

Potatoes and the Variability of the Glycemic Index

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A couple of years ago, I wrote an article about the glycemic index and the factors that can affect it.¹ I also compiled a glycemic index for a textbook chapter I wrote.² Whenever I hear people discussing glycemic index, the natural response is to see the numbers as absolute. What most glycemic index charts don't say is how variable true GIs are. The following is a good example of how easy a "bad" food can become "good."

A few months ago, I read a very interesting article on the glycemic index of potatoes. Two Canadian dental students and a professor of nutrition at the University of Toronto Medical School teamed up for a study to see how different varieties of potatoes and different cooking methods could affect the glycemic index.³ In the first part of the study, the researchers compared russet potatoes that were baked, refrigerated at least 24 hours, and then reheated in a microwave, with russet potatoes that were baked that day. In the second part, they compared russet potatoes that were precooked in a microwave oven, refrigerated at least one day, and then reheated in a microwave oven, with russet potatoes that were microwaved that day. They also compared white potatoes that had been boiled, refrigerated, and reheated in a microwave oven, with white potatoes that were boiled that day.

The results showed there was little difference between baking and microwaving a russet potato just prior to consumption. The russet potatoes precooked by microwave had an 18% lower glycemic response than the same-day-microwaved russet potatoes, although the authors said this was not statistically significant, due to the small sample size of subjects (10). The russet potatoes that had been oven baked, refrigerated, and reheated in a microwave had a 30% lower response than those oven baked and consumed fresh. Finally, the glycemic index of white potatoes that were boiled, refrigerated, and reheated did not differ from white potatoes that were freshly boiled.

In a second phase of the study, the authors tested seven meals that each provided 50 gm of available carbohydrate. The following were compared:

1. russet potatoes cooked in a microwave oven;
2. instant mashed potatoes;
3. white potatoes cubed and oven roasted in a baking dish;
4. white potatoes cooked in a microwave oven;
5. red potatoes cubed and boiled;
6. red potatoes cubed, boiled, refrigerated at least 18 hours, and eaten cold;
7. frozen French fries baked in a conventional oven.

Table 1 - Results

Test Meal		Glycemic Index
1.	Microwaved russet potatoes	76 ± 8.7
2.	Instant mashed potatoes	87.7 ± 8.0
3.	Oven-roasted white potatoes	73 ± 8.2
4.	Microwaved white potatoes	72 ± 4.5
5.	Boiled red potatoes	89 ± 7.2
6.	Boiled red potatoes, refrigerated and consumed cold	56 ± 5.2
7.	French fries	63 ± 5.5

Comment

It is clear that both the method of cooking and variety of potato can affect glycemic index. What was most interesting was that when a red potato was boiled, refrigerated, and consumed cold the next day, the glycemic index plummeted 37%, from the upper end of a high glycemic index food (89) to one point away from classification as a low glycemic index food (56).

Table 2 - Glycemic Index and Glucose Scale

Glycemic Index	Glucose Scale
High	70-100
Medium	55-69
Low	54 or less

When potatoes are cooked, the starch granules absorb water. This is called gelatinization, and it tends to change the structure of the starch, making it more susceptible to the digestive enzymes. When the cooked potato starch is cooled, the molecules bond in an irregular fashion, making it more difficult to be hydrolyzed by enzymes. The authors mention that repeating the cooking-cooling cycle will continue to result in a more resistant starch. The more resistant a starch is, the longer it will take the body to break it down, digest, and absorb it.

Please note that this was only one small study. But the next time you read a GI chart, remember that the published values are far from absolute. In this case of red potatoes, eating them cold the next day makes a huge difference.

References

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