

Alert: Protein drinks

You don't need the extra protein or the heavy metals our tests found

THE PROMISES are enticing. Whether you're looking to shed unwanted pounds, get a quick energy jolt, build muscles, or fight the aging process, protein drinks are being boosted by some supplement makers as a scientifically proven way to quickly achieve your goals.

The products, sold as ready-to-drink liquids or powders that you mix with milk, juice, or water to make shakes, attract not just athletes and body-builders but also baby boomers, pregnant women, and teenagers looking for a shortcut to a buff body.

Some ads say that protein supplements, in flavors such as strawberry and vanilla cream, can be a nutritious and time-saving snack or meal replacement.

Marketing for Energy First Pro Energy Whey Protein Isolate says the protein supplement is "ideal" for pregnant women and growing children, and also offers this

promise for aging adults who use it: "You will rarely if ever be sick and you will begin to look and feel years younger."

In a testimonial for BSN Lean Dessert Protein Shake, "fitness celebrity" Jennifer Nicole Lee says, "Being a busy mom with 12-hour workdays, I rely upon my Lean Dessert Protein to get adequate amounts of protein without wasting time on creating complex meals . . ."

Another product, Muscle Milk, boasts on its website: "Designed after one of nature's most balanced foods: human mother's milk . . ."

But our investigation, including tests at an outside laboratory of 15 protein drinks, a review of government documents, and interviews with health and fitness experts and consumers, found most people already get enough protein, and there are far better and cheaper ways to add more if it's needed. Some protein

drinks can even pose health risks, including exposure to potentially harmful heavy metals, if consumed frequently. All drinks in our tests had at least one sample containing one or more of the following contaminants: arsenic, cadmium, lead, and mercury. Those metals can have toxic effects on several organs in the body.

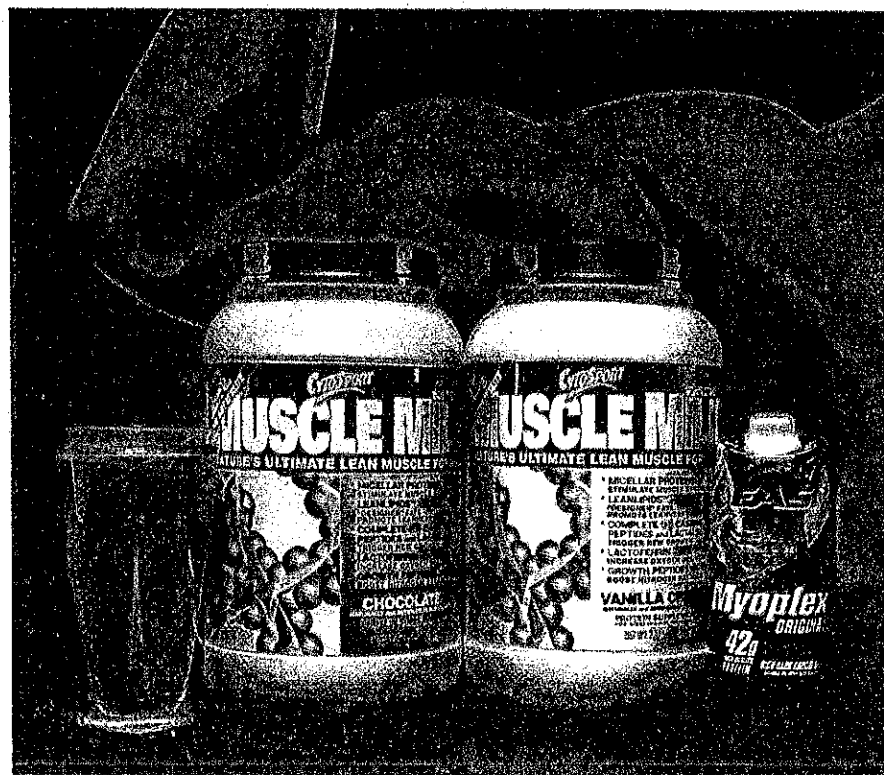
Hitting the limits

For most drinks we tested, levels of those contaminants were in the low to moderate range, when we could detect them at all. But with three of the products, consumers who have three servings daily could be exposed to levels that exceed the maximum limits for one or two of those contaminants in dietary supplements proposed by U.S. Pharmacopeia (USP), the federally recognized authority that sets voluntary standards for health products. Nutritionists and trainers say they commonly see people who consume three servings a day.

