

Micronutrients in Parenteral Nutrition



Micronutrients (vitamins and trace elements)

are an integral part of nutritional support and are essential for the metabolism of macronutrients¹

VITAMINS:²

- enable effective metabolism of major nutrients
- support the immune system
- provide antioxidative capacity

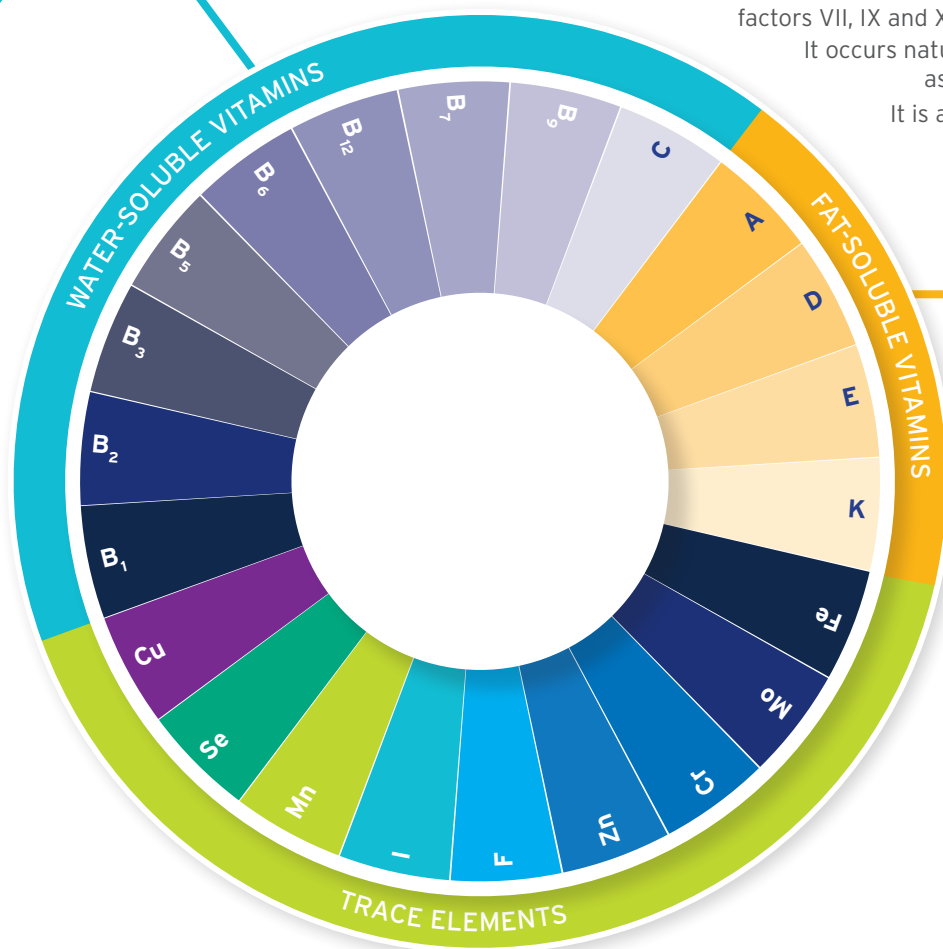


Why is Vitamin K so important for your patients?^{2,3,4}

Vitamin K is necessary for the activation of vitamin K dependent proteins such as coagulation factors VII, IX and X, and prothrombin

It occurs naturally in two forms as vitamin K₁ and K₂.

It is also involved in the regulation of bone mineral density



TRACE ELEMENTS:¹

- provide antioxidative capacity
- essential for immunity, endocrine function, and gene repair and cell signaling



Micronutrients in Parenteral Nutrition (PN) recommendations⁵

Water-soluble vitamins

Thiamine (B₁)	PN should provide at least 2,5 mg per day (R14.4, B, 92 %)
Riboflavin (B₂)	PN should provide 3,6 – 5 mg riboflavin per day (R15.4, B, 96 %)
Niacin (B₃)	PN should provide at least 40 mg of niacin per day (R16.4, B, 95 %)
Pantothenic acid (B₅)	PN should provide at least 15 mg pantothenic acid per day (R17.4, B, 98 %)
Pyridoxine (B₆)	PN should provide 4 to 6 mg pyridoxine per day (R18.4, B, 98 %)
Biotin (B₇)	In PN vitamin additives should provide 60 µg biotin per day (R19.4, B, 98 %)
Folate (B₉)	PN shall provide 400 – 600 µg folic acid per day (R20.5, B, 98 %)
Cobalamin (B₁₂)	PN should provide at least 5 µg cyanocobalamin per day (R1.6, GPP, 97 %)
Vitamin C	PN should provide 100 to 200 mg vitamin C per day (R23.5, GPP, 97 %)

Fat-soluble vitamins

Retinol A	PN should provide 800 to 1 100 µg RE per day (R22.4, B, 97 %)
Vitamin D	PN should provide at least 200 IU (5 µg) of vitamin D per day (R24.4, B, 95 %)
α-tocopherol E	PN should provide at least 9 mg α-tocopherol per day (R25.4, B, 100 %)
Phylloquinone (K₁)	PN may provide 150 µg of vitamin K ₁ per day (R26.1, GPP, 95 %)

Trace elements

Chromium	PN can provide 10 µg/day chromium (R4.6, O, 100 %)
Cobalt	PN does not need to provide additional cobalt, as long as vitamin B ₁₂ is administered (R5.4, GPP, 92 %)
Copper	PN should provide 0,3 – 0,5 mg copper per day (R6.4, B, 94 %)
Fluoride	There is no equivalent recommendation for standard dosing of fluoride in PN (R7.4, GPP, 100 %)
Iodine	PN should provide standard dose of iodine of 130 µg/day (R8.6, B, 91 %)
Iron	PN shall provide at least 1 mg/day of elemental iron, or an equivalent amount at periodic intervals or separate infusion (R9.4, A, 94 %)
Manganese	PN shall provide 55 µg manganese per day (R10.6, A, 91 %)
Molybdenum	PN should provide 19 – 25 µg molybdenum per day (R11.4, B, 100 %)
Selenium	PN should provide 60 – 100 µg selenium per day (R12.4, B, 91 %)
Zinc	PN should provide 3 – 5 mg zinc IV per day in patients without abnormal losses (R13.4, B, 88 %)

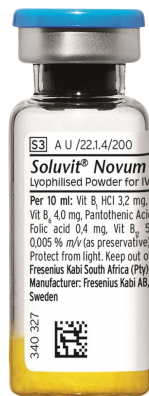


ESPEN practical short micronutrient guidelines 2024 recommend that:⁵

Adequate amounts of all essential trace elements and vitamins should be supplied to all patients (R1, A, 100 %)

Intravenous Total Nutrition is compounded to include macronutrients and micronutrients

Composition



Soluvit® Novum
(per 10 mL reconstituted)

Thiamine (B ₁)	2,5 mg
Riboflavin (B ₂)	3,6 mg
Niacin (B ₃)	40 mg
Pantothenic acid (B ₅)	15 mg
Pyridoxine (B ₆)	4,0 mg
Biotin (B ₇)	60 µg
Folate (B ₉)	400 µg
Cobalamin (B ₁₂)	5 µg
Vitamin C	100 mg



Vitalipid® Novum Adult
(per 10 mL)

A	990 µg (3 300 IU)
D ₂	5 µg (200 IU)
E	9,1 mg (10 IU)
K ₁	150 µg



Addaven®
(per 10 mL)

Chromium	10 µg
Copper	380 µg
Fluoride	950 µg
Iodide	130,0 µg
Iron	1,1 mg
Manganese	55 µg
Molybdenum	19 µg
Selenium	79 µg
Zinc	5,0 mg

References

- Singer P, Blaser AR, Berger MM, *et al.* ESPEN guideline on clinical nutrition in the intensive care unit. Clin Nutr. 2019 Feb;38(1):48-79. doi: 10.1016/j.clnu.2018.08.037. Epub 2018 Sep 29. PMID: 30348463.
- Berger MM, Shenkin A, Schweinlin A, *et al.* ESPEN micronutrient guideline. Clin Nutr. 2022 Jun;41(6):1357-1424. doi: 10.1016/j.clnu.2022.02.015. Epub 2022 Feb 26. Erratum in: Clin Nutr. 2024 Apr;43(4):1024. PMID: 35365361.
- Ferland G. Vitamin K, an emerging nutrient in brain function. Biofactors. 2012 Mar-Apr;38(2):151-7. doi: 10.1002/biof.1004. Epub 2012 Mar 15. PMID: 22419547.
- Fang Y, Hu C, Tao X, Wan Y, Tao F. Effect of vitamin K on bone mineral density: a meta-analysis of randomized controlled trials. J Bone Miner Metab. 2012 Jan;30(1):60-8. doi: 10.1007/s00774-011-0287-3. Epub 2011 Jun 15. PMID: 21674202.
- Berger MM, Shenkin A, Dizdar OS, *et al.* ESPEN practical short micronutrient guideline. Clin Nutr. 2024 Mar;43(3):825-857. doi: 10.1016/j.clnu.2024.01.030. Epub 2024 Jan 30. PMID: 38350290.

[S3] Addaven®. Each 1 ml concentrate contains 5,33 µg chromic chloride hexahydrate; 0,10 mg cupric chloride dihydrate; 0,54 mg ferric chloride hexahydrate; 19,80 µg manganese chloride tetrahydrate; 4,85 µg sodium molybdate dihydrate; 17,3 µg sodium selenite anhydrous; 1,05 mg zinc chloride; 16,6 µg potassium iodide; 0,21 mg sodium fluoride. Reg. No.: 49/24/0996

[S3] Soluvit® Novum. Each 10 ml vial contains 3,2 mg thiamine HCl (as thiamine mononitrate); 3,6 mg riboflavin (as sodium riboflavin phosphate); 40,0 mg nicotinamide; 4,0 mg pyridoxine (as pyridoxine HCl); 15,0 mg pantothenic acid (as sodium pantothenate); 100,0 mg ascorbic acid (as sodium ascorbate); 60,0 µg biotin; 0,4 mg folic acid; 5,0 µg cyanocobalamin. Reg. No.: U/22.1.4/200

[S3] Vitalipid® Novum Adult. Each 1 ml concentrate contains 99 µg (330 IU) Vitamin A; 0,5 µg (20 IU) Vitamin D₂; 0,91 mg (1 IU) Vitamin E; 15 µg Vitamin K₁. Reg. No.: Z/22.1/236

For full prescribing information refer to the latest professional information approved by the South African Health Products Regulatory Authority.

PNB_154_6_2026_V1



**FRESENIUS
KABI**

Fresenius Kabi South Africa (Pty) Ltd, Reg. No. 1998/006230/07
7 Kingfisher Avenue Midpoint, 162 Tonetti Street, Halfway House
Ext. 7, Midrand, Gauteng, 1685
PO Box 4156, Halfway House, Gauteng, 1685
Tel: + 27 11 545 0000
www.fresenius-kabi.co.za