

# Micronutrients and herbal supplements in patients with diabetes

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# Introduction

- The dietary supplement industry has estimated sales of over \$30 billion in the US and over \$100 billion globally. Many consumers believe that dietary supplements are safer and possibly more effective than drugs to treat diabetes
- According to the [American Diabetes Association](#), diabetics are more likely to use supplements than those without the disease.
- Supplements should not be used to replace standard diabetes treatment. Doing so can put your health at risk.

# Overview

- ADA does not endorse the use of routine vitamin or mineral supplementation in people with diabetes (compared with the general population) who do not have underlying deficiencies
- There is, however, some emerging evidence that suggests certain supplements may be helpful in lowering blood sugar levels.
- These include cinnamon, chromium, alpha-lipoic acid (ALA), and berberine



# Vitamin D

- There is some evidence suggesting that hypo-vitaminosis D may have a possible role in the pathogenesis of T2DM
- The relationship between vitamin D and diabetes can be related to the detection of vitamin D receptor (VDR) in the pancreatic b cells
- In individuals at high risk of diabetes or with newly diagnosed type 2 diabetes, 5000 IU daily vitamin D supplementation for 6 months significantly increased peripheral insulin sensitivity and  $\beta$ -cell function.

## Vitamin D (Cont,..)

- Stimulates insulin release by pancreatic beta cells
- Stimulates the expression of insulin receptors genes
- Stimulates the transcription of insulin genes
- Activates PPAR-g gene expression
- Modulates the production of cytokines
- Decreases the accumulation of advanced glycation end products

# Vitamin D conclusion

- Studies demonstrate an association with decreased beta-cell function and low vitamin D levels.
- Patients with T2DM who have vitamin D deficiency should be treated with vitamin D supplementation according to the guidelines.
- The efficacy of vitamin D supplementation in improving glycemic control in patients with T2DM needs to be examined in more studies.

# Cinnamon

- A 2013 systematic review and meta-analysis found that cinnamon doses of 120 mg/day to 6 g/day for 4 to 18 weeks reduced levels of FPG, total cholesterol (–15.60 mg/dL), LDL cholesterol (–9.42 mg/dL), and triglycerides (–29.59 mg/dL) while increasing levels of HDL cholesterol (1.66 mg/dL).
- However, despite the reductions observed in FBG, no significant effect on hemoglobin A1C (HbA1C) levels (–0.16%) was seen (Allen et al, 2013)



# Chromium

- Chromium is an essential trace mineral required by the body in small amounts.
- Some research suggests that chromium may be used to improve glycemic control for diabetes (types 1 and 2), prediabetes, PCOS, reactive hypoglycemia, metabolic syndrome, and other glucose regulation disorders



([Natural Medicines Database, 2018](#)).

# Chromium (Cont.,)

- 42 µg Cr/day of chromium supplementation in a small number of people with newly diagnosed diabetes, after 3 months of chromium supplementation, the intervention group experienced a significant reduction in FBG.
- Additionally, A1C values improved significantly from 9.51% to 6.86%, indicating better glycemic control.
- In the experimental group, total cholesterol, triglycerides and LDL levels were also significantly reduced. These data demonstrate a possible beneficial effect of chromium supplementation on glycemic control and lipid variables in subjects with newly onset T2DM (Sharma et al, 2011).

# Chromium (Cont.,)

- It should be noted that cell culture studies suggest a possibility of DNA damage with long-term chromium supplementation, however this has not been shown in living organisms (Linus Pauling Institute, 2018).
- High doses also have the potential to cause kidney damage.



# Alpha-lipoic acid (ALA)

- ALA is an essential cofactor in mitochondrial enzymes related to energy production that may improve glucose utilization in those with T2DM ([Linus Pauling Institute, 2018b](#)).
- One trial randomized 105 people with diabetes to two groups. The first was instructed to take a supplement containing 600 mg of ALA (along with **L-carnosine, zinc, and vitamins of group B**). The second was given a placebo. The study found that after 3 months, there was a reduction of FPG, postprandial glucose, and A1C in the group that supplemented with ALA compared the placebo.

(Derosa et al, 2016).

# zinc

- Zinc is an essential trace element which widely participates in the physiology of glucose metabolism including synthesis, storage, secretion, and action of insulin and also translocation of GLUT4 to the cell surface in insulin-responsive cells
- Human islet amyloid polypeptide (HIAPP) is a hormone that is released from pancreatic beta-cells and stored with insulin in secretory granules.
- Zinc has a role in stability of HIAPP, when zinc status is low; HIAPP trends to accumulate in the amyloid fibers and thereby causes a cytotoxic condition in beta-cells.

# zinc

- zinc supplementation can activate PPAR $\gamma$  signaling and improves glycemic control
- Zinc supplementation may have beneficial effect in glucose metabolism in patients with T2DM.



# Magnesium



- Stimulates the expression of insulin receptors genes
- Stimulates insulin release by pancreatic beta cells
- Plays role in glycolysis/insulin signaling cascade
- Magnesium supplementation may have favorable effects in glucose homeostasis and glycemic control.

# Magnesium

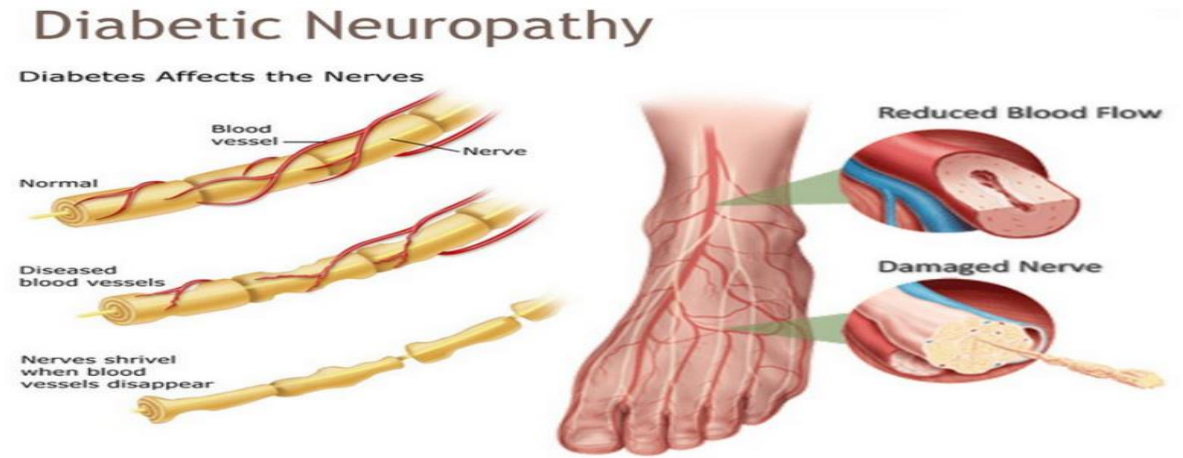
- One review of 26 studies including 1,168 people found that those with the highest regular intake of magnesium had a 22% lower risk of developing type 2 diabetes than those who regularly consumed the least magnesium . [Diabetes Metab Res Rev . 2020 Mar;36\(3\)](#)
- In one review of 18 studies, 12 of them including people either with diabetes or at risk of developing diabetes found that taking [250–450 mg](#) of magnesium daily for 6–24 weeks helped significantly reduce fasting blood sugar levels, compared with placebo groups. [Nutrition . 2017 Jun;38:54-60.](#)

# Vitamin B12

- People who take metformin for type 2 diabetes have lower levels of vitamin B12. Patients who are on metformin, should periodically being tested for B12
- Especially if the individual has a history of anemia or peripheral neuropathy.
- The treatment of patients with DN with 1 mg of oral methylcobalamin for twelve months increased plasma B12 levels and improved all neurophysiological parameters, sudomotor function and pain score



# Diabetic neuropathy



- **Vitamins B-1, B-6, and B-12** have been found to be especially beneficial for treating neuropathy. Vitamin B-1, also known as thiamine, helps to reduce pain and inflammation and vitamin B-6 preserves the covering on nerve endings.
- **N-Acetyl-Cysteine** is an antioxidant and amino acid that is used to treat nerve pain and reduce inflammation. It has been found to reduce neuropathic pain, improve motor coordination, and improve nerve damage. Since it is not naturally found in foods, it can be taken as a supplement.

■

# Omega3

- There is evidence from the general population that foods containing omega-3 fatty acids have beneficial effects on lipoproteins and prevention of heart disease.
- Therefore the recommendations for the general public to eat fish (particularly fatty fish) at least two times (two servings) per week is also appropriate for people with diabetes.
- However, evidence from randomized controlled trial (RCTs) does not support recommending omega-3 supplements for people with diabetes for the prevention or treatment of CVD (ADA, 2018).



# Vitamin B6

- Consumption of 40 mg B6 daily may reduce albuminuria in diabetic nephropathy



# Green Coffee Extract

- The results of a meta-analysis showed a significant decrease in HOMA-IR status in a dose greater than 400 mg.
- These findings suggest that GCE intake might be associated with FBG improvement



# Green Coffee Extract (Cont.,)

- The results of the included studies showed there is controversy about the effect of GCE and CGA on lipid profile improvement.
- Furthermore, GCE supplementation could reduce appetite level.



# Curcumin

- Using either 1,500-mg curcumin or placebo daily for 10 weeks may reduce diabetes complications through decreasing TG level as well as indicators of inflammation and increase adiponectin.
- Daily administration of 1500 mg curcumin has positive effects in reducing fasting blood glucose and weight in patients with type 2 diabetes.



# Curcumin (Cont.,)

- There are some reports linking curcumin with iron deficiency anemia.
- So patients with iron deficiency anemia and using curcumin supplements should be tested for possible causality.



## Curcumin (Cont.,)

- A study conducted among patients with prediabetes has shown that intake of 800 mg curcumin for 9 months enhance prevention of T2D, improve  $\beta$ -cell function, reduce insulin resistance, and higher level of adiponectin in curcumin-treated group compare with placebo group (Tan, 2004).
- Curcumin has been found to prevent chronic pain associated with neuropathy.



# Vitamin E & St. John's Wort

- Both vitamin E and the herb St. John's wort can have dangerous interactions with blood-thinning drugs used to treat heart disease—increasing your bleeding risk. Among people with heart disease being treated with the blood thinner warfarin,
- Those most likely to experience bleeding events have higher levels of vitamin E in their bodies. Other studies have found that St. John's wort amplifies the effect of blood thinners. Avoid these supplements if you're taking a blood-thinning medication.

- قرص شوگر متا بالانس، مکمل تخصصی تنظیم وزن و قند خون
- تامین کننده ویتامین ها و مواد معدنی مورد نیاز افراد با رژیم های لاغری با مواد غذایی محدود
- شوگر متا بالانس، حاوی گروه ویتامین B، ویتامین D، زینک، کروم و منیزیم
- کمک به کاهش اشتها
- شوگر متا بالانس، دارای ریزمغذی های موثر در متابولیسم و تولید انرژی
- کمک به تنظیم قند خون با دارا بودن کرومیوم



## FOOD SUPPLEMENT



# DiaFit® دیفیت

The comprehensive supply with 12 vitamins and 8 minerals – suitable for diabetics. Chromium contributes to the maintenance of normal blood glucose levels and normal macronutrient metabolism, which is also contributed by zinc and biotin. In addition, zinc contributes to normal metabolism of carbohydrates and fatty acids.

### دیفیت یوروویتال - مکمل، کپسول ژلاتینی نرم

ترکیبات: ویتامین‌های B1، B2، B3، B5، B6، B12، C، D3، E و اسید فولیک، بیوتین، کروم، آهن، سلنیوم، روی، منیزیم، مس، ید و منگنز.  
موارد مصرف: کمک به سلامت عمومی بدن، تأمین مواد مغذی مورد نیاز و مناسب برای افراد مبتلا به دیابت.  
موارد احتیاط: در صورت مصرف داروهای ضد دیابت، مصرف این قرآورده با توصیه پزشک انجام شود.  
میزان مصرف: روزانه یک عدد کپسول با میزان کافی آب میل شود.  
شرایط نگهداری: در دمای پایین‌تر از ۲۵°C، در جای خشک، دور از نور و دسترس کودکان نگهداری شود.  
در دوران بارداری و شیردهی، مطابق دستور پزشک و یا دکتر داروساز مصرف شود.  
این قرآورده صرفاً مکمل بوده، جهت تشخیص، درمان و پیشگیری از بیماری نمی‌باشد.  
سری ساخت، تاریخ تولید و انقضا روی بسته بندی درج شده است.  
تولید تحت لیسانس Euro OTC Pharma GmbH آلمان  
در داروسازی دانا  
دارنده پروانه ساخت: شرکت حکیمان طب کار  
جهت کسب اطلاعات بیشتر در خصوص این قرآورده، عدد ۲۰ را به شماره ۰۲۱-۷۵۹۴۸ مرکز پاسخگویی و مشاوره علمی شرکت حکیمان طب کار پیامک نمایید.

## DIETARY SUPPLEMENT

### Average amount per 1 capsule % NRV\*

Vitamin A (2000 I.U.)	600 µg	75
Vitamin D3 (200 I.U.)	5µg	100
Vitamin E (45 I.U.)	30 mg	250
Vitamin C	120 mg	150
Vitamin B1	4.2 mg	319
Vitamin B2	5 mg	357
Niacin	35 mg	219
Vitamin B6	6 mg	428
Folic acid	400 µg	200
Vitamin B12	3 µg	120
Pantothenic acid	10 mg	166
Biotin	200 µg	400
Iron	8 mg	57
Magnesium	100 mg	27
Zinc	10 mg	100
Chromium	35 µg	87
Selenium	50 µg	91
Copper	0.5 mg	50
Manganese	1 mg	50
Iodine	100 µg	66 %

\* Nutrient Reference Value according to Regulation (EU) 1163/2011

Euro OTC Pharma GmbH,  
Postfach 1242, D-59194 Bönen  
Germany



## One-a-day nutritional support from Diabetone®

A carefully balanced expert formula to support overall health and wellbeing, with 21 nutrients to help safeguard your daily nutritional requirements, including:

- Chromium which helps to maintain normal blood glucose levels.
- Vitamin B6 which contributes to normal protein and glycogen metabolism.
- Thiamin which supports normal functioning of the nervous system.
- Zinc which contributes to normal macronutrient metabolism.

TESTED IN INDEPENDENT NUTRITIONAL RESEARCH INTO WELLBEING

Diabetone® tablets are supported by original published nutritional research.

Ref: George Marakiset al, Integrative Medicine Insights 2007:2.

Nutritional Information	Average per Tablet	% EC NRV*
L-Carnitine	50 mg	—
Vitamin A (2333 IU)	700 µg RE	88
Vitamin D (as D3 600 IU)	15 µg	300
Vitamin E (Natural Source)	20 mg α-TE	167
Vitamin C	120 mg	150
Thiamin (Vitamin B1)	30 mg	2727
Riboflavin (Vitamin B2)	5 mg	357
Niacin (Vitamin B3)	45 mg NE	281
Vitamin B6	10 mg	714
Folic Acid	400 µg	200
Vitamin B12	9 µg	360
Biotin	200 µg	400
Pantothenic Acid	10 mg	167
Magnesium	100 mg	27
Iron	8 mg	57
Zinc	15 mg	150
Copper	1000 µg	100
Manganese	2 mg	100
Selenium	100 µg	182
Chromium	160 µg	400
Iodine	100 µg	67

\*NRV - Nutrient Reference Value  
mg - milligram, µg - microgram, IU - International Units

[www.diabetone.com](http://www.diabetone.com)

### DIRECTIONS

**ONE TABLET PER DAY WITH YOUR MAIN MEAL.**  
Swallow with water or a cold drink. Not to be chewed.  
Do not exceed the recommended intake.  
Diabetone® should not be taken on an empty stomach.

This comprehensive formula replaces other Diabetone® multivitamins.

### User Information

Diabetone® is a vitamin and mineral supplement for those who wish to safeguard their daily diet with key vitamins and minerals. It is not a treatment for diabetes or metabolic control, but intended to help maintain overall health and wellbeing. Diabetone® does not contain any drugs or hormones but should be used under the guidance of your pharmacist, physician or healthcare professional.

## قرص دیابتون

مکمل تغذیه ای / ۳۰ عددی

این قرص آورده فاقد رنگ مصنوعی، مواد نگهدارنده، شکر، مخمر، لاکتوز و گلوتن می باشد.

موارد مصرف:

کمک به سلامت عمومی بدن و تامین مواد مغذی مورد نیاز بدن در افراد سالم و دیابتی

روش مصرف : روزی ۱ عدد قرص به همراه وعده غذایی اصلی یا ۱ لیوان آب میل شود.

این قرص آورده جهت پیشگیری، تشخیص و درمان بیماری نمی باشد.

چنانچه هر داروی دیگری مصرف می کنید قبل از مصرف این قرص آورده با پزشک یا داروساز مشورت کنید.

مصرف این قرص آورده در کودکان توصیه نمی شود.

موارد هشدار و احتیاط: در صورت ابتلا به صرع، اختلالات تیروئید، هموکروماتوز، آلرژی به مواد غذایی و یا اجزای تشکیل دهنده قرص آورده (از جمله سویا) و در دوران بارداری و شیردهی، قبل از مصرف، با پزشک خود یا داروساز مشورت نمایید.

بیشتر از مقدار توصیه شده مصرف نشود.

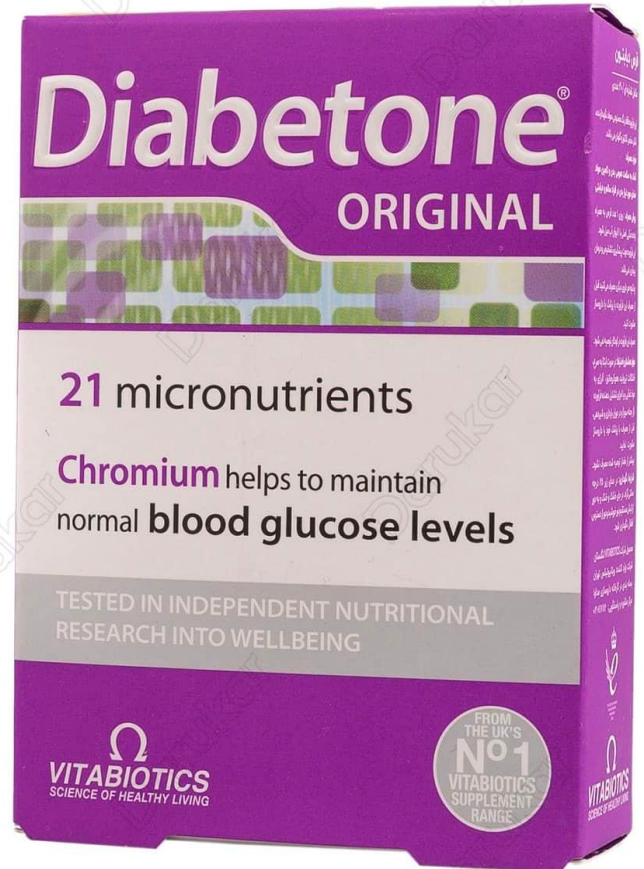
شرایط نگهداری: در دمای زیر ۲۵ درجه سانتی گراد، در جای خشک و خنک و به دور از تابش مستقیم نور خورشید و دور از دسترس اطفال نگهداری شود.

محصول شرکت VITABIOTICS انگلستان

شرکت وارد کننده: ویتابیوتیکس تهران

پسته بندی در کارخانه داروسازی مداوا

مرکز مشاوره و پاسخگویی: ۰۲۱-۴۱۷۸۲



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21 micronutrients  
& omega-3

**Chromium** helps to maintain  
normal **blood glucose levels**

  
**VITABIOTICS**  
SCIENCE OF HEALTHY LIVING

FROM  
THE UK'S  
**Nº1**  
VITABIOTICS  
SUPPLEMENT  
RANGE

## DIETARY SUPPLEMENT

Supplement facts	Per softgel capsule	%RDA
Vitamin D3	600 I.U.	100
Vitamin E	45 I.U.	250
Vitamin C	120 mg	150
Vitamin B1	4,2 mg	319
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Chromium	35 µg	87
Selenium	50 µg	91
Copper	0,5 mg	50
Manganese	1 mg	50
Iodine	100 µg	66

Percentage of RDA (recommended daily allowance) according to EU

### Other Ingredients:

Gelatin, Sorbitol, Glycerine, Vegetable oils and Iron Oxide.

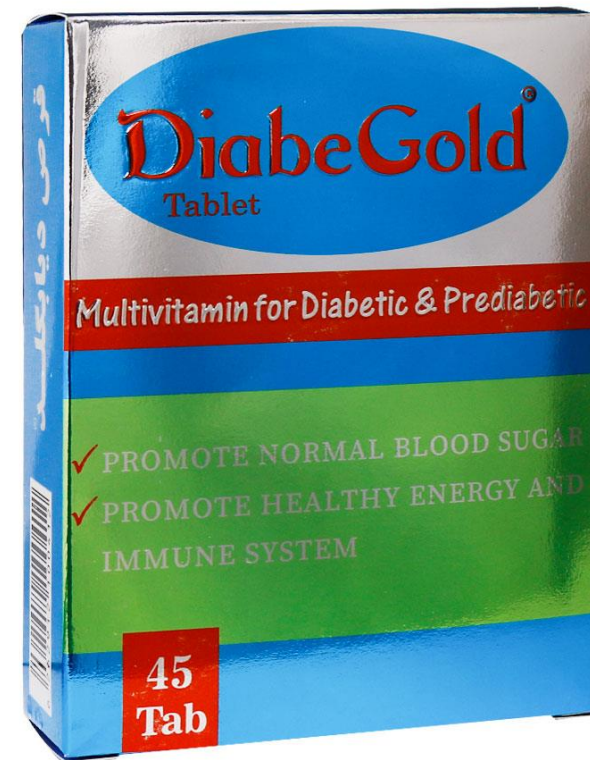
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## MultiVitamin for Diabetics



- Provide important nutrient supplement for the daily food with a special combination of vitamins and minerals.
- In addition, B-Vitamins contribute to normal energy-yielding metabolism and to the reduction of tiredness and fatigue.





# حاوی عصاره دارچین

# Conclusion

- It is recommended that healthcare practitioners encourage patients with diabetes to continue using standard diabetes care and make appropriate lifestyle change in diet and physical activity.



Any  
Question?

