

- Expiration -

Background Information

- Once, I noticed something printed on the back of a packet of snacks: “EXP: 122521”.
- I did not know what EXP stands for and what the numbers after it meant, [REDACTED] replied that it was the expiration date when the food loses its nutritional value. Hence, many would throw expired food away.
- After hearing what he said, I decided to not consume it and was about to throw expired food away when he said that it was still fine for me to eat it so as to reduce **food wastage**.

Motivation

- Feeling conflicted, I want to find out whether it is indeed safe to eat food that has expired.
- I would also like to find out if [] from [] eat expired food so that I can share my findings with them.

Research Aim

To educate [redacted] students on expired food, the difference between 'use by / expiration' and 'best before' dates, and how to tell whether food has indeed expired.

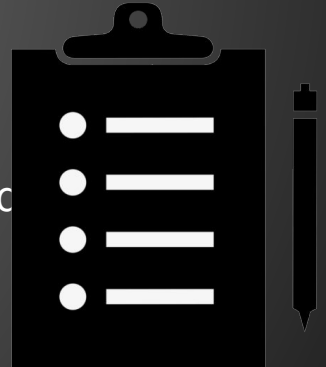


Research Question

Is food that has passed the expiration date safe for consumption?

Methods of Gathering Data

- Research to find out more on food safety and if expired food can still be consumed:
 - the types of food that can/cannot be consumed and reasons why
 - how to check if expired food can still be eaten
 - other important and/or related information on food safety
- Conduct a survey to see if consume expired food, and the reasons why.



Definition

Use By and Best By

Based on my research readings, I have learnt that:

- Food past its '**best by**' date is safe for consumption but the product may lose its quality; e.g. taste, flavour, aroma, appearance, colour
- Food past its '**use by**' is considered not safe for consumption and should not be eaten.

Is It Safe to Eat Food That Has Expired?

According to Janilyn Hutchings, a certified food safety professional at State Food Safety, here are some general factors that are important to note:

1. How susceptible is the food to bacterial growth?

- Bacteria need three things to grow: food, moisture, and warmth.
- Food item that has a high number of carbs or protein and contains moisture is more vulnerable to bacterial growth.
- Dairy, eggs, cooked grains, cut greens, fruits, and other vegetables, opened condiments, meat and poultry, and fish are more susceptible to bacterial growth than other types of food.

Storage Methods

Refrigerator	Freezer
<ul style="list-style-type: none">• Refrigerator temperatures do <u>not</u> completely stop bacteria from growing, but they just slow its growth.• Perishable foods generally can last for about seven days.• Exception: opened condiments as they are generally more acidic	<ul style="list-style-type: none">• Freezer temperatures stop bacteria from growing.• Food stored in the freezer is generally safe to eat indefinitely.• Though safe for eating, the quality/ taste will be compromised.

Foods That Are Still Good After Expiration

Food Item	Room Temperature	Refrigerator	Freezer
Eggs	2 days	4-5 weeks	
Bread	5-7 days		3-6 months
Canned Corn	1-2 years		
Cereal/ Granola	1-3 weeks		
Dried fruit	1-3 weeks		
Crackers	1-3 weeks		
Chips	1-3 weeks		
Pasta	1-3 weeks		
Dry Ingredients (flour, salt, sugar)	1-2 months		
Hard cheese		Weeks after	

Foods That Are Still Good After Expiration (cont.)

Food Item	Room Temperature	Refrigerator	Freezer
Milk		1 week	
Nuts	Weeks to months after		
Uncooked pasta/oats/oatmeal/rice	2 years		
Root vegetables (carrot, radish)	several weeks		
Yoghurt		3 weeks	
Honey	Indefinitely	Indefinitely	
Marinara Sauce (for pasta)	1-4 weeks	1-4 weeks	

IRS Survey Form

My name is [REDACTED] from [REDACTED] I am doing my Individualised Research Study to find out how many [REDACTED] consume expired food and whether it is safe to do so or not. Please take a few minutes to complete this survey and be rest assured that your responses will be kept strictly confidential. If you have any other comments for the question/section, feel free to write them down. Kindly return the survey to me upon completion. Thank you!

For each question, please respond using a scale of 1 to 5; 1 never, 2 rarely, 3 sometimes, 4 often, 5 always.

Q.	Statement	Write 1,2,3,4 or 5
1.	I am aware that food comes with an 'expiration' date.	
2.	I am aware that food comes with a 'best by' date.	
3.	I am aware that food comes with a 'use by' date.	
4.	I take note of these dates when I purchase food.	
5.	I take note of these dates when I consume food.	
6.	I do not consume food after its expiration date.	
7.	I do not consume food after its best by date.	
8.	I do not consume food after its use by date.	
9.	I read food labels to find out how to store it properly.	
10.	I eat food that is stored properly even if it has been kept for a longer time.	
11.	I usually throw away leftover food.	
12.	I usually store leftover food properly instead of throwing it away.	
13.	I usually store leftover food quickly in the fridge instead of throwing it away.	
14.	I do not mind eating food that is a few days old as long as it is fit for eating.	
15.	I throw away food that has been out at room temperature for longer than 2 hours.	
16.	I store food in the freezer to extend its shelf life.	

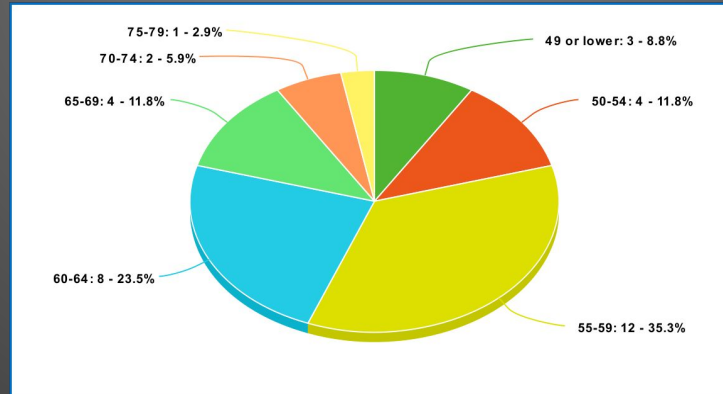
Data

After receiving all my data, I managed to have a total of 34 valid responses from different participants. I decided to record all of their responses down on an Excel spreadsheet. Below is a preview of my responses, which includes each participants' scoring for every question and their total score out of 85, and their average score for every question out of 5.

IRS Survey Form Responses																																					
Part 1																																					
No.	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	Total	AVG	
1	5	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	4	4	5	5	5	164	4.82	
2	5	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	3	3	4	5	5	5	160	4.71	
3	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	4	3	4	5	5	5	162	4.76
4	3	3	3	3	3	3	3	5	5	5	5	5	2	5	4	4	2	3	3	5	1	5	3	4	3	1	1	1	2	2	2	4	4	4	111	3.26	
5	4	3	3	3	4	4	3	5	5	4	5	4	4	5	4	4	4	2	4	5	1	4	2	5	4	2	1	3	3	2	2	4	2	4	118	3.47	
6	3	4	5	5	5	3	5	5	5	4	3	5	5	5	3	5	4	4	4	5	5	4	5	5	3	4	4	5	5	2	3	5	2	5	144	4.24	
7	3	5	5	5	5	3	3	5	5	4	3	5	1	5	3	3	4	4	5	5	1	4	3	5	3	4	2	2	1	2	3	5	2	5	123	3.62	
8	3	5	5	5	5	3	5	5	5	4	3	5	5	5	5	5	4	4	4	5	5	5	5	3	4	2	3	4	2	3	5	2	5	143	4.21		
9	5	3	4	4	3	4	4	5	5	4	4	2	2	4	5	3	3	2	3	3	3	2	2	2	4	5	2	4	1	1	2	4	3	4	111	3.26	
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12	2	3	1	3	1	4	1	1	1	1	3	2	1	5	3	1	2	4	2	1	1	5	1	1	3	2	4	2	1	2	3	3	4	1	75	2.21	
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17	4	2	4	5	3	5	4	5	5	5	4	5	3	1	4	4	3	5	5	3	5	3	5	4	4	4	1	3	5	3	5	3	5	4	5	133	3.91
Total	57	56	61	66	59	63	56	59	65	59	64	62	52	77	71	62	59	63	53	67	44	72	59	64	58	57	47	57	50	47	52	66	56	61	2021	59.4	
AVG	3.35	3.29	3.59	3.88	3.47	3.71	3.29	3.47	3.82	3.47	3.76	3.65	3.06	4.53	4.18	3.65	3.47	3.71	3.12	3.94	2.59	4.24	3.47	3.76	3.41	3.35	2.76	3.35	2.94	2.76	3.06	3.88	3.29	3.59	119	3.5	

Findings

After analysing the results and calculating their total scores, I realised that about 44.1% of [redacted] pupils has an awareness level below 70% (60 out of 85), about 8.8% of all participants have a poor awareness score under 58.9% (50 out of 85), and the total average score of all participants is 69.8%. From this information, I deduced that most [redacted] are generally unaware of whether food past its expiration date and food past its best before date is safe for consumption.



Conclusion

After analysing the results and calculating all the survey participants' total scores, I deduced that most [redacted] are generally unaware of whether food past its expiration date and food past its best before date is safe for consumption. Thus, I created a poster to educate [redacted] about the difference between the 2 different expiration date labels.



Limitations

- I was unable to receive as much data as I was hoping for as only 34 people participated in my survey.
- Many survey participants submitted their surveys with invalid responses and hence their responses could not be recorded as data for my project.
- I was unable to ensure that all survey participants did not answer dishonestly.



REFERENCES

- The Difference Between 'Use-By' 'Sell-By' and 'Best-By' Dates
www.sciencedaily.com/releases/2015/04/150415203336.htm
- 13 Foods That Are Still Safe to Eat After the Expiration Date
www.eatthis.com/foods-safe-to-eat-after-expiration-date/
- Finding Research Data
www.wur.nl/en/Library/Researchers/Finding-sources/Finding-research-data.htm

Includes photos from iStock by Getty Images™.

Thank you for your kind attention!

Special thanks to [REDACTED], my [REDACTED], and all of my survey participants.