

Lions and Tigers and Gummy Bears. And Diarrhea. A Pantload of Chemistry



By Josh Bloom — August 1, 2020

COVID COVID COVID COVID. Enough already. We need a break. Fortunately, We got a tip about a steaming, hot story (which will at least temporarily take your mind off COVID.) Certain Haribo Gummi Bears have been causing intense gastrointestinal distress in some people who have partaken, and they're not shy about revealing this. Or is this just urban legend? Let's get to the "bottom" of this. With a mini chemistry lesson.



Frank, the tuna, experiences severe gastrointestinal distress.

From all around the country I hear from friends and colleagues who are bored out of their minds, scared half to death, or both. And, who could blame them? COVID COVID COVID COVID COVID COVID. We need a distraction. Fortunately, one just fell into my lap, courtesy of our esteemed president Thom Golab, who sent me "[5 Things You Didn't Know About Haribo Gummy Bears](#) ^[1]."

The article could have just as easily been named "5 Things You Don't Want to Know About Haribo Gummy Bears," because it's on the tedious side of tedious. But Thom also mentioned that there were some pretty interesting comments in the review section on Amazon. He wasn't kidding. Gold.

Here are some of the comments.

- One unfortunate young woman gulped down a bunch of them at work during a night shift. The next morning while driving..." *my stomach suddenly begins to cramp and I feel the immediate urge to empty my bowels...I'm speeding along, arching my back, practicing lamas breathing techniques, anything to stall the inevitable... Finally! I spot the end of a brushy trail and whip my truck sideways, thrusting the drivers side door open and leaping from the seat to scurry around to the other side. I turn around with fingers in waste band about to drop trow and look up to my horror realizing it is indeed the end of a driveway and the folks outside are staring down toward me.*" (It got worse after that).
- Another customer stated, "*I weighed 189 before I ate these, I'm now a skeleton.*" No evidence was provided to support this claim.
- In a fine example of research-based cost-cutting in medicine, a constipated (and broke) reviewer writes "*I went to the store to purchase some medicine, I had to only the \$10 in change [I scrounged] from the couch, but MiraLax was \$11, with tax. But these gummies, free 2-day shipping, I knew this was a win-win... "the prized gummies made their way to my door. Just the opening smell from the bag, made my bowels rumble like a UCF fight. I knew this would do the trick. Forget Miralax, this stuff is the JAM!"* He does not lack gratitude. "' *My intestines want to specifically thank Haribo and their Anti-Sugar stance. These outperform any modern medicine when you need to be "on-the-go".'*

Yet, it gets *better*. From another reviewer, who ate a **pound** of them here's the winner. This guy can really write (emphasis mine):

- *I sit here writing this review at 4 AM from my porcelain throne, a fixture you will become all too familiar with if you chose to eat these cute little bears from the pits of hell...Like **the slow build-up of a Martin Scorsese** film however, those bears were waiting for **their baptism scene to destroy my insides**. It started with the cramping, very akin to doing 1,000 crunches and then being forced to hold the 1,001st crunch indefinitely. Then came the initial "run" which opened the proverbial flood gates. I'm over 30 and I'm beginning to wonder if these bears know that and want to send me back to the can for each year I've been on this earth to make me wonder why I'd ever been born. **In between gastrointestinal bouts of pressure washing the inside of my toilet from my anus** I lay in bed feeling as if someone were to punch me in the stomach, I'd explode, **turning the walls of my bedroom into a soiled Jackson Pollock rendition**.*

(I can't stop laughing. If ACSH had the budget and the need for another juvenile idiot on the staff this guy would have a new job.)

So, what's going on? Your hint is that it is only the sugar-free gummy bears, not the regular ones.

Indigestible Sugars Are Laxatives

To understand why this is we don't need a full-fledged version of The Dreaded Chemistry Lesson From Hell®. (My apologies to both of you who actually enjoy TDCLFH®. It will be back.)



A Mini-Chemistry Lesson From Cleveland® will suffice at this time.

