

# Nutrition Supplement Bars - by Alan Sugarman

## **PART ONE: GLYCERINE, THE COMPROMISE FOR LOW CARBOHYDRATE.**

Nutrition Bars. Are they really good for you? What are you really getting? In this article, we will focus on the multitude of nutritional supplement bars out there, specifically we will look at the recent trend of high protein, low carbohydrate bars being launched by many of the major companies in the supplement world. Here, we will discuss one of the most popular ways in which people are attempting to get their protein, from bars. Let me be blunt, bars are always a nutritional compromise. Why? It is nearly impossible (and no one has really done it yet so maybe it is impossible) to create a supplement bar that is high in good quality protein sources while also containing few carbohydrates while being low fat. Certainly consumers should not equate a nutrition supplement bar to a meal replacement powder. A good MRP will be far better nutritionally than supplement bar. For example, take a look at a 3 Musketeers. It has approximately 8g of fat. Think that is a lot? It is a candy bar right? Well many of the supplement bars out there that are high in protein and low in carbohydrates also contain nearly, if not as much, fat as some candy bars. Granted most candy bars have more carbs, simple sugars, and less protein but are nutrition bars really low in carbs. How do manufacturers get their bars to be low in carbs?

When attempting to make a high protein bar it is necessary to incorporate something that will keep the bars soft and pliable (read chewable) so they do not become a protein brick necessitating a trip to the local dentist. Glycerine is something companies seem to be using quite a bit. Glycerine and glycerol are one in the same and represent the chemical backbone to which one, two, or three fatty acid side chains are attached to create what we commonly know as fat. Glycerine is generally used to make a bar stay soft, in the face of ever increasing amounts of protein, by trapping water within the bar. The government (FDA) clearly states in the Code of Federal Regulations that glycerine is to be listed as a carbohydrate by "difference". The government does this in order to classify glycerine under one of the three macronutrient categories, fat, carb, or protein. Glycerine is not fat since it has no fatty acids. Glycerine is not a protein since it has no amine group (nitrogen containing portion). The only category left is carbohydrates. Look at the label of your favorite high protein low carb bar. Most of them will not be listing glycerine as a carbohydrate. If a company does not list it as a macronutrient then how can a consumer keep track of how much glycerine they are actually getting. Well first we must ask about the fate of glycerine metabolically. Hopefully they are counting the 4.32 calories/g within the total calories stated on the label. Ok biochemistry fans, this part is for you. As for the rest of you, please just grin and bear it as this will provide you with the basics of glycerine metabolism. Don't worry it will be over soon. Glycerine can normally come from food sources (via tri-acyl-glycerol a.k.a. fat, phosphoglycerides, glyceryl esters, and other miscellaneous sources), supplements (bars, beverages, or plain straight glycerine) and of course endogenously from the fat liberated from your own personal

storage (lucky you). The fate of glycerine once it enters the body is highly variable depending mostly on energy storage status at the time of consumption. Energy storage status is basically how well fed your body is at any given point and time. This does not mean that obese people are always in a high-energy balance. What this does mean is that if you have been eating regularly, or overstuffed your face at Thanksgiving, you are probably in balanced or positive energy balance. The metabolic destinations are numerous and dependent upon this whole energy balance business.

