Tangled in a Net?

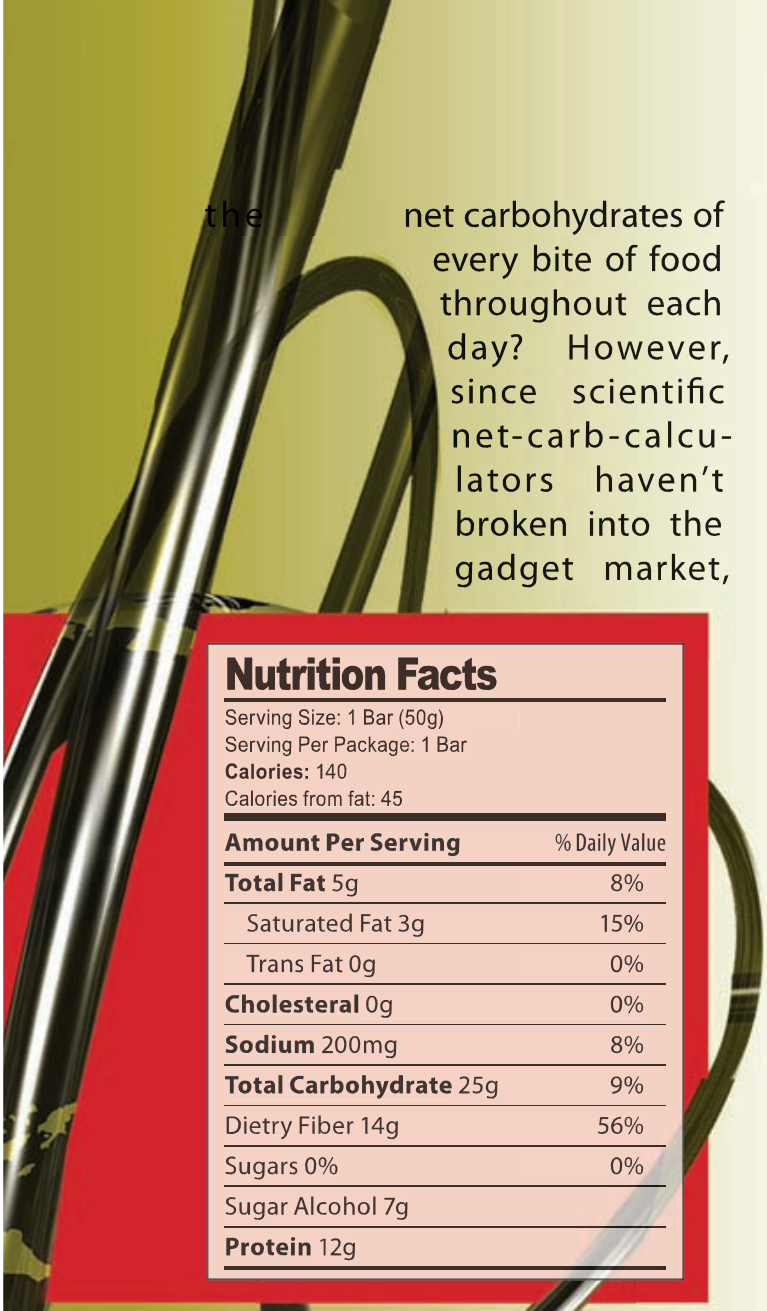
Get untangled, with these guidelines for accurate net carb counting

by R. Baren

Concentration was challenging, my thinking skills were dull. I had hit that mid-afternoon slump, when there's still ample time left in the day to get work done, yet not much motivation in the air. It was the perfect time to refuel. With a steaming mug of coffee in hand, I picked up a package of newly purchased "nutritious snack bars." Conscientious about carbs, I flipped the box over to check the nutrition label. Okay, total carbohydrate grams per serving were clear (25g), and right beneath were the listings for dietary fiber (14g) and sugar alcohols (7g). I racked my tired brain trying to recall what I was supposed to do with that information. I knew that I had to find the net carbs, but the mathematical formulae eluded me. Subtract half the grams of fiber… or was it half the sugar alcohol? And what was that again about only subtracting if there's more than 5 grams?

An image of my daughter's sleek scientific calculator popped into my head, with all those nifty buttons, like cos and sin. Wouldn't it be great if we had a specialized calculator to determine

the net carbohydrates of every bite of food throughout each day? However, since scientific net-carb-calculators haven't broken into the gadget market,



Nutrition Facts

Serving Size: 1 Bar (50g)
Serving Per Package: 1 Bar
Calories: 140
Calories from fat: 45

Amount Per Serving	% Daily Value
Total Fat 5g	8%
Saturated Fat 3g	15%
Trans Fat 0g	0%
Cholesteral 0g	0%
Sodium 200mg	8%
Total Carbohydrate 25g	9%
Dietry Fiber 14g	56%
Sugars 0%	0%
Sugar Alcohol 7g	
Protein 12g	

it's advisable and more practical to simply become familiar with the main guidelines for computing net carbohydrates – also known as usable carbs, nutritive carbs, effective carbs, or glycemic carbs.

