

# Vitamin B12 Supplementation: Natural or Unnatural?

Compiled by Manuj Chandra. Special thanks to Dr. Nandita Shah (SHARAN) and Dr. Michael Greger (HSUS) for the medical information. Thanks to Amrita (<http://vegan-india.blogspot.com>) for helping with the article.

## What is Vitamin B12?

Vitamin B12, also called cobalamin, is a water soluble vitamin with a key role in the normal functioning of the brain and nervous system, and for the formation of blood. It is one of the eight B vitamins. It is normally involved in the metabolism of every cell of the human body, especially affecting DNA synthesis and regulation, but also fatty acid synthesis and energy production. It also helps to reduce homocystene which is one of the contributing factor to heart diseases. It is the largest and most structurally complicated vitamin.

## How is Vitamin B12 produced?

Vitamin B12 is produced only by bacteria (which are not animals). It can be produced industrially only through bacterial fermentation-synthesis.

## Current state of Vitamin B12 deficiency

A study [1] on diabetic non-Vegans (people who consume dairy, poultry and flesh) found that 22% of the people tested were deficient in Vitamin B12. Overall, its estimated that 25% of non-Vegans are deficient in Vitamin B12. A randomized test conducted by SHARAN [2] found that 50% of the non-Vegan test subjects were deficient in Vitamin B12. Of those who were not deficient, some were on B-complex supplements, which included Vitamin B12. 60% of Vegans are deficient in Vitamin B12.[3]

## Sources and Reliable Sources

The natural Vegan sources of Vitamin B12 are:

- Bacteria in our mouth
- Bacteria in our lower gut
- Water
- Organic Fruits and Vegetables
- Poor hygiene

It is important to note here, that non of the above sources are reliable into themselves. It was the combined doses from all sources plus a “natural-to-humans” lifestyle that allowed more vitamin absorption in general.

The natural non-Vegan sources of Vitamin B12 are:

- Meat
- Dairy

Unfortunately, most of these sources of Vitamin B12 are now lost to humans due to the following factors:

- Bacteria in our mouth is destroyed by anti-bacterial substances in modern toothpastes and dental care products.
- Vitamin B12 produced by the bacteria is not properly absorbed by the lower gut due to a lifestyle that impedes vitamin absorption in general.
- Water is chlorinated or contaminated with industrial wastes, herbicides and pesticides. So there is no bacteria left in the water to produce Vitamin B12.
- The skins of organic fruits and vegetables contain Vitamin B12 deposited by the bacteria. Due to herbicides, pesticides, irradiation, washing, peeling and cooking of the skin, the Vitamin B12 becomes inaccessible to humans.
- Since we maintain good hygiene and wash our hands with soap on a frequent basis, we lose dirt that contains traces of Vitamin B12.
- Non-human animals raised for meat are no longer fed grass but genetically modified, mono-cultured corn, soy and flesh and blood of their own kind thus forcing herbivore animals to become cannibals. This reduces Vitamin B12 present in their flesh and bodily secretions such as milk. Vitamin B12 is often artificially introduced into animal products by means of fortification.

As can be seen from above, even though the aforementioned may be sources of Vitamin B12, they are not "reliable sources". For this very reason, people from all walks of life, irrespective of dietary choices are getting deficient in Vitamin B12. For this reason, the U.S. government recommends Vitamin B12 supplementation for everyone over age 50 irrespective of dietary choices.

Although today there are sources for Vegans to get Vitamin B12, which are the fermented foods available in all cultures, like idli, dhosa, miso, sauerkraut, rejuvelac and of course present day vegan foods like vegan yogurt, nutritional yeast or curds, tempeh, natto etc. in most cases they are not reliable sources too.

## **Symptoms of vitamin B12 deficiency**

Symptoms can be a wide range and may not manifest at all, because Vitamin B12 is required by all cells of the body. Some of the common symptoms of Vitamin B12 deficiency are weakness, apathy, memory loss, acidity, loss of weight, nausea and vomiting, anaemia,

mental confusion, delusions, paranoia, respiratory symptoms, hives and other symptoms of allergy. A long-term deficiency can lead to heart attacks and stroke - the very problems that a healthy vegan diet can prevent. Long-term vitamin B12 deficiency can cause irreversible damage to the brain and nervous system.

## Naturalistic Fallacy

In the developed countries, most Vegan foods are fortified with Vitamin B12. In many cases, and as discussed before, animal products are also fortified with vitamins such as Vitamin D and B12. This can suffice for people who are genetically attuned to efficiently process even minute quantities of Vitamin B12. For the remainder of the majority, who follow a particular lifestyle with irregular sleep patterns, alcohol and coffee[5] use etc., require supplementation from a "reliable source". Many people, especially Vegans fall victim to the "Naturalistic Fallacy"[11] and refuse to supplement, in order to be more "natural". The first and the most obvious thing they miss is that the "natural" Vitamin B12 that they intend to consume is actually fortified – the same Vitamin B12 that is available in supplements or the ones produced by the bacteria. Some Vegans, in order to be "natural" go back to meat and dairy in an attempt to chase the "natural" Vitamin B12. As discussed earlier, the cobalamin molecule is very complicated and is always produced by bacteria, even if synthesized industrially.

Since this is very important to the health of Vegans, extra explanation is supplied below.

Its fallacious to assume that just because something is made by nature so its right/effective/moral/positive etc. and just because something is man made so its wrong/ineffective/immoral/negative etc. It may or may not be the case. The truth of this contention is made on a case-by-case basis, based on efficacy pertaining to the applied subject at hand.

The formula for water is H<sub>2</sub>O. Two atoms of hydrogen and one atom of oxygen. Water is water, anywhere in the universe. Whenever these 3 atoms come together in this configuration water is formed. It doesn't matter if this happens due to nature or assembled by man.

Similarly, Vitamin B12 has a chemical formula.[4] Whenever these atoms are arranged in this molecule, cobamine or Vitamin B12 is formed. It doesn't matter if this is done by a bacteria or a human.

Even the most ardent supporters of non-GM organic farming will agree that though tobacco is natural, even organic non-GM tobacco is harmful to human health. Herein lies the fallacy. Below are some examples of man made systems that are superior to nature:

1. Unnatural Immunity: We would all be crippled by polio today had our immunity not unnaturally strengthened by vaccines.
2. Man made law, even though not perfect, is better than no law of the nature or jungle .
3. A rickshaw, even though man made and unnatural, is a better means of transporting weight on a relatively flat plane over a given distance, compared to walking with the weight over your shoulders or means not involving a wheel.

Nature produces many substances like poisonous fruits that are not good for humans. So the question is not whether its "natural", the question is whether its safe and effective for humans in general and individual people in particular.

## How to Test?

There is only one reliable test for Vitamin B12 for people below the age of 70. This is the MMA (Methylmalonic acid) test. Since this test can be expensive and not available in all regions, a less and cheaper indicator can be used. This is by testing blood for Serum B12. The reason why this test is not reliable is because it can detect analog or inactive Vitamin B12 present in plants and thereby give a false sense of security. For example, a person may be deficient yet have positive Serum B12 results. So its advisable to use this only as an indicator for rough measures.

## How to Supplement?

The normal range of Vitamin B12 is 200 to 900 pg/ml. (Please note that your B12 may have been measured by another system - pmol/l so you should see the normal range described in your report.) If your Vitamin B12 is less than 150 it is very low. A good level is around 400.

1. Vitamin B12 can be taken orally. If deficiency is less and absorption of vitamin is not yet affected, one can opt for this. There are many preparations available in India. Methycobal 500mcg by Wockhardt is recommended. Other options are Nurokind by Mankind, and Folinext by Otsira genetics. Folinext contains both Folic acid and methylcobalamin. Take one tablet daily initially when the deficiency is detected. After 3 months, get your blood levels checked again and see if levels are normal. Once your blood levels reach normal take one tablet every alternate day for life.

2. Injections: Injections should be given to you by a doctor and after a test dose for the first time. If the deficiency is very severe, you should take injections. You may be able to absorb, so after the initial injections you could switch to tablets and continue for life or you may chose to take regular injections (about once in two months).

Options:

- Injection Eldervit from Elder Company is recommended. It comes as combi pack of two vials. No.1. vial contains vitamin B12, 2500mcg with Folic acid 0.7mg, and Niacinamide 12 mg. No.2 vial contains Vitamin C, 150 mg. No. 1 vial can be taken as it is or mixed with no. 2 vial. Mixed is better for absorption of vitamin B12. About 10 injections may be required initially in one month depending upon the severity of deficiency. Later one injection every two months is good as maintenance dose.
- Injection Vitcofol . This contains B12 and Folic acid. Take a total of 2 vials (each vial 10 ml) in the following way - Take 2ml twice a week of Vitcofol for 15 days. After that, 2ml each week. This should be enough to lift the B12 levels. The second vial would last for one month and one week.
- Injection Methycobalamin - this contains only vitamin B12 but is in the same dosage as the Vitcofol injection and comes in similar sized vials of 10ml each. This can be taken in exactly the same way as you would take Vitcofol. This is not painful. The other one is a little painful.
- In case you experience some side effects after the injection they should not last for long.

## How much to Supplement?

For every vitamin, two types of doses exist. One dose to prevent deficiency and one to reap benefits. For example, there is a dose required of Vitamin C to prevent scurvy. Yet there is another higher dose required to boost immunity. Similarly, there are two doses for Vitamin B12 too. One is to avoid deficiency and another to improve the functioning of the brain. [6]

The amount of vitamin B12 that we need is extremely small. But we are unable to absorb most of what we take in. Therefore it is recommended to take larger amounts just to make sure that the small amount that we need will be absorbed.

<b>Vitamin B12 Recommendations: Follow one of these dose regimens.</b>				
Age	US RDA (µg)	2 Doses per Day (µg)	Daily Dose (µg)	2 Doses per Week (µg)
0 - 5 mos	0.4	n/a	n/a	n/a
6 - 11 mos	0.4	0.4 - 1	5 - 20	200
1 - 3 yrs	0.9	0.8 - 1.5	10 - 40	375
4 - 8 yrs	1.2	1 - 2	13 - 50	500
9 - 13 yrs	1.8	1.5 - 2.5	20 - 75	750
14+ yrs	2.4	2 - 3.5	25 - 100	1000
pregnancy	2.6	2.5 - 4	25 - 100	1000

lactation	2.8	2.5 - 4	30 - 100	1000
n/a - Not applicable. Infants should be receiving breast milk which contains the necessary amounts of vitamin B12.				
Amounts much larger than these are considered safe, but it's probably best not to take more than twice the recommended amounts.				

## Conclusion

A Vegan diet is the most compassionate[7], healthy[8] and environment friendly[9][10] diet known to humans. There is no reason why a Vegan should unnecessarily get sick. Its advisable not to fall victim to the naturalist fallacy and supplement Vitamin B12 as part of a healthy whole food plant based diet.

## Disclaimer

All attempts have been made to make this information as accurate and contemporary as possible. Yet, this document is not a replacement for the advise of a Vegan Nutritionist or a Vegan Medical Doctor. Please do not exceed the prescribed dose and under no circumstances self-medicate yourself.

## References:

[1]: <http://www.jabfm.org/cgi/content/short/22/5/528>

[2]: <http://sharan-india.org>

[3]: <http://www.ajcn.org/content/89/2/693S.abstract>

[4]: <http://en.wikipedia.org/wiki/File:Cobalamin.png>

[5]: <http://www.livescience.com/9821-coffee-kill-benefits-vitamins.html>

[6]: [http://www.ox.ac.uk/media/news\\_stories/2010/100909.html](http://www.ox.ac.uk/media/news_stories/2010/100909.html)

[7]: [www.earthlings.com](http://www.earthlings.com)

[8]: <http://www.adajournal.org/article/S0002-8223%2809%2900700-7/fulltext>

[9]: <http://www.pnas.org/content/early/2010/09/27/1004659107>

[10]: <http://www.ajcn.org/content/78/3/660S.full>

[11]: [http://en.wikipedia.org/wiki/Naturalistic\\_fallacy](http://en.wikipedia.org/wiki/Naturalistic_fallacy)