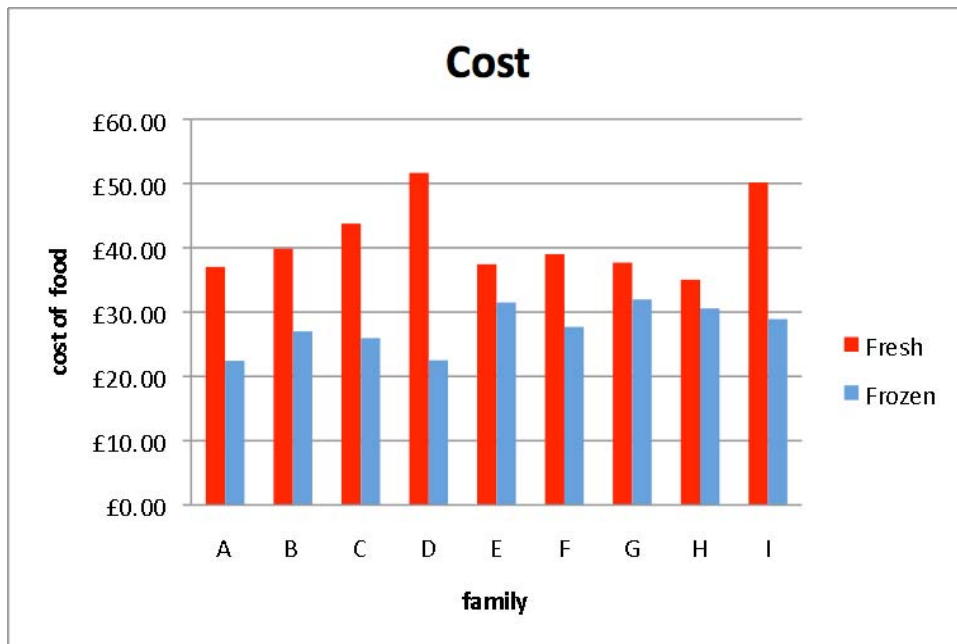
Source: Data collected from Diaries

The study revealed that cooking from frozen was 33.12 % better value than from fresh for main meal of the week for all families as shown in the chart above. Each family who took part in the study made savings ranging from 12.73% to as much as 56.95% when cooking from frozen meals.

For the fresh food the *average* actual cost per week for the main meal of the week, for a family, was £41.29 whereas for frozen food it was £27.60.

The substantial difference in costs between fresh and frozen food can best be highlighted in the following bar chart, table 3 below.

Table 3: Comparison cost of frozen and fresh food cooked and consumed during the study week



Comments in diaries and with the focus group confirm that all families believed that buying frozen food was better value. As the families selected normally cooked from fresh produce and were not familiar with many frozen products, there was also an element of surprise (see quotations below) as to what good value some of the meals were and the range of products available.

Family I: “In the beginning we found it difficult to find frozen meals as we were not used to shopping in this way. It is surprising what you can buy, perhaps with a little research and trial and error you could actually find really good food at very reasonable prices. The actual pricing and value of the frozen food was excellent, this was a pleasant surprise and in the current economic climate will be much welcome”

There are many examples of frozen meals purchased and cooked which were considered by families as good value for money such as Branded, 8 Sausages at £1.50 and Branded Vegetable Mix at £1.00 where Family A said “Sausages were much cheaper to buy frozen.

Vegetable was good value for money". Family G thought that Branded Minced Beef lasagne £1.00, 360g, was *"good value for money and for a very quick, no preparation meal"*.

Branded mince at £3.33, 500g and branded rice at £1.39, 500g was thought as *"brilliant value. We only used half of the mince and half of the rice. We will use the rest another day.*

For more quotations on the costs comparison see Participant Quotes on Costs.

Participant Quotes on Costs

The following quotes and details were selected from diaries and from the Focus Group to illustrate that families found most frozen meals out of 63 cooked were better value than fresh.

Family A: Branded chicken curry £1.00, 350g.” Each meal cost just £1.00. Only downside is that the portion could have been bigger”. Branded mince £3.33, 500g and Branded rice £1.39 500g. “Brilliant value. We only used half of the mince and half of the rice. We will use the rest another day.”

Branded Sausages at £1.50 and vegetable mix at £1.00. “Sausages were much better value to buy frozen. Vegetables were good value for money”

Family B: Branded Chicken Tikka Masala £1.50, 375 g.” This meal was half the price of the fresh version and just as nice.”

Family C: Branded Lamb Balti Curry £2.00, 750g and Pilau Rice £1.00, 700g. “£6.00 is pretty good value for a curry for 3 people”.

Family D: Branded Spaghetti bolognaise at £1.00, 300g. “Good value but small portion. Would not make much of a meal alone”. Total cost of the frozen meal for the family of 3 was £3.00 whereas branded, Salmon Fillets £3.95.” Good value, you just take out what you want and defrost.” (3 portions of a supermarket’s fresh salmon from cost the family £5.60)

Family F: Branded 4 Salmon Fillets, £3.95. “Good value, you just take out what you want to defrost.’ (3 portions of fresh salmon cost the family £5.60).

Family G: Branded Minced Beef Lasagne £1.00, 360g.” Good value for money and for a very quick, no preparation meal.” On frozen lasagne family spent (4 persons) £4.00 whereas on fresh £4.76. Branded fish in batter, £1.99, 330g. “ Good value, less than £4.00 for all meals.” (£6.59 for a freshly bought and cooked version).

Family H: Branded Salmon £3.96, 400g.” I will definitely buy this salmon again, we had three good size pieces, very good value for money.”

Branded pork steak, £2.00, 500g, rice and black bean sauce £1.55, 500g. “The meal was tasty and satisfying without spending more than five pounds”. (Frozen version of the meal was £3.55 and the fresh one was £5.35)

Family I: Branded Curry and rice-chicken masala.” Excellent value meal. £3.00 for a family is great especially when we felt the product was great”. In contrast, the cost of their freshly prepared Curry and Rice-Chicken Masala was £10.92.

“If you make a shepherd’s pie fresh with mince it is costing me like a fiver but cost £3 to get frozen.’ As commented at the focus group.

Waste Comparison

Table 4: Comparison of wastage of fresh food and frozen food cooked and consumed during the study week

Wastage

family	frozen food wastage grams	fresh food wastage grams	variance grams	frozen food wastage % reduction
A	200	475	275	57.89
B	0	250	250	100
C	400	340	-60	-17.65
D	600	1290	690	53.49
E	920	620	-300	-48.39
F	0	25	25	100
G	83	260	177	68.08
H	50	550	500	90.91
I	700	860	160	18.6
Total	2953	4670	1717	36.77

Source: Diaries

The chart clearly shows that when cooking with fresh food there was 36.77% more waste than when cooking from frozen. 7 out of 9 families wasted more food on fresh than frozen. The amount of waste for the fresh food ranged from 25grams per week, per family to 1290 grams. In contrast to wastage on fresh, the amount of wastage on frozen ranged from zero to 920 grams, with 2 families showing zero waste.

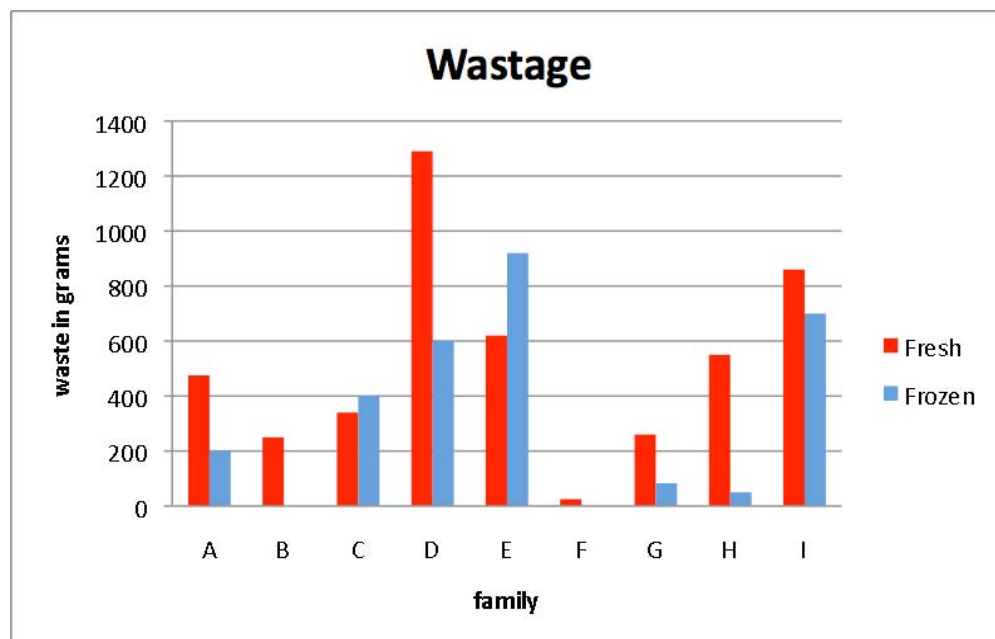
The average waste for fresh food for a family of 2 adults and 1 to 2 children was 519 grams whereas for frozen food it was only 328 grams.

Family C and Family E wasted more frozen food than fresh due to the portions being too large and not being able to split it before cooking, otherwise the wastage would have been significantly lower (see chart above, table 4).

In the case of Family C, the wastage was due to *“not enough rice in one pack and too much in 2 packs”*. The pilau rice was from Iceland. Family E who bought 3x400g branded Chilli and Rice commented: *“there was a lot to start with, with this meal”*. It was clearly too much for 2 adults and a small child.

The difference in the amount of waste is best illustrated in the following bar chart, table 5.

Table 5: Comparison wastage of frozen and fresh food cooked and consumed during the study week



Source: diaries

The above bar chart clearly shows that families wasted much more food when cooking from fresh ingredients than from frozen. Although on average the wastage in fresh food was more than a third, for some families it was double or more.

The bulk of wastage of fresh food was mainly rice, potatoes, bread, vegetables with some meat and fish, mainly due to cooking too much or food had deteriorated and had to be thrown away.

The wastage in cooking from frozen food was considered by families as minimal as shown above. It represents on average more than a third less when compared to cooking from fresh food. Family B and F had no wastage on frozen food at all.

Reasons for wastage on both fresh and frozen food are further explained in the next section together with more quotations from participants. See Participants Quotes on Waste below.

Participant Quotes on Waste

The following quotations from diaries and the focus group highlight reasons for wasting/not wasting both, fresh or frozen food.

Frozen Food

Using only what is required

Many families were able to cook only the amount they needed, therefore minimising the wastage, as illustrated below from the Focus Group and diary:

Family I - " It is easier to avoid waste on frozen as you can put the remainder back in the freezer".

"I do buy frozen herbs, I find them quite good. They come in a foil pack and they are already chopped and everything, you just snip off the end and shake out what you need ". "It is more effective isn't it, you can control it and not have to do the shopping and everything".

"Yes if you only use small quantities when cooking it doesn't make sense to buy fresh".

No deterioration of food

Most families felt, as highlighted at the focus group that with frozen food there is not much wastage as there was no *deterioration*, or out of date food that cannot be put in a freezer. In addition there is no additional waste when preparing food, for example, peels, ends of food etc.

No wastage due to small portions sold

Some families found some ready meal portions too large but they also found some portions too small. In the case of small portions there was no wastage, especially if the meal was liked, as quoted for example by Family B who said that with Branded Frozen 340gm Fish Pie. "There was no waste as the portions were small".

Wastage due to large portions sold

Waste due to large portions was evident, when a portion was bought for a child as a member of Family E commented on Branded Chilli and Rice " there was a lot to start with, with this meal": The Family bought 3 portions of Chilli and Rice, each portion containing 500g which was clearly too much for 2 adults and a 5 year old child.

Fresh Food. The following reasons were highlighted for waste in the fresh food preparation

Too much being cooked from fresh and then thrown away, if it cannot be frozen again as shown by two families:

Family A: “Mash thrown away 175 g” (fresh).

Family D: “Leftover finished dish 300g (fresh tuna and pasta bake). Recipe made 4 servings so I thrown (some away). The dish could not be frozen after cooking so not as good value for money as others could be.”

Too much being served. Some families felt that too much food was being prepared as quoted from the focus group: “I think it is to do with servings, they eat less than you are putting out”

Deterioration of Food. These were further comments made at focus group:

“When your vegetables get slightly bendy you throw them away”

“Things like perishables”

“Mine was always pasta and rice”

“I had some vegetables that had to be discarded at the end of the week”

“Food going out of date”

Taste Comparison

Comments from both diaries and from the focus group revealed a mixed response to the question of taste.

Whilst on average, families preferred the taste of most of their own freshly cooked meals, there were some frozen meals that tasted “better than home-made” or “as good as”, This is illustrated in the following quotations:

Family I: “Branded Potato and Meat Pie “very tasty, as good as home-made, even the pastry was excellent”

Family F: Branded Salmon Fillet was “just like fresh”

Family H: Branded Beef Stew and Mash Potato “This meal was very tasty, it had lots of flavour. The children loved the frozen mash and commented that it was nicer than mine”

The preference for many freshly cooked meals was that fresh cooked meals were meals:

1. That they were familiar with having cooked before
2. They knew how to prepare in order to achieve the expected taste they desired.(for example, the required amount of seasoning, and cooked only with the ingredients they were used to).

NB .All families were selected on the basis that they normally cook from fresh but were prepared to try out the frozen equivalent. Consequently there was a lot of experimentation in finding suitable frozen equivalent, i.e. different brands, price range, availability etc.

The importance of the families knowing what to buy (within the frozen range) is further highlighted by the following comments: "It is surprising what you can buy, perhaps with a little research and trial and error you could actually find really good food at very reasonable prices"

"If you cook from fresh you know exactly what you are putting in, if you are buying frozen you can have five lined up and they will taste completely different, so if you are going to do it. It is going to be trial and error, finding ones' you like I suppose isn't it"

Participants Quotes on Taste

Additional favourable quotations on TASTE

Some further quotations were selected to illustrate that families found some meals very tasty.

Family A: Branded Chicken Curry. “This was a very tasty curry! Not much chicken but the sauce was spicy and the rice was full of flavour. The sauce was nice rich colour with chunks of tomato and peppers. Rice was a lovely yellow colour”.

Branded Sausages. Vegetable Mix. “Sausages tasted the same as fresh. Veg was a little bland but looked nice, bright in colour.” Branded rice –“ we were also surprised how nice the rice was. We never used frozen rice before”.

Family B: Branded Chicken Tikka Masala. “This was really tasty, it was quite spicy and had quite a bit of chicken. I would buy these curries again for a quick meal”.

Family C: Branded Haddock in Batter.” Very nice crispy batter on the fish”. Branded Pork Joint and Roast Potatoes.” Pretty good. The meat was quite tender and the potatoes were nice and crisp”.

Focus Group comment: “ I was worried because they (children) don’t like my own curry but they said it were great. Yes the pizza was ok, I can’t remember what it was called, a nice big pizza, a nice pepperoni pizza and taste better than a lot of them fresh ones really”

Family F. “My son, who is 10 loved the frozen options (in the week’s study) and I think I would now have a supply of certain frozen foods in the freezer for convenience for him.” Branded Stuffed Chicken Breast Joint and Roast Potatoes. “Chicken was tasty and juicy, however roast potatoes didn’t have much taste.”

Family G: Branded Beef Dinner. “Surprisingly tasty, little dry, but meat tender and tasty”

Family H: Branded Salmon and frozen rice.” The salmon was very tasty. It was very moist. The frozen rice was just perfect”.

Family I: Branded Spicy Italian Meat Balls - “Meat Balls were tasty and not too spicy”

Other findings:

Perception on Nutritional Value/Health

General perception was that “fresh” were healthier than “frozen” apart from certain types of foods, for example some vegetables such as peas as quoted “they are actually better for you nutritionally” (peas).

Frozen Fish also was perceived as healthy: “its just as good as fresh”

Preference of well known brands

In general, families thought that well known brands of frozen food tasted better and were perceived to be healthier.

Convenience of cooking from frozen food was a major plus as illustrated by the following comments

“well, I can cook up a meal in 20 minutes (fresh)”

“Yes, but time wise all that messing about with fresh food, when you can put a meal (frozen) in the microwave and have it ready in 3 minutes”

“Yes but if you have three or four meals to put in the oven it could take 45 minutes just to cook ready meals”

“Yes but you don’t have to sit and watch them all you can go and do something else and come back to it, which you can’t with fresh”

“You open the freezer door, pick one and you are done”

“I think it is handy if you know you are going to be busy that evening, you can a couple of nights per week do a frozen whatever and then know that you will end up with something half decent to eat, but you couldn’t do that every night, could you when you come home in the evening”

The above comments were shared amongst the whole group at the Focus Group. Also comments analysed from diaries shows that for most families cooking from frozen food was regarded as very convenient.

5.CONCLUSIONS

The main conclusion from the study is that frozen food creates less wastage, (on average 36.77%) and reduces costs by average of 33.12%. and there are many frozen meals for consumers to choose from to meet their taste expectations.

The study also reveals that there is still a lack of awareness of the benefits of frozen food such as low cost, variety, nutritional value and convenience. The perception amongst the families before taking part in the study was that fresh is best.

The study made some of the families more aware of the potential advantages of cooking from frozen food and made some of them question if fresh is always best or healthiest as stated at the Focus Group by one of the participants: ***“we all seem to assume that whatever we cook fresh is healthier but I don’t think that is necessarily the case”***

Further Conclusions

Most families pointed out that cooking solely from fresh for one week and then only from frozen in the next week whilst important for the study, in normal situations, they would mix cooking between fresh and frozen which for them works best.

Evidence from both the completed diaries and from the focus group ***suggests that families will incorporate more frozen meals into their weekly diet.*** The experience of participating in this study enabled them to find some suitable frozen dishes and at the same time make cost savings as stated by one family:” *Initially we could not find an Iceland near us but when we did find one we were actually quite amazed at the products that they did, and they actually had some really good products. You could buy almost anything. From that experience, I would actually buy the frozen products which I would not have done in the past. I think the value came through, it was actually an eye opener, because you don’t analyse what it actually cost you for a meal do you?”*

This reinforces the findings as to “value for money” in frozen food.