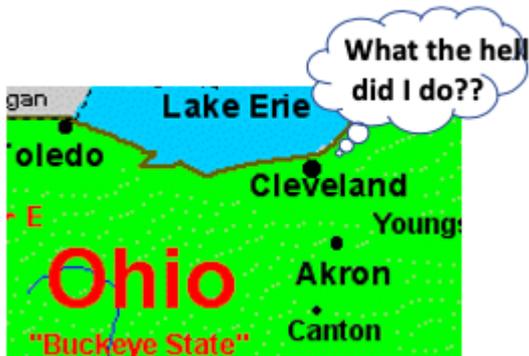
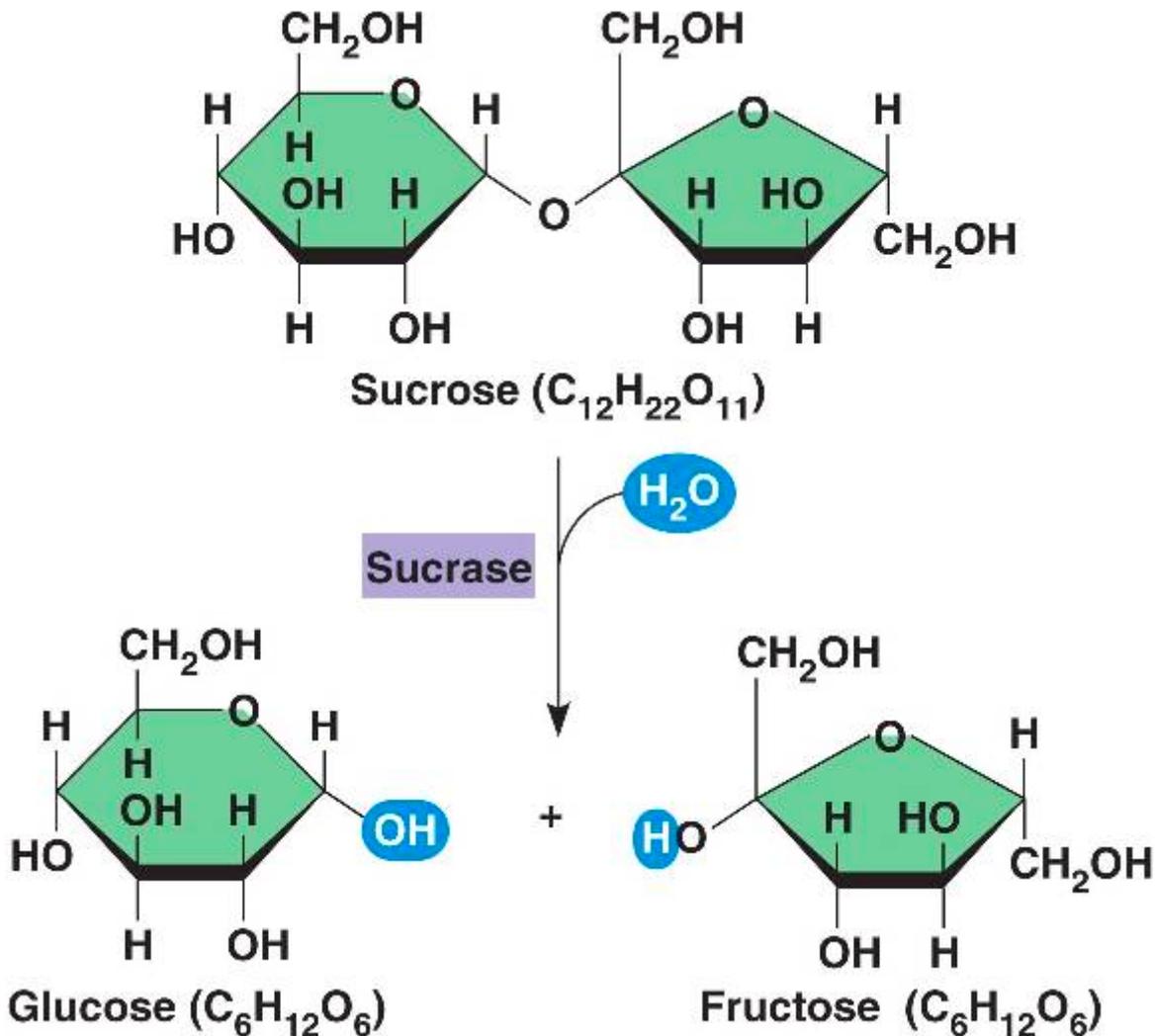


Image: [Enchanted Learning](#) [2]

The MCLFH® is all about the enzymatic breakdown of sugars, or the absence thereof.

Sucrose (cane sugar) is enzymatically hydrolyzed in the gut to form glucose and fructose.



