

Product Information

Retinol All Trans

Product Number **R7632**

CAS Number: 68-26-8

Synonyms: Vitamin A; Vitamin A₁; Vitamin A Alcohol;
Anti-Infective Vitamin; Axerophthol¹

Physical Description

Appearance: Yellow to orange with a brown cast powder

Molecular weight: 286.5

Formula: C₂₀H₃₀O

Melting point: 62-64°C (solvent free)⁴

E^M(325nm) = 52,480 (ethanol)³

E^{1%}(324-325nm) = 1835 (ethanol)⁴

RE exhibits fluorescence properties with maximum absorbance and emission at 325 nm and 520 nm (cyclohexane), respectively

Method of Preparation

Retinol all trans (RE) is synthetically prepared by Sigma. Many procedures have been reported for methods of synthesis which include synthesis from retinal⁸ and total synthesis from various starting compounds.^{4,9} Methods of purification and various assays for purity determination have been described.^{4,10}

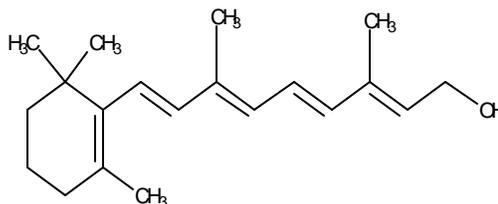
Stability / Storage as Supplied

RE is expected to be stable for about one year if unopened in the sealed amber glass vial (packaged under argon atmosphere), stored at -20°C.²

Solubility / Solution Stability

RE is practically insoluble in water or glycerol. It is soluble in absolute ethanol, methanol, chloroform, ether, fats and oils.⁷ RE has been dissolved at 50 mg/ml in chloroform; a clear yellow to orange solution results.² Stock solutions of RE (1 mg/ml) were prepared in ethanol, diluted in DMSO under low light conditions and stored at -50°C under nitrogen in brown glass vials.¹¹ RE solutions (50 µM) were sterile filtered before use.¹¹ RE both as a solid and in solution is readily oxidized in air and inactivated by UV light.

To reduce photodestruction of RE, manipulations of RE solutions can be performed under yellow or red light.^{12,13} Solutions may be stabilized by dissolving in oil, by the addition of anti-oxidant compounds including a-tocopherol or hydroquinone or by conversion to the



palmitate and acetate esters.³ It is recommended to prepare solutions fresh for optimal quality. However, if absolutely necessary, store solutions in the dark under an inert atmosphere at least at -20°C preferably at -70°C. Solvents preferred for storage are peroxide-free ethyl ether, acid-free acetone or ethyl acetate. For short term storage, ethanol is suitable as a solvent for spectroscopic analysis.⁴

Usage / Applications

The isolation of retinol from human plasma has been described.¹⁴ RE is an effective antioxidant displaying lipoperoxy radical scavenging activity.¹⁵ The interactions between RE and Vitamin E (a-tocopherol) in suppressing lipid peroxidation were observed in bovine retinal membrane preparations.¹³ RE may influence the production of transition vesicles by stimulating the activity of a protein disulfide isomerase-like activity involved in vesicle formation.¹² RE may be involved in immune system mechanisms; an RE deficiency will depress the immune response producing a negative effect on both humoral and cellular immunity.¹⁶ RE (10 µM) and other retinoid compounds effectively induced sanguinarine and chelerythrine (benzophenanthridine alkaloids) accumulation in suspension-cell cultures of *Sanguinaria canadensis* in a way similar to fungal elicitation.¹¹ RE (10 µM) stimulated DNA synthesis and possibly repair mechanisms in Sertoli cells of rat.¹⁷

General Notes

The USP unit of vitamin A (same as the International Unit⁶) is equal to 0.3 µg of the pure all-trans isomer of retinol which is equivalent to 0.344 µg of all-trans retinyl acetate.⁷

RE and its metabolites, including retinoic acid, are part of the retinoid class of compounds, involved in vision, normal embryo morphogenesis and in the regulation of proliferation and differentiation of a number of cell types. Current information and hypotheses on the absorption, transport, storage and metabolism of this fat soluble Vitamin A (retinol) have been reviewed.¹⁸ Studies on RE metabolism including its mobilization and transport in plasma and in tissues via serum and cytosolic retinol-binding proteins have been described.¹⁹

References

1. Sigma Material Safety Data Sheet
2. Sigma Quality Control Data
3. Dawson, R.M.C. et al., eds. *Data for Biochem. Res.* 3rd edition, Clarendon Press, Oxford, 136, 1987.

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