The first step – the root of the equation, if you will— is to focus on carbohydrates. What are they, and why count them?

Common carbohydrates include starches, sucrose, fructose and lactose, all of which are eventually broken down into basic sugar before entering your bloodstream and raising blood glucose levels. The ultimate goal is to eat snacks and meals in a way that promotes stable blood glucose. So whether you settle down to enjoy your favorite dish of comforting starchy food, naturally sweet fruit salad, a tall glass of frothy milk, or a spoonful of sugar straight, every swallow of carbs is directly correlated with blood glucose fluctuations. A good grip on how different foods affect glucose contol will help you to count carbs accurately – and accurate carb counting will take you a long way towards improved control with both type 2 diabetes and type 1 diabetes, as well as with weight loss and general healthy eating.

When faced with the problem of how to count carbs, I consider myself fortunate. For while my daughter presses a frenzy of buttons to find the value of x in her trigonometry homework, I have nutrition labels with all of the numbers provided. Total grams of carbohydrate and dietary fiber are printed on any processed or packaged food. In addition, low carb, low sugar, and sugar-free foods must display the amount of sugar alcohols contained.

Why bother reading the whole nutrition label? Isn't it enough to know the total grams of carbs per serving? Nope, it's not… because all carbs are not equal. Precise

carb counting is therefore based on factoring in only the carbs that impact your blood glucose. Now we're back to where I started out, baffled by how to find the net carbs in my snack bar.

Deducting Dietary Fiber

The total carbohydrate grams per serving need to be adjusted to accommodate for carbohydrates not absorbed by the human digestive system. Cellulose (plant fiber), better known as dietary fiber, is not absorbed and therefore does not generally impact blood sugar levels significantly.[1]

Recommended guidelines for how to deal with fiber vary. The three basic methods are as follows:

1. **Subtract the full amount of listed fiber grams from the total carbs.** Gary Scheiner, MS, CDE, and author of "Think Like a Pancreas" (Marlowe, 2004), supports this approach since fiber doesn't raise glucose.

Snack bar calculation:
25g -14g = 11g carbs

2. **Subtract the full amount of fiber grams, only if eating more than 5 grams of dietary fiber total.** The 2005 Joslin Guide to Diabetes, asserts that most people can ignore the dietary fiber content. Yet for more precise carb counting, all of the fiber can be deducted when there is more than 5 grams total consumed at one time.

Snack bar calculation:
25g -14g = 11g carbs

3. **Subtract half the amount of listed fiber grams from the total carbs, only when eating more than 5 grams dietary fiber *per serving*.** American Diabetes Association guidelines recommend this approach. Note that the ADA only applies this rule when consuming foods with more than 5 grams fiber per serving.

Snack bar calculation:
25g – 7g = 18g carbs

Which method should you follow? The answer is highly individual, and trial and error is the only way to figure it out. It's wise to start with the first approach – subtract all the fiber grams, and check your sugars carefully to see what happens. Some people have found that a combination of methods is most effective, depending upon how and what they are eating. For example, Rabbi Hirsch Meisels testifies, "When I eat low-carb, I don't deduct at all. Yet when I eat more carbs, I'll subtract 2/3 of the fiber." Tweak and refine your personal calculations until you see the blood glucose results that you want.

[1] "Counting Carbohydrates Like a Pro. Practical Tips for Accurate Counts," Diabetes Self Manag. 2009 Mar-Apr; 26(2):8, 10-2, 14.

Subtracting Sugar Alcohols

With dietary fiber deducted, the tasty snack bar is now one step closer to being eaten. Next up on the nutrition label are sugar alcohols. Also called "polyols," sugar alcohols are made by adding hydrogen atoms to sugars. Unlike alcoholic beverages, they contain no ethanol and are not alcoholic. The chemical structure though partly resembles alcohol and partly resembles sugar, hence the name. Sugar alcohols (regulated by the FDA as food additives) are found in many processed foods, adding sweetness and texture. Well-known examples of sugar alcohols include sorbitol, maltitol, mannitol, xylitol, isomalt and erythritol.

Sugar alcohols are only partially absorbed into the bloodstream. Their impact on blood sugar is therefore less than that of sugar, and calories per gram are also less than sugar. Yet depending upon the specific sugar alcohol, "less" may still pack a powerful punch. While many sugar-free treats may pique and raise your interest, beware that many of these foods also raise blood sugars.