The hydrolysis of sucrose is catalyzed by the digestive enzyme sucrase. Once formed, glucose and fructose are quickly absorbed, either by the stomach or small intestine and enter the bloodstream. Source: [Socratic.org](https://www.socratic.org) [3]

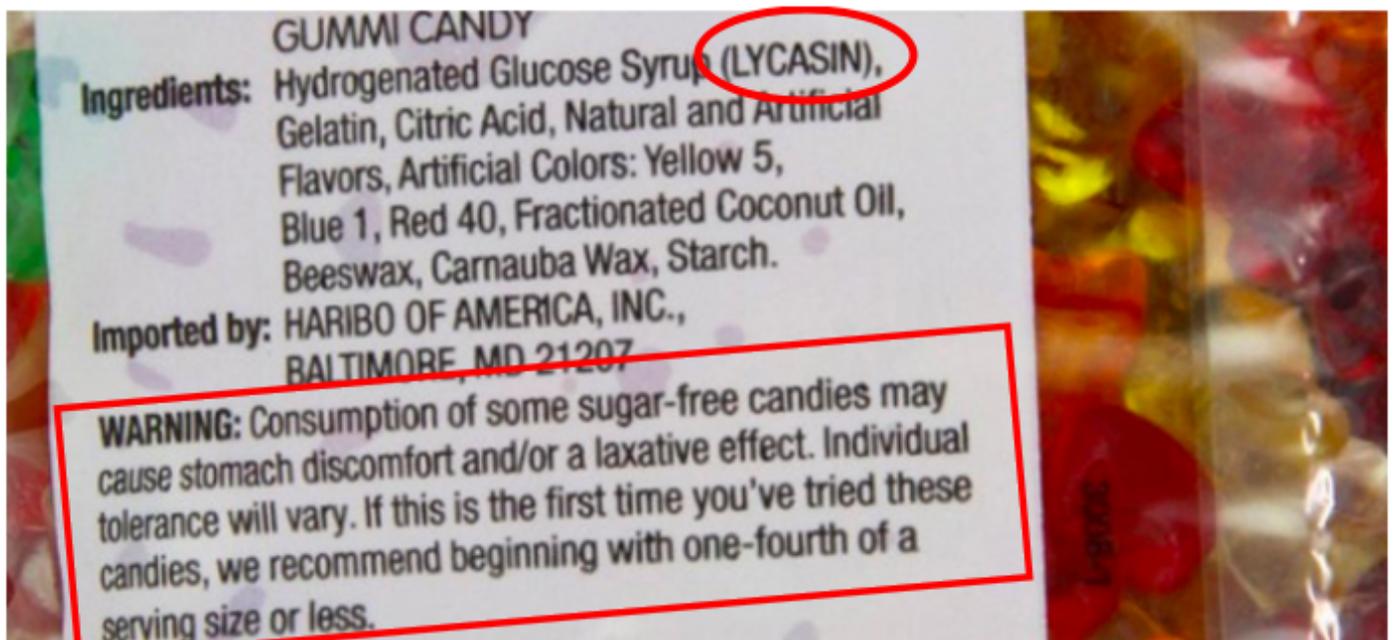
Do all sugars behave the same?

No way. Just about any organic molecule that contains multiple hydroxyl (OH) groups will be sweet, but the body handles them differently. One class of sugar substitutes is called "sugar alcohols" (1). Although they may fool your taste buds they won't fool your intestines. Sugar alcohols are not as well absorbed as sucrose. Nor are they metabolized the same. The table below shows the common sugar alcohols and how "fond" your intestines are of them.

Absorption, Fermentation & Excretion of Sugar Alcohols (g/100g)			
Sugar Alcohol	Absorption	Fermentation	Urinary Excretion
Erythritol	90	10	90
Xylitol	50	50	<2
Sorbitol	25	75	<2
Mannitol	25	75	25
Isomalt	10	90	<2
Lactitol	2	98	<2
Maltitol	40	60	<2
Polyglycitol	40	60	<2

Source: Livesey, G. (2003). Health potential of polyols as sugar replacers, with emphasis on low glycaemic properties. *Nutrition Research Reviews*, 16(2), 163-191. doi:10.1079/NRR200371

It would seem obvious that I am calling your attention to maltitol. There's a reason for this. It also goes by a different name – Lycasin. You don't need a Ph.D. in chemistry to know what's coming next...

