Bread and Chocolate, No Longer D-Minimus –Part 3 0n Vitamin D

Janet Raloff

How do you get people to take a big dose of vitamin D? One midwestern company thinks the answer is to put the sunshine vitamin in bread—and chocolate. The firm, Natural Ovens Bakery, is responding to growing concerns about chronic, widespread vitamin D deficiency by pioneering the robust fortification of new foods.

While milk and some orange juice today carries 100 international units (IU) of this essential nutrient per 8 ounce serving, and vitamin pills typically contain up to 400 IU, the small Wisconsin bakery has developed a whole-grain bread that contains 1,600 IU per slice. The firm is also about to begin marketing a dark chocolate that contains a whopping 2,000 IU of vitamin D per piece.

These new products are about to be marketed as bone-building dietary supplements that look and taste like ordinary bread and chocolate.
Natural Ovens Bakery

Indeed, both products will have so much vitamin D that they will have to be marketed as dietary supplements, much as vitamin pills are today, observes Paul A. Stitt, board chairman of Natural Ovens Bakery.

Stitt justifies such heavy enrichment of his company's products with findings from new studies, many reported last month at the Experimental Biology meeting, in San Diego. The company funded one of the studies.

Over the past few years, a scientific consensus has grown that not only do most people consume far too little vitamin D, but also that the official recommended daily intake (RDI) for this nutrient is inadequate (SN: 10/16/04, p. 248). Driving those assessments has been research linking more and broader benefits to the vitamin, which can come from the sun, food, or supplements. The nutrient is the pivotal feedstock for a hormone that protects bones and muscle and appears to stave off various cancers, autoimmune disorders, diabetes, and gum disease (SN: 10/9/04, p. 232). Most recently, researchers found that ample vitamin D improved the odds of people surviving lung cancer (see **Season Affects Cancer-Surgery Survival**).

Concludes Stitt: When it comes to vitamin D, superfortified foods are long overdue because "society is already seriously hurting."

The issue of safety

Many vitamin D experts have been lamenting the fact that the current recommended safe upper limit for this nutrient is 2,000 IU per day—well below

the 10,000 to 20,000 IU that the skin may naturally generate while a person sunbathes on a summer day. Although there is growing consensus within the research community that the 2,000 IU limit should be raised, and some scientists say the hike should be dramatic, that change hasn't happened.

As a consequence, major supplement manufacturers have generally steered clear of offering products that would allow consumers to easily exceed the 2,000 IU value. Reinhold Vieth of the University of Toronto says he recently spoke with representatives of some of the supplement makers, "and they said that although they were converts to the idea [of raising vitamin-D intake dramatically], their lawyers said they do not want them to do anything that might incur some risk of litigation." For instance, if someone were to develop kidney stones after taking supplements offering 3,000 IU per day, he or she might allege that the problem came from the extra calcium absorption made possible by all of that vitamin D.

In fact, several scientists argue, ample data already exist to indicate that intakes of several thousand IU daily don't cause injury.

For instance, in a 1991 study, Vieth's team had each of 61 men and women consume 1,000 or 4,000 IU of vitamin D daily for 2 to 5 months. The researchers examined all of the participants for excessive urinary excretion of calcium, a risk factor for kidney stones, and could "not detect an effect of treatment on urinary-calcium excretion."

Moreover, Bruce W. Hollis of the Medical University of South Carolina has been involved in trials in which pregnant and lactating women took 2,000 to 6,000 IU of vitamin D per day. The federal government is funding the trial that includes pregnant women. In another study, Vieth's group has administered up to 2,000 IU of vitamin D per day to 362 children 10 to 17 years old. At a meeting of the American Society of Bone and Mineral Research last October, his team reported that girls receiving the upper dose in that trial grew more and denser bone than did girls who got placebo pills. A lower dose of vitamin D in girls also brought some bone gains, compared with the performance of placebo pills. Among boys, vitamin D didn't affect bone development. No adverse effects were seen in any of the children.

That's not to say vitamin D can't be toxic. It just takes really high doses, says Vieth, pointing to a criminal case on which he consulted. The incident came to light when a father and son were hospitalized in Canada with a case of what initially appeared to be gastroenteritis. After doctors ruled that out, Vieth's lab tested foods that might underlie the illnesses. They found the culprit in the sugar bowl.

It appears that someone had maliciously mixed pure crystalline vitamin D into the sugar. Over the next few months, both father and son ingested whopping amounts, Vieth says, "at a dose that we worked out to be about 1 million IU per teaspoon of sugar." Not surprisingly, he adds, the victims ended up with the dubious distinction of "world-record high levels of vitamin D in their blood." However, once the spiked sugar was discovered and removed from the men's diets, they recovered.

Foreign affairs

By comparison to such figures, 2,000 IU of vitamin D a day seems innocuous. However, Stitt says, as long as the U.S. government continues to list 2,000 IU as the safe upper threshold for vitamin D, it's been hard to get approval for experiments with doses higher than that in the United States.

So, Stitt financed a trial in Romania, where profound vitamin D and calcium deficiency are common. Endocrinologist Veronica Mocanu of the University of Medicine and Pharmacy in Iasi recruited 45 men and women in their 70s. Many suffered from osteomalacia—weak muscles and calcium-hungry bones—a hallmark of severe vitamin D deficiency.

For a year, each volunteer received a daily 100-gram (3.5 ounce) bread roll fortified with 5,000 IU of vitamin D and 800 g of calcium. The volunteers were allowed to eat the roll all at once or nibble on it throughout the day. Researchers took blood and urine measurements throughout the trial to scout for any early signs of toxicity, such as excess calcium in the urine. None emerged.

Instead, Mocanu reported at the Experimental Biology meeting, signs of vitamin deficiency disappeared in these senior citizens, and their hips and spines strengthened. For instance, bone density in their hips—a region especially vulnerable to fractures associated with osteoporosis—increased 28 percent. In contrast, Stitt notes, "the best drug, right now, will increase bone density only an average of 3 percent per year."

At least as importantly, each of the participants ended up with blood concentrations of vitamin D of at least 75 nanomoles per liter, a level recently recommended by several expert panels. Many women in the United States, especially blacks, have blood concentrations no higher than about 35 nanomoles per liter, well below the concentration necessary for building strong bones.

Like candy

The bread used in the Mocanu study was baked with a batter that Stitt expected to deliver 10,000 IU per roll. "One thing we learned in doing this study," he observes, "is that we lose 50 percent [of vitamin D] during baking." His company is now fine-tuning a recipe to deliver similarly huge quantities of vitamin D per 70-calorie slice of bread, along with 136 milligrams of calcium and a host of other vitamins and minerals.

However, if a person wants a sweeter option, Stitt's company is creating an 80-calorie dark-chocolate almond cluster, each of which offers 2,000 IU of vitamin D plus 1,000 mg of vitamin C, which is 10 times the RDI; 20 percent of the RDI for calcium; and fully 100 percent of the RDI for vitamins E, B_6, folate, and B_{12}.

Not only will the candy offer this supplemental bounty of nutrients, Stitt says, but also the natural antioxidants typical of dark chocolate, which have been linked in several studies to vascular changes that might reduce heart disease (SN: 3/18/00, p. 188). Even almonds have been linked to heart health (SN: 11/21/98, p. 328).

The trick, of course, would be to not overindulge—as if the chocolate clusters were, well, candy.

The product looks like, smells like, and tastes like dark chocolate with nuts. However, the label on the treat will read more like that for a multivitamin pill.
Natural Ovens Bakery

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