Guidelines for how to subtract grams of sugar alcohol from total carbs are correlated with the type of sugar alcohol. Check which sweetener is listed in the ingredients. As detailed in the chart below, sweeteners such as maltitol are capable of impacting blood glucose even more than some high carb vegetables, such as carrots. With 2-3 cal/g and 75% of the sweetness of sugar, only ¼ of the carb grams from maltitol can be subtracted from the total carbs. In contrast, erythritol and mannitol have very low glycemic properties, with virtually no effect on blood sugar. A basic familiarity with the main sugar alcohols on the market helps with understanding how to compute net carbs.

Comparison of Sugar and Sugar Alcohols [2] :

TYPE OF SUGAR ALCOHOL	CAL/G	% EFFECTIVE	% TO DEDUCT
Sucrose (sugar)	4	100%	0%
Malitol Syrup	3	75%	25%
Hydrogenated Starch Hydrolystate	2.8	70%	30%
Maltitol	2.7	68%	33%
Xylitol	2.5	63%	38%
Isomalt	2.1	53%	48%
Sorbitol	2.5	63%	38%
Mannito;	1.5	38%	63%
Erythritol	0.2	5%	95%

No single formula for net carbs can obviously apply to all sugar alcohols. To simplify matters in the beginning though, Gary Scheiner advises the following rule of thumb:

Subtract half the grams of sugar alcohols from the total carb count.

Snack bar calculations:

Using carb values from fiber method #1 and #2:
11g – 3.5g = 7.5g net carbs/bar

Using carb values from fiber method #3:
18g – 3.5g = 14.5g net carbs/bar

Many long-time carb counters have found success by starting with this guideline and experimenting with a few different foods sweetened with sugar alcohols. Refer to the provided chart for additional guidance. Once again, we're back to trial and error as the only true way to know what works. After experimentation, many people with diabetes report that they cannot deduct anything for sugar alcohols, or they experience high blood glucose.

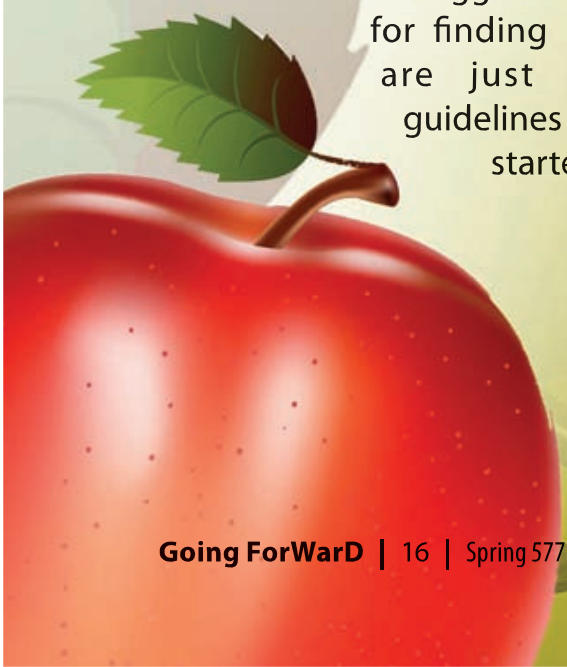
[2] Based on "Health Potential of Polyols as Sugar Replacers, With Emphasis on Low Glycemic Properties," by G. Livesey. Nutrition Research Reviews 2003; 16:163-91.

NATIONALITY MATTERS, WITH NET CARBS

Nutrition labels in European and Oceanic countries, versus the United States and Canada, cannot be interpreted the same. The US and Canada determine the amount of carbohydrates indirectly, by measuring water, protein, fat and ash per 100 grams, and then subtracting this amount from 100. The result is the total carbohydrate amount, including unavailable carbs such as fiber. However in Europe and Oceania, effective carbohydrates are computed directly, so the nutrition label lists net carbs and unavailable carbs separately (not together as "Total Carbohydrate"). Practically speaking, the dietary fiber has already been subtracted from the carbohydrates.

Ready to set out and woo investors with a proposal for developing scientific net-carb calculators, I stumbled over the word "scientific." For how much of individual glucose control consistently follows absolute, scientific formulae that work for all? When it comes to solving equations for blood sugar control, each person with diabetes may share the same value for x, input the same variables, go through the same computation – and still come out with a different number for y.

David Mendosa, medical writer and diabetes consultant, highlights an important principle in his article on net carbs, "It seems to me that there is a huge difference between *non-blood sugar impacting carbs* and those with a *minimal impact*."[3] This is really the crux of what determines your unique net carb formulae. Figure out which carbs impact your blood sugar fully, minimally, and not-at-all, and then start computing the numbers. All of the suggested methods for finding net carbs are just essential guidelines to get you started.

So much for my *scientific* net-carb calculator scheme, but at least now I can finally eat my snack bar with confidence.

[3] "Net Carbs. Can You really Exclude Sugar Alcohols, Glycerin, Polydextrose, and Fiber?" by David Mendosa. Mendosa.com, Feb 2004.