Some journal articles and textbooks discuss glycerol as a direct precursor for both gluconeogenesis (production of glucose by your body (blood sugar)) and glycolysis (anaerobic portion of energy production within the body). It is common practice for many bar manufacturers to state that "Glycerine is not a carbohydrate but yields 4.32 calories/g", somewhere on their label. Most of you are aware that carbohydrates yield about 4 calories/g, so if glycerine does yield 4.32 calories/g there is only a small difference in calories between regular carbohydrates and glycerine. So glycerine must be a carbohydrate right, well sometimes. Recent research has shown that glycerine does not significantly elevate blood insulin levels and only minimally elevates blood sugar levels. Most interesting is that some of this research was done following a 36 hour fast, and if glycerine really was gluconeogenic you would think that blood glucose levels would have increased when glycerine was administered after the fast. Fasting for 36 hours would lower the bodies glycogen stores (as well as make you pretty cranky and hungry), therefore since glycerine did not affect blood glucose or insulin levels it is difficult to conclude that glycerine is a carbohydrate. The research that is available is not conclusive with regard to the gluconeogenic properties of glycerine. By definition glycerine is a trihydric alcohol and is the building block of all plant oils and nearly all animal fats. Glycerine can be incorporated into fat production by providing the backbone for fatty acids to attach onto and create what we know as fat. Another possible destination within the body is that glycerine can become part of phosphoglycerides (cell membrane compounds). Orally administered glycerine has also been found in the urine meaning that some of it is actually excreted without being utilized. Ok, so glycerine can be a carb on occasion, a fat precursor on occasion, a phosphoglyceride precursor on occasion, and it can simply pass through the body unused. Wow, that is a lot of possibilities for one compound. Glycerine does have a few other interesting properties worth noting. When administered orally, glycerine has a hydrating/dehydrating effect. This is based on the fact that glycerine has an ability to hold onto water. Glycerine's water binding ability helps keep bars soft and also may be of benefit to endurance athletes and bodybuilders alike. Endurance athletes can utilize glycerine in conjunction with extra water prior to an event in order to support hydration and therefore enhance performance. The recommended dosage for accomplishing superhydration ranges and each individual should experiment sufficiently prior to use during competition. For reference start with approximately 1-gram glycerine per kilogram body weight along with an additional 1.5L - 2.0L of water, consumed 1 - 4 hours prior to the event. Interestingly bodybuilders might consider taking glycerine prior to their stage appearance in lower dosages without consuming the additional water to "dry out". Leaving the water out of the equation may cause a shift of existing body water temporarily out of the tissues and into the blood.

While this may work to obtain the shrink wrapped look you should definitely test it out prior to the day of the show to see how you react. Glycerine supplementation will not help those who have failed to diet properly and are covered by a small layer of blubber. Proper precaution should be taken if you are going to utilize glycerine. Notify someone you know and trust that is going to attend the show so they can help you if you begin to cramp up. Enough digression back to the subject.

Now that you have a thorough understanding of the complex utilization, or lack there of, as well as some of the unique useful ergogenic effects of glycerine, what does all of this mean for the bar eater. Well as stated bars are a compromise, and in the process of that give and take companies must use things like glycerine to make their product palatable. The government has yet to come after any of the companies not labeling glycerine as a carbohydrate and may never. Unfortunately the consumer is left not knowing how much glycerine they may be getting in their favorite bar. Hey, call them up and ask if it you want to know and it is not on the label. Any reputable company will gladly provide the info. Is the consuming of glycerine a negative thing? No, not really, however for those of you attempting to monitor your daily nutrient intake, you should be aware of how glycerol can affect your individual body chemistry and most importantly your goals. Consuming a bar once in a while when you are in a hurry is certainly preferential to say a Big Mac, but bars are by no means equivalent to a good meal replacement powder or a well balanced meal of (oh my!) real food. There are other things to watch out for in your nutrition bars. For instance, the type of sweetener and fat used in the bar. Often the protein sources are far inferior to what you would get in a meal replacement powder.

## **PART TWO: THE COMPROMISE ON SWEETENER, PROTEIN, AND FAT.**

Ok, now that you know your supplement bar probably contains some form of sugar alcohol, glycerol being the most likely of the bunch, what about the other drawbacks I mentioned last month. Many companies are making bars that taste almost like a candy bar these days, sure many are low in carbohydrate as discussed last month, still others are not, and many probably contain a compromise in the type of sweetener they are using. You might also have noted that many of the labels for the so called supplement bars are sporting a hefty 7 - 9 grams of wonderfully tasting fat. What about all this hype surrounding the "high protein" content of these bars? Oh, I think you are going to like this little ditty (this whole bar issue really peeves me sometimes) Let's start with the sweetener of the day. Fructose. Ah the lovely little byproduct of corn production. Look around you. It is everywhere. High fructose corn syrup, corn syrup, corn syrup solids, corn sweetener, sucrose (½ fructose), fruit sweetener, etc. all of which when found on a label should scream to you, "HEY THIS IS FRUCTOSE". Fructose is sweeter tasting than regular sucrose (table sugar) and cheaper and sweeter than glucose (which is a better choice for a human/bodybuilder to consume). In an effort to sweeten their bar, and make it taste good, as well as keep costs down, companies will often use some form of fructose in their bars. What's the big deal you say? Allow me to elaborate a bit.

Biochemistry time again folks. You see your muscles cannot use fructose, at least directly. When you eat fructose and it enters the blood stream the liver is where it gets sucked up. Your liver has a love affair with fructose and like the movie "Fatal Attraction" just has to have it all to itself. Glucose is the preferred fuel for your working muscles. Once fructose is in the liver it does not leave and is eventually either converted to glycogen (long chains of glucose units that acts as long term sugar storage that can be exported from the liver to the brain and muscles on demand) or go towards producing cholesterol and fat. Well at least one of the three options, glycogen production, is beneficial. Think one out of three isn't bad, think again. The body is more likely to convert the fructose to fat and VLDL cholesterol in persons who have filled their glycogen stores by eating regular meals that contain other carbohydrates, because once your storage of liver glycogen is full the fructose has no place else to go. So let us say you eat a normal meal. The meal will likely have both complex and simple carbs and may contain some fructose. Those complex and simple carbs might just fill up your glycogen stores (your muscles can and will take up glucose from the blood if they need it or their glycogen storage is low) then you are left with fructose having nowhere to go but towards fat and cholesterol. Scared yet? Well it is not all bad, because the liver does like fructose so much so that it is better at replenishing liver (not muscle) glycogen than glucose, about 50% better (mostly because fructose is pulled out of the blood into the liver so easily while glucose can pass on by and be utilized by the muscles and other tissues). Therefore, fructose would be ok for someone who is an ultraendurance athlete with very low glycogen stores that wants to replenish their supply of liver glycogen. On the bodybuilding side of the coin, I know some people that use fructose as part of their carb up cycle (works for some and not so much for others). Overall, if you are trying to lose body fat, fructose is something you probably can do without. The fat content of supplement bars is often as high or higher than some candy bars. What do companies think we are dumbbells, "dah nope those are them things we lift in the gym". Well some of us must either not care or actually are dumbbells because these bars are selling and more are coming out every day. Try this, next time you are in the checkout line at your local feed store, pick up some of the "candy bars". Don't be surprised when some of them have as little, I mean as much fat as your favorite supplement bar. Not impressed yet, think that your supplement bar has "better fat" than those candy bars? Think again. Often the fat in candy bars is from very similar sources as to those found in your favorite supplement bar, cocoa butter from the chocolate coating, cotton seed oil, fractionated vegetable oils, fractionated palm oil, hydrogenated oils, etc. All of these are pretty much on the bad side of the coin. Sure some use canola oil, essential fatty acid mixtures and other fancy names for fat be it good or bad. Most of these supplement bars that do contain some good fat still have more fat than you will find in a good meal supplement powder. So here you are trying to get a healthy, convenient, meal alternative, and they give you a high protein "candy bar". This is one of the reasons I always say a bar is not a replacement for a good meal supplement powder. Check out the labels for yourself and then think twice about shoving a couple bars down your throat when you are trying to stay lean or diet down. Another issue worth mentioning is the cholesterol content of these bars. Someone please explain to me how you can have a whey protein concentrate, milk protein concentrate, or some other milk protein source and list 0mg of cholesterol on the label. If the company is using a whey isolate or calcium or sodium caseinate, both of

which have fairly low cholesterol, for most their protein I might understand, but some of the companies making bars actually expect us to believe they have 0mg of cholesterol. Honestly, they must really think we are stupid or something. While 0mg cholesterol looks great on the label it is not and cannot likely be the truth. Some bars may only have 5mg or 10mg but why lie about it and deceive consumers and those keeping track of their cholesterol for health reasons. Sorry, in my book that is just plain wrong. Call up the manufacturer of your 0mg cholesterol bars and make them explain to you how this is possible. Send their response to my email (listed at then end of this column). I just have to hear what some of these folks will come up with to cover their proverbial hind sides. The only logical explanation they could have is that they are really not using very much of the milk proteins and are therefore they might be telling the truth about the cholesterol content. Now that would be an honest and probably unlikely response. If you do call them up and can't get a response, or get an unsatisfactory response maybe you ought to find another companies bar to purchase. This all leads me to the familiar (for those of you who read my little column regularly see September 1999 Volume 4 Number 7)) world of proteins. Many of today's supplement bars proudly proclaim "high protein" content and herein lies one of the greatest of all compromises. Back in the day when high protein bars were hard and chewy instead of the now soft and easily chewed bars (some anyway), soy protein was often used to make up much of the protein found in supplement bars. Today you will find such things as hydrolysed whey protein (might be expensive might not), whey protein isolate (fairly expensive), caseinates (a little cheaper than WPI), whey protein concentrates (pretty inexpensive), soy protein isolates (ranges greatly but about the same as WPC), hydrolysed protein (usually cheap low quality protein most often collagen) and occasionally egg or beef protein. Hydrolysed collagen is often used in bars because it is one protein that does not get hard as the bar ages, is inexpensive, and does not taste bad. Collagen is not a biologically high quality protein, meaning its' amino acid profile is not optimal for humans. So, one of the major protein sources in your bar might be collagen, or some slightly hydrolyzed whey protein concentrate, better biologically speaking. You might find some calcium caseinate, some whey protein concentrate, some soy protein isolate, and a little of this and a little of that. Now pick up your favorite meal supplement powder. If it is any good it will mainly be composed of a whey protein concentrate or isolate and possibly some type of caseinate. Incidentally, I recently read an article in a popular magazine saying casein is inferior to whey and is a cheap way for companies to fill in protein rather than using whey in their meal supplement powders. This is far from the whole truth. While whey is absorbed more quickly into the body and promotes protein synthesis better than casein, whey is also subjected to higher rates of hepatic amino acid oxidation. The liver is partly responsible for maintaining amino acid balance in the blood and when it senses a sudden rise in blood amino acids it will start oxidizing them to bring the level back to normal. Casein's amino acids, on the other hand, are not subjected to as much liver oxidation because casein is absorbed more slowly and the amino acids enter the blood at a slower rate. Recent studies show a combination of whey and casein to act most effectively for promoting protein synthesis while minimizing liver oxidation. Hey that's funny, cows milk is a mixture of both casein and whey and baby calves grow like crazy on the stuff. Hmmm? Sorry for the tangent but as I said some of this stuff peeves me and I felt it was necessary to clarify. The point is that your supplement bar does not and probably cannot contain the protein profile that is optimal

(at least no one has done it yet). Your high protein bar is going to have protein for sure, but it is going to be a non-optimal compilation of protein sources that to date cannot match the quality of proteins found in a good meal supplement powder. Keep that in mind when you reach for a good tasting (usually because of the extra fat), high protein (not necessarily high quality) supplement bar instead of a meal supplement powder. The tale of the tape here is that supplement bars are definitely a compromise on optimum nutritional content. Bars are a source of food yes, but so is a Big Mac, fries, and a milk shake and you don't go out and eat that, hopefully not regularly. Think of supplement bars as a healthy alternative to eating a triple chocolate cake for desert. At least most are fortified with a vitamin mineral premix. By the way some of these bars are getting up their in size and therefore calorie content so you might actually be getting a deserts worth of calories and fat in one of these supplement bars. Just be aware that simply because the supplement bar has pretty packaging that screams "HEY BOZO, I'M HEALTY BUY ME" does not make it so. Read the label, call the company, know what you are getting and you will not end up with a clown sized midsection in the process. Till next month. "Train Hard, Eat Right, Rest Well"

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