The amount of lead in a single daily serving of eight of the protein supplements we tested would require that the products carry a warning in California. State legislation known as Proposition 65 mandates that manufacturers notify consumers when products contain toxic substances at levels the state says pose even a low cancer or reproductive risk.

But federal regulations do not generally require that protein drinks and other dietary supplements be tested before they are sold to ensure that they are safe, effective, and free of contaminants, as the rules require of prescription drugs.

"Most consumers and even many doctors don't realize that in this country we're left to simply trust the manufacturer to decide what level of quality and safety they'll provide," says Pieter Cohen, an internist at Cambridge Health Alliance and author of a recent *New England Journal of Medicine* article on contaminants in dietary supplements. Even in California, some manufacturers don't comply with the requirements of Proposition 65 to put warnings on supplements, and enforcement seems to be lax. Sometimes warnings appear only after lawsuits are filed.



TEST RESULTS: EAS Myoplex Original Rich Dark Chocolate and Muscle Milk Chocolate and Vanilla Crème can expose users to elevated levels of heavy metals when they consume three servings a day.

Pushing an image of fitness

Protein drinks are helping fuel the growing sales of sports-nutrition products, which now top \$2.7 billion.

Teenagers who want to look like the sculpted images they see in fitness magazines are particularly vulnerable to the marketing messages, experts say, because they are easily hooked by the promise of "hope in a can." They tend to overuse the products, assuming that if one scoop is good, four or five would be even better, says Dave Ellis, of Colorado Springs, Colo., who has 28 years' experience as a sports dietitian for college and professional athletic teams. A 2005 study published in *Pediatrics*, the journal of the American Academy of Pediatrics, found that protein powders and shakes were the supplements most commonly used by those aged 12 to 18.

Andrew Shao, senior vice president of scientific and regulatory affairs at the Council for Responsible Nutrition, a supplement industry group, says that protein powders and drinks are a safe option for teenagers and even pregnant women. But we found that some products had labels warning that they are not suitable for people under age 18 or that pregnant women should first consult a physician.

Kathy Burns, a toxicologist and founder of Sciencecorps, a Boston-area nonprofit network of science and medical professionals, was concerned about possible health effects of protein supplements her then

Protein
28%

Sales of ready-to-drink liquid protein supplements climbed by that percentage between 2008 and 2009.

high-school-aged son and his friends extensively used. She and her colleagues sent a small sampling of protein supplements to be screened at an independent lab. Burns said what they found worried them, and she contacted CONSUMER REPORTS.

What our tests found

We purchased 15 protein powders and drinks mainly in the New York metro area or online and tested multiple samples of each for arsenic, cadmium, lead, and mercury. The results showed a considerable range, but levels in three products were of particular concern because consuming three servings a day could result in daily exposure to arsenic, cadmium, or lead exceeding the limits proposed by USP.

We found that three daily servings of the ready-to-drink liquid EAS Myoplex Original Rich Dark Chocolate Shake provides an average of 16.9 micrograms (μg) of arsenic, exceeding the proposed USP limit of 15 μg per day, and an average of 5.1 μg of

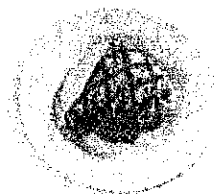
cadmium, which is just above the USP limit of 5 μg per day. Concentrations in most products were relatively low, but when taking into account the large serving size suggested, the number of micrograms per day for a few of the products was high compared with most others tested.