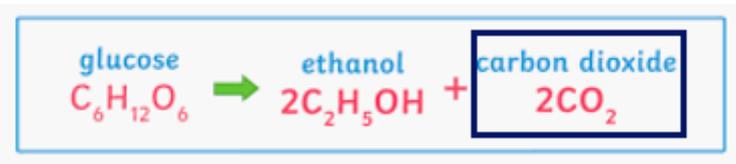


Haribo Sugar-Free Gummi Bear Label. Uh oh.

The creative, intestinally-distressed individuals who wrote the reviews at the beginning should have read the warning label. They were eating a laxative.

Why is maltitol a laxative?

Part of the answer can be found in the table above. Only 40% of it gets absorbed and the rest of it goes... you know... where bacteria are only too happy to ferment it. Although the fermentation of maltitol and sucrose aren't identical, they are similar, both produce a lot of gas...



...the effect of which can be demonstrated by Frank, the dyspeptic tuna.



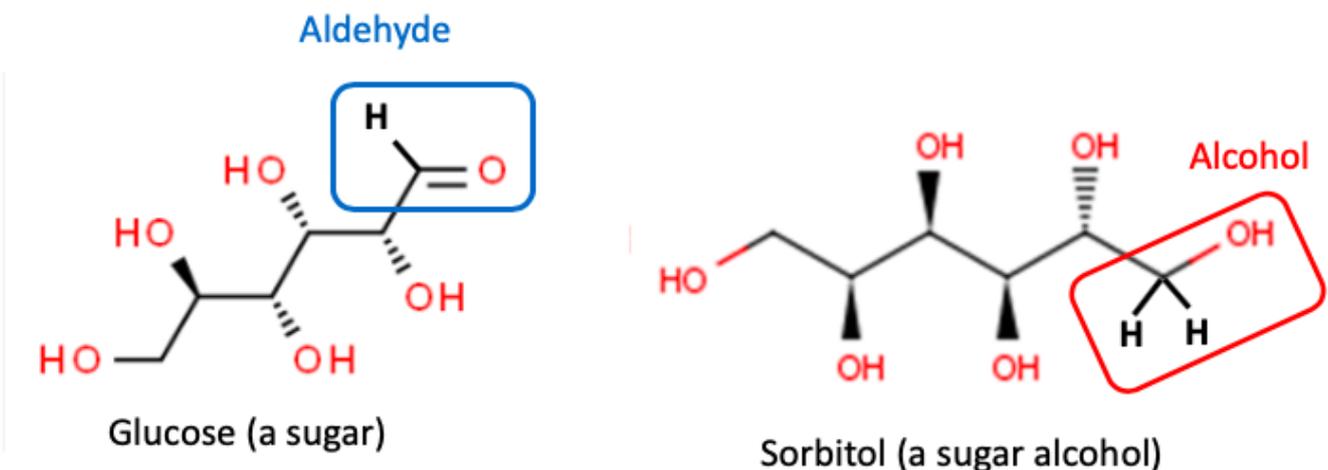
Furthermore, if large amounts of maltitol are consumed and are sitting around in the intestine it can act as an [osmotic laxative](#) [4], just like Miralax or some of the other lovely colonoscopy preps, by bringing large amounts of water into the large intestine.

So, a bunch of gas plus liquid in your guts, and...

"Ladies and gentlemen, if you have never farted like a Howitzer and wish to experience it for yourself, pick up some of these sugar-free Haribo Gummi Bears. If you have a roomie or co-worker who's always eating your snacks, leave a dish of these lying around. I bet they'll never eat your food again. If you enjoy the feeling of being bloated like a Macy's Thanksgiving Day balloon, or want to experience searing gut pain not unlike appendicitis, or feel like you just haven't been spending enough time in your favorite bathroom then this is the candy for you."

NOTE:

(1) Sugars and sugar alcohols differ by the oxidation state of one carbon. Glucose contains an aldehyde group while its reduced analog sorbitol has an alcohol group in the same place on the molecule. The reaction of an aldehyde to an alcohol is called a reduction. This is why sugar alcohols are sometimes called hydrogenated carbohydrates.



Source URL: <https://www.acsh.org/news/2020/08/01/lions-and-tigers-and-gummy-bears-and-diarrhea-pantload-chemistry-14933>

Links

[1] <https://www.thedailymeal.com/eat/5-things-you-didnt-know-about-haribo-gummy-bears>

[2] <https://www.enchantedlearning.com/usa/states/ohio/>

[3] <https://socratic.org/questions/sucrase-is-an-enzyme-that-breaks-sucrose-down-into-glucose-and-fructose-what-hap>

[4] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5093271/>