

Inactive Ingredient	(Anhydrous) Ethanol	Acetone	Dexpanthenol Pro-Vit. B5	Phytantriol Pro-Vit. B3	Glycerol Monolaurate	Dimethyl Sulphone	Coleus Forskohlin
FDA GRAS	YES	YES	YES	YES	YES	YES	--
Acute Oral Toxicity	FDA Guidance - 50mg or less per day	FDA Guidance - 50mg or less per day	FDA Guidance - 50mg or less per day	Food additive ¹ >5000mg/kg	LD50/oral/rat = >5000 mg/kg LD50/dermal/rat VALUE - ²	Developmental delay in 4yo & 6yo; >2000mg/kg in rats	14 days in a dose of 2000mg/kg. No observational symptoms appeared ³
Acute Dermal Toxicity	FDA Guidance - 50mg or less per day	FDA Guidance - 50mg or less per day	FDA Guidance - 50mg or less per day ⁴	None determined	Acute Tox Dermal = No information available ¹⁰	GRAS Status no acute dermal toxicity ⁵	Estimated Human Lethal Serum Concentration = 32.6µg/mL ⁶
Eye Irritation	Eye Irritant ⁷	known eye irritant ⁸	RX for eye disease ⁹	Severe in Rabbits @100%	Mild eye irritant ¹⁰	Moderate Eye Irritant ¹⁰	May be an eye irritant ¹¹
Skin Irritation	Testagen Study - mild irritation	Dermal effects in humans exposed by direct skin contact to pure substance. ¹²	Dermal irritation in 1.2% of 2,171 Ss ¹³	Severe in Rabbits @100%, slight at 3%	GRAS FDA for topical use at doses up to 100 mg/ml ¹⁴	None to slightly irritating ⁸	None to slightly irritating ¹⁰
Skin Sensitization, Neat	6 of 93 human volunteers 2 months post 1 ⁿ challenge ¹⁵	Sensitizing	Non-sensitizing ¹⁶	Concentration dependent (<1%)	Results for glycerol monolaurate indicate no toxicity (Toxicity Category IV) ¹⁷	Not a contact sensitizer 8 18	No Data ¹⁰
Application Site Evaluation	Non-toxic, non-irritating ¹⁹	Non-toxic, non-irritating ¹⁶	Non-toxic, non-irritating ¹⁶	<3% no reaction	Non-toxic, non-irritating ¹⁶	Non-toxic, non-irritating ¹⁶	Non-toxic, non-irritating ¹⁶
Phototoxicity / Photoallergy	Non-toxic, non-irritating ⁹	Non-toxic, non-irritating ¹¹	Non-toxic, non-irritating ¹¹	Negative. Phytantriol did not cause erythema at doses of 3% and 10%. ²⁰	Glