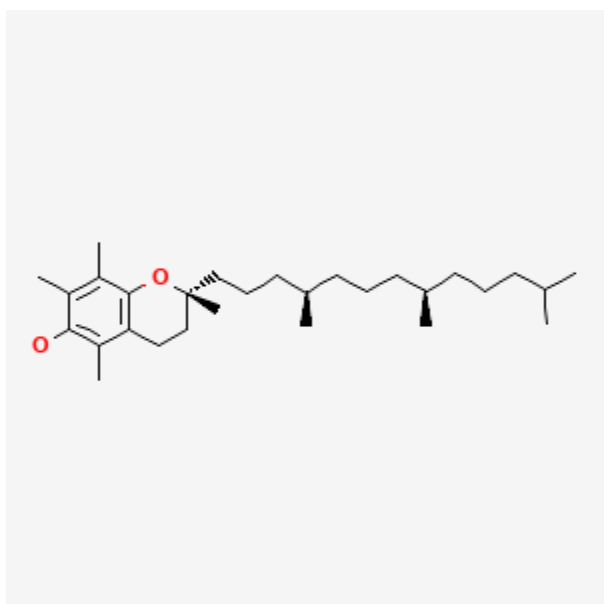




Vitamin E

Revised: December 15, 2023.

CASRN: 59-02-9



Drug Levels and Effects

Summary of Use during Lactation

Vitamin E is a normal component of human milk. Maternal obesity, smoking and possibly preterm birth (<37 weeks gestational age) are associated with lower milk vitamin E levels. Lactating mothers may need to supplement their dietary intake of vitamin E to achieve the recommended daily intake of 19 mg.[1] Daily maternal vitamin E supplementation from prenatal multivitamins can safely and modestly increase milk vitamin E levels and improve the vitamin E status of the breastfed infant compared to no supplementation. Higher daily dosages have not been studied.

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Drug Levels

Alpha-tocopherol is the major isoform of vitamin E present in the human diet and in breastmilk.[1,2] Levels are highest in colostrum and decrease postnatally.[3] Higher alpha-tocopherol milk levels result in greater milk antioxidant capacity.[2,4,5] Maternal serum levels correlate with breastmilk levels during the early postpartum period, but this relationship has not been studied in mature milk.[6,7] Vitamin E is naturally found in plant seed oils, and women with higher intakes of polyunsaturated fatty acids during lactation have higher alpha-tocopherol in breastmilk.[8] A serum alpha-tocopherol concentration <12 micromoles/L indicates vitamin E deficiency in adults and children.

United States Food and Drug Administration standards for dietary supplement labeling recommend mcg rather than the traditional “international units” (IU) when describing vitamin E doses. One IU = 0.67 mg = 1.556 micromoles (0.43 mg per micromole) of the naturally occurring stereoisomer d-alpha-tocopherol, also known as RRR-alpha-tocopherol. Some vitamin E supplements and food fortifiers are manufactured using the synthetic racemic dl-alpha-tocopherol form where 1 IU = 0.45 mg.[1]

Maternal Levels. In mothers not taking a vitamin E supplement, average alpha-tocopherol levels reported in colostrum range from 20 to 50 micromoles/L. At 1 to 2 weeks postpartum, milk levels are 7 to 14 micromoles/L, and beyond 2 weeks they are 3 to 9 micromoles/L.[3,9] Hindmilk levels are higher than foremilk.[10] Maternal obesity and smoking are associated with lower milk alpha-tocopherol levels.[11,12] Preterm birth (< 37 weeks gestational age) may also be associated with lower milk levels.[10] In some comparative studies, reported levels range from 1/3 to 2/3 lower in preterm than term milk.[11,12] Others have not found a difference associated with prematurity.[13,14]

In a series of prospective studies conducted by the same research group in Brazil, a single supplemental dose of vitamin E given to mothers in the first 48 hours postpartum produced small to modest short-term increases in colostrum and milk levels compared to no supplementation. The best results came from 400 IU (268 mg) of natural vitamin E which increased colostrum levels by nearly 60%, from about 35 micromoles/L at baseline to 50 micromoles/L at 24 hours after the dose compared to a 36% increase from the same dose of synthetic vitamin E. [15] By 7 days after the dose, mothers who received 400 IU (268 mg) of natural vitamin E had milk levels return to baseline, although still significantly higher than milk of unsupplemented mothers whose levels were below baseline. By 30 days, both groups had similar milk levels, which were about one-third of baseline levels.[16] A single 110 IU (50 mg) dose of synthetic vitamin E did not significantly change colostrum levels 24 hours after the dose.[17]

In Tanzania, 320 women with vitamin E deficiency (serum vitamin E levels of approximately 10 micromoles/L) were given a daily multivitamin containing 30 mg of natural vitamin E during pregnancy and postpartum. Their average milk levels of alpha-tocopherol at 3, 6 and 12 months postpartum were significantly higher (12.5, 11.5 and 10.3 micromoles/L, respectively) than in 306 women not given the multivitamin (10.3, 8.8, and 8.4 micromoles/L).[18]

Infant Levels. The average serum level observed in healthy children is 20 micromoles/L.[19]

In 306 HIV positive Tanzanian women who were given a daily multivitamin containing 30 mg daily of natural vitamin E starting at 12 to 27 weeks of pregnancy and continuing postpartum, the average serum alpha-tocopherol levels in their exclusively breastfed infants were significantly higher (17 and 15.7 micromoles/L, respectively) at 6 weeks and 6 months postpartum compared to 288 women not given the multivitamin (15.2 and 14.6 micromoles/L, respectively). All the women studied had similar serum vitamin E levels of approximately 23 micromoles/L at baseline. The contribution of breastmilk to the higher infant vitamin E levels cannot be determined.[20]

Effects in Breastfed Infants

Relevant published information was not found as of the revision date.

Effects on Lactation and Breastmilk

Relevant published information was not found as of the revision date.

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Substance Identification

Substance Name

Vitamin E

CAS Registry Number

59-02-9

Drug Class

Breast Feeding

Lactation

Milk, Human

Vitamins

Antioxidants