

BAKING UPDATE

Vitamin D: The Epidemic Insufficiency

Practical technology from Lallemand Inc., parent of American Yeast, producers and distributors of Eagle® yeast, fresh and instant.



Vitamin D: a True Vitamin?

IF a vitamin is defined as a required substance that is not endogenously produced, vitamin D does not meet the criteria. It is produced in the skin upon ultraviolet (UVB) rays exposure. But as humankind becomes increasingly urban and specialized, our lifestyle is reducing the exposure of skin to sunlight and so, reducing the ability of skin to synthesize vitamin D.

In the near future, it could be that vitamin D will become a true vitamin and optimal health might, therefore, require an exogenous source, as there are few natural food sources apart from fatty fish.

WHAT IS VITAMIN D?

Vitamin D, which is a fat-soluble vitamin, has 2 forms: D2 and D3, also called ergocalciferol and cholecalciferol, respectively. Vitamin D2, which is found in some plants in our diet and is produced commercially by exposing yeast to UVB rays, is used for fortification and supplementation. Vitamin D3 is produced during skin exposure to sunlight or can be obtained from the diet (ie, animal sources such as deep sea fatty fish, egg yolks, or liver) or from supplements made with lanolin (wool grease).

The differences and similarities between vitamin D2 and D3 were reported by numerous studies. They are absorbed in the same ways in the gastrointestinal tract, but their rates of disappearance from the circulation and in their metabolism and breakdown are different. Yet they have both shown their usefulness in treating clinical vitamin D deficiency.

However, uncertainties about their relative efficacies remain because of inconsistencies in the scientific evidence. ●

Life Choices and Risk Factors

THE genesis of mankind was almost certainly in sub-Saharan Africa, and these people were probably deeply pigmented. As some of them migrated northward some 60 000 years ago, they experienced less direct UVB radiation from the sun, and there were periods of time when no radiation was available during winter months. As they moved north and adapted to these conditions, their skin became increasingly depigmented, providing a survival advantage over more deeply pigmented subgroups whose vitamin D deficiency produced problems with mobility and repro-

duction. The possible exceptions were the Inuit in the far north, who consumed a diet of fat and oily fish, one of the few food sources high in vitamin D.

Adaptation occurred gradually over generations and is reflected in such features as skin colour, clothing, rituals, and diet. These days there can be rapid changes in location and environment that cause new stresses, advantages, and deprivations without time for adaptation. A variety of these changes and life choices strongly affect vitamin D levels, and some, such as advancing age, reduced exercise, obesity, and lack of sun exposure, act in synergy. ●

RISK FACTORS FOR VITAMIN D DEFICIENCY

RISK FACTORS	MECHANISM
Lack of sun exposure	Reduced skin synthesis
Latitude of residence	No skin synthesis from Nov. to March at 52° north
Season	Very little vitamin D synthesis can occur from sun exposure in northern latitudes in winter months
Sunscreen use	SPF of 15 blocks 99% of skin synthesis
Skin pigmentation	Melamin is a very efficient blocker of UVB radiation
Urbanization	Increasing time indoors and increased automobile use
Aging	75% reduction in skin production by age 70; increased institutionalization as a greater percent of population ages
Limited dietary choices	Fatty fish and fish oils are the only ample food source, and are becoming increasingly unavailable
Migration of population	Rapid migration of people with dark skin pigmentation
Obesity	A 2006 survey found that 2/3 of the US population was overweight or obese; vitamin D is sequestered in body fat, and levels are inversely related to BMI

BMI – body mass index, SPF – skin protection factor
Canadian Family Physician 2011, Vol 57:16-20

Vitamin D Deficiency and Insufficiency

SEVERAL factors can limit the amount of vitamin D produced by the body. Due to the growing concern about overexposure to sunlight and the limited dietary sources of vitamin D, there has been evidence of re-emergence of rickets in many countries where it was once eradicated.

Vitamin D status is assessed by measuring serum 25-hydroxyvitamin D (25(OH)D), an indicator of supply rather than function. Bone diseases caused by

vitamin D deficiency is associated with serum 25(OH)D values below 25 nmol/L (divide by 2.496 to convert to ng/mL). More recently, the term vitamin D insufficiency has been used to describe suboptimal levels of serum 25(OH)D that may be associated with other disease outcomes. Precisely defining vitamin D deficiency or insufficiency on the basis of 25(OH)D values is still a matter of much debate. ●

CLASSIFICATION OF VITAMIN D STATUS BY 25(OH)D CONCENTRATION

nmol/L	HEALTH STATUS
<25-27.5	Deficiency; leads to short-latency diseases seen in rickets & osteomalacia
25-75	Insufficiency; leads to long-latency diseases such as osteoporosis, fractures & falls
75-110	Optimal
>250	Possible toxicity

LIMITED DIETARY SOURCES OF VITAMIN D

SUMMER sunlight is the best source of vitamin D, but diet takes on an increasing importance during winter at latitudes greater than 40°N or S due to the unavailability of UVB rays of sufficient strength to stimulate dermal synthesis of the vitamin. There are very few dietary sources of Vitamin D, with oily fish (salmon, mackerel, sardines) being the richest source of the nutrient. Other dietary sources include eggs, meat and fortified products such as margarine, reduced fat spreads and some breakfast cereals.

DIETARY SOURCES OF VITAMINE D	QUANTITY	PORTION
Cod liver oil	1 tsp	~400-1,000
Salmon, fresh, wild caught	3.5 oz	~600-1,000
Salmon, fresh, farmed	3.5 oz	~100-250
Salmon, canned	3.5 oz	~300-600
Sardines, canned	3.5 oz	~300
Mackerel, canned	3.5 oz	~250
Shiitake mushroom, fresh	3.5 oz	~100
Shiitake mushroom, sun-dried	3.5 oz	~1,600
Egg yolk	1	~20
Fortified milk, orange juice, yogurts	250 mL	100
Fortified breakfast cereals	1 serving	~100

IU, International Units
New England Journal of Medicine 2007; 357:266-281

Helping to satisfy consumers' quest for vegetarian and more natural vitamin D rich ingredients, Lallemand's yeast is exposed to UVB rays during the regular production process that naturally transforms the sterols present in yeast into vitamin D. In this way, Lallemand yeast products can be used as sources of vitamin D to enhance the vitamin D content of bread, baked goods, and other food products* and can also be used as a supplement. ●

*At this point in time, the EU regulatory status of the vitamin D yeast is undetermined. In North America its use is allowed and our customers add it to bread and we are working with food companies that want to fortify their yogurt, fruit juices, etc.

AIB Food Labeling Services

BAKERS that want to declare the vitamin D content of their products can use the AIB Food labeling services to meet food labeling requirements

cost-effectively, speed up the labeling process, and assure compliance with food labeling regulations. ●

For more details: <https://www.aibonline.org/researchandtechnical/services/foodlabeling/>

Lallemand Vita D Yeast

All Lallemand North American bakers yeasts (Eagle®, Lallemand®, Instaferm®, Vita D®) are natural and vegetarian sources of vitamin D that can enhance the vitamin D content of baked goods, and of bread in particular:

Lallemand yeast cream (liquid) contains 680 IU vitamin D/100g of bakers yeast, based on 18% solids.

Lallemand yeast packaged in bags (crumbled) or blocks (compressed) contains 1135 IU vitamin D/100g of bakers yeast, based on 30% solids.

Instaferm® contains 3590 IU vitamin D/100g of instant dried yeast, based on 95% solids.

Instaferm® Vita D® Plus

- Dry powder: contains 2,000,000 ±15% IU vitamin D/ 100 g of instant dried yeast, based on 95% solids.

- Tablets: contains 20,000 (for retail bakers) and 40,000 (for industrial bakers) IU vitamin D/ 100 g of instant dried yeast tablet, based on 95% solids. ●

For more information, please visit our website: <http://vitamind.lallemand.com/>

Why Get More Vitamin D?

A PART from the deficiency diseases of rickets and osteomalacia, recent evidence suggests other skeletal and nonskeletal benefits of vitamin D.

It is involved in maintaining calcium balance in the body, normal cell division, and in regulating a healthy mineralization and growth of bone and teeth.

Furthermore some studies suggest that vitamin D may help in the prevention of several chronic diseases such as diabetes, cancer, multiple sclerosis, allergies and asthma, infection, and musculoskeletal pain through its role in maintaining normal function of the immune system, a healthy inflammatory response, and normal muscle function.

VITAMIN D IN YOUR BREAD

American consumers are now more and more conscious of the health benefits of vitamin D.

A recent Angus Reid survey conducted in the USA for Lallemand (online survey among 1,000 randomly selected American adults) revealed that nearly 50% of American consumers believe that vitamin D plays a great role in maintaining or improving their health and more than 50% of consumers say they would prefer to buy bread that is naturally rich in vitamins than to buy bread that is fortified with vitamins.

The most important factors influencing consumer's bread purchasing decisions (factors ranked either 1 through 5 by respondents) were taste (78%) and price (72%) followed by fiber content (56%) and natural ingredients (54%). Vitamin fortified (37%) came ahead of low fat (32%) and low sodium (26%). ●

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BAKING UPDATE

Lallemand Baking Update is produced by Lallemand Inc. to provide bakers with a source of practical technology for solving problems. If you would like to be on our mailing list to receive future copies, or if you have questions or comments, please contact us at:

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