The samples of Muscle Milk Chocolate powder we tested contained all four heavy metals, and levels of three metals in the product were among the highest of all in our tests. Average cadmium levels of 5.6 μg in three daily servings slightly exceeded the USP limit of 5 μg per day, and the average lead level of 13.5 μg also topped the USP limit of 10 μg per day. The average arsenic level of 12.2 μg was approaching the USP limit of 15 μg per day, and the average for mercury was 0.7 μg , well below the USP's 15 μg -per-day limit. Three daily servings of Muscle Milk Vanilla Crème contained 12.2 μg of lead, exceeding lead limits, and 11.2 μg of arsenic. A fourth product, Muscle Milk Nutritional Shake Chocolate (liquid), provided an average of 14.3 μg of arsenic per day from three servings, approaching the proposed USP limit.

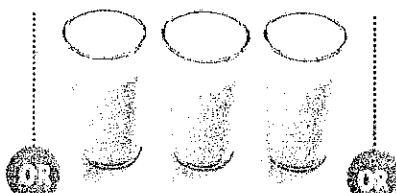
Cadmium raises special concern because it accumulates in and can damage the kidneys, the same organs that can be damaged by excessive protein consumption. And it can take 20 years for the body to eliminate even half the cadmium absorbed today.

"This is a highly toxic metal, and while there are some cases where decisions have

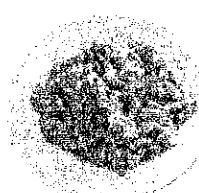
Better, cheaper ways to bulk up



Half of a chicken breast
27 grams of protein
62 cents



Three 8-ounce glasses of milk
23 grams of protein
60 cents



Three scrambled eggs
20 grams of protein
46 cents



One scoop of Nitro-Tech
25 grams of protein
\$1.61

Meeting your daily protein requirements through a balanced diet rather than supplements is best for both your health and your wallet.

You can roughly calculate how many grams of protein you need daily by multiplying your body weight by 0.4. For athletes, a general rule of thumb is about 1 gram of protein per pound of body weight per day.

A sandwich with 3 ounces of chicken and an 8-ounce glass of whole milk provides about 40 grams of protein, which is more than half the 72 grams required by the average 180-pound person and most of the 48 grams required by someone weighing 120 pounds. According to federal health survey data, Americans get an average of 82 grams of protein per day from their diet.

You can find the protein content for a wide range of foods at www.nal.usda.gov/fnic/foodcomp/Data/SR18/nutrlist/sr18a203.pdf. Because foods can also be a source of exposure to cadmium or other heavy metals, you can find out the levels in many different types of foods by viewing the Food and Drug Administration's list at www.fda.gov/downloads/food...totaldietstudy/ucm184301.pdf.

to be weighed against relative risks, accepting that you have to be exposed to any cadmium at all in your protein drink after your workout is definitely not one of them," says Michael Harbut, M.D., director of the Environmental Cancer Initiative at the Karmanos Cancer Institute in Royal Oak, Mich.

"When these toxic heavy metals are combined in a product that is marketed for daily use, that raises serious public health concerns, especially for pregnant women, children, and young adults," says Burns, who has been a toxicology consultant to state and federal government agencies.

For most people, protein drinks are not the only possible source of exposure to heavy metals, but they are an easily avoidable one, since most people can meet their protein needs, help minimize exposure to contaminants, and save money by choosing the right foods.

Shellfish and organ meats such as liver can be high in cadmium, and some plant foods such as potatoes, rice, sunflower seeds, spinach, and other leafy greens can also take in significant amounts of the metal from the environment, due in large part to the use of cadmium-containing phosphate fertilizers, according to Bruce A. Fowler, a researcher at the federal Agency for Toxic Substances and Disease Registry. Food and Drug Administration research suggests that foods such as milk, yogurt, eggs, poultry, and red meats are generally good protein sources that seem to contain little or no cadmium, lead, arsenic, or mercury. For perspective about the relative risks exposure to those metals can pose, consider the agency's list of 275 hazardous substances at toxic waste sites: Arsenic, lead, and mercury rank Nos. 1, 2, and 3, and cadmium is No. 7, based on risks to people around those sites.

Robert Wright, M.D., an associate professor at Harvard Medical School, who is conducting research on the health effects of exposure to toxic metals, says, "Small amounts of exposure are inevitable, but a product that exceeds the USP limit is clearly doing something wrong."

Being exposed simultaneously to a mixture of toxins can also potentially increase health risks, particularly when they target the same organs or systems, as some metals we detected do, according to Harbut. He says that this is the result of a synergistic effect, meaning the effects of two toxic substances together can be even

greater than those of the sum of the two, and not enough research has been done to determine whether that occurs from multiple exposures to even relatively low levels of those heavy metals.

How much protein?

The lure of many of those dietary supplements is the promise of a protein boost, one that many people do not really need.

Labeling for BSN Core Series Syntha-6 is ambiguous and could lead males to consume as many as eight scoops (four two-scoop servings) per day. That would deliver up to 176 grams of protein in the powder alone, plus another 33 grams when mixed with four 8-ounce glasses of nonfat milk. When you add those 209

Consuming too much protein can cause health problems.

grams from the protein drinks to the average 82 grams most adults already get from their daily diet, according to federal data, a 150-pound nonathlete would consume 291 grams of protein, or about five times the amount needed. An athlete could get nearly double.

Only one of the products we tested, Six

Star Muscle Professional Strength Whey Protein, specifies a maximum intake, warning that consumers should not exceed six servings in a 24-hour period. Others use vague language that could encourage a high level of consumption. For instance, labeling on BSN Lean Dessert and BSN Core Series Syntha-6 suggests an intake of one to four servings daily but then concludes, "or as needed to satisfy protein or body shaping/muscle building requirements."

Shao, the industry trade-group official, says there is no such thing as consuming too much protein, as long as you're getting other nutrients in your diet as well.

Not so, says Kathleen Laquale, a licensed nutritionist and certified athletic trainer. "The body can only break down 5 to 9 grams of protein per hour, and any excess that is not burned for energy is converted to fat or excreted, so it's a ridiculous waste to be recommending so much more than you really need," she says.

Roberta Anding, a clinical dietitian and director of sports nutrition at Baylor College of Medicine, agrees. And, she says, "If you ask the average consumer how much protein they need they have no clue."

Anding says protein drinks might help vegans or some seniors. The American Dietetic Association says proteins could help athletes after strength and endurance training, although it says they haven't been shown to improve athletic performance and should be used conservatively.



OVERLOAD Scott Baker cut back on protein supplements after feeling ill effects.

The products can be costly. For example, we paid \$45 for a 2-pound jar of MuscleTech Nitro-Tech Hardcore powder; it yields servings for about five days if you follow directions for maximum results.

Consuming excess protein through supplements can cause health problems. "Often I see clients who are getting plenty of protein in their diets and then drinking three protein shakes on top of that," says Erin Palinski, a registered dietitian and certified personal trainer who has seen the ill effects. "Cutting back is one of the first pieces of advice I give them."

Among those she helped is Scott Baker, 24, of Hamburg, N.J., who found that when he was chugging down protein shakes to boost his total protein intake to more than 300 grams daily, he suffered from bouts of diarrhea. That's a side effect of too much protein, Palinski says. "When I began cutting down my use of shakes and trying to get most of my protein from whole foods instead," Baker says, "those symptoms went away completely and I also began seeing better results from my workouts at the gym."

Although protein is needed for bone development, excessive protein intake over the long term might also cause calcium to be excreted from bones, increasing the risk of osteoporosis. And for diabetics or others with kidney problems, it can lead to further complications. "There are a lot of people these days who are undiagnosed pre-diabetics who may not be aware their kidneys aren't fully functional and they definitely should not be loading up on protein," says Nancy Clark, an author and certified specialist in sports dietetics.

Athletes complain

Protein powders have been under scrutiny before. In 2005, National Football League running back Michael Cloud filed a lawsuit against MuscleTech. He claimed that after he temporarily substituted MuscleTech Nitro-Tech powder for the protein powder he normally used, he tested positive for the banned steroid nandrolone, because of the presence of ingredients in Nitro-Tech that were not disclosed on the product's label.

According to Cloud's legal complaint filed in U.S. District Court in Rhode Island, an independent laboratory analysis of the Nitro-Tech powder he used revealed the undisclosed ingredients norandrostenedione and androstenediol, steroid precursors that would cause the positive

test results. A similar complaint was filed by Olympic bobsledder Pavle Jovanovic.

Both cases were settled out of court. Jamie Moss, a spokeswoman for Iovate, the company behind Nitro-Tech and other MuscleTech dietary supplements, says, "At no time have banned substances been confirmed to be found in any Nitro-Tech branded product."

In the U.S., supplements aren't generally required to undergo a pre-market review, as are prescription drugs; health claims are not assessed for validity; and a requirement that makers comply with good manufacturing practices is just being fully phased in as of June. In Canada, supplements undergo pre-market testing.

Consumers Union, the nonprofit publisher of CONSUMER REPORTS, believes that the FDA's oversight under the Dietary

Supplement Health and Education Act is inadequate to ensure that protein drinks and other dietary supplements are consistently low in heavy metals and other contaminants. Legislation pending in Congress to strengthen the FDA's oversight of food safety could incorporate language from another bill sponsored by Sens. John McCain, R-Ariz., and Byron Dorgan, D-N.D., to improve regulation of dietary supplements. Those moves are steps in the right direction, but more must be done to ensure that those products are properly evaluated for safety and effectiveness before they are sold to consumers.

"It is foolish to have these and other dietary supplements being sold with practically no regulation," says David Carpenter, M.D., head of the Institute for Health and the Environment at University at Albany.

What's in your protein drink

Here are the average amounts of metals we found in three servings of these protein drinks. The maximum limits for them in dietary supplements proposed by U.S. Pharmacopeia are: **arsenic** (inorganic), 15 micrograms (μg) per day; **cadmium**, 5 μg ; **lead**, 10 μg ; **mercury**, 15 μg . Amounts at or exceeding those limits are in **bold**. Experts said three servings a day is common.

Products are listed in alphabetical order.

Product (powder unless otherwise indicated)	Amount in 3 servings	Protein (g/3 servings)	Test results			
			Arsenic ($\mu\text{g}/3$ servings)	Cadmium ($\mu\text{g}/3$ servings)	Lead ($\mu\text{g}/3$ servings)	Mercury ($\mu\text{g}/3$ servings)
BSN Core Series Lean Dessert Protein Shake Chocolate Fudge Pudding	105 g	63	3.3	3.7	2.5	0.3*
BSN Core Series Syntha-6 Ultra Chocolate Milkshake	132 g	66	4.2	2.6	5.4	1.1
Designer Whey 100% Whey Protein Chocolate	78 g	54	3.9	1.6	2.4	0.9
EAS Myoplex Original Rich Dark Chocolate Shake (liquid)	1,500 mL	126	16.9	5.1*	-	-
GNC Lean Shake Chocolate	144 g	27	7.0	3.9	4.9	-
GNC Pro Performance AMP Amplified Wheyolic Extreme 60 Chocolate	237 g	180	5.4	2.5	2.5	-
Jillian Michaels Natural Whey Protein Vanilla Cream Shake	81 g	45	1.9	-	1.2	-
Muscle Milk Chocolate	210 g	96	12.2	5.6	13.5	0.7*
Muscle Milk Nutritional Shake Chocolate (liquid)	990 mL	66	14.3	-	6.8	-
Muscle Milk Vanilla Crème	210 g	96	11.2	2.0	12.2	-
MuscleTech Nitro-Tech Hardcore Pro-Series Vanilla Milkshake	96 g	75	1.2	-	0.4*	0.9
Optimum Nutrition Gold Standard 100% Whey Extreme Milk Chocolate	96 g	72	2.5	1.7	1.0	0.2*
Optimum Nutrition Platinum Hydro Whey Velocity Vanilla	117 g	90	1.5	-	-	-
Six Star Muscle Professional Strength Whey Protein French Vanilla Cream	117 g	78	2.3	-	-	-
Solgar Whey to Go Whey Protein Powder Natural Vanilla Bean	60 g	48	0.6*	-	-	-

(-) Element was not measurable in all samples tested.

*In some samples of this product, this metal was below measurable levels and could be as low as zero. For those products, the average was calculated using zero as the value for samples in which metal could not be measured by the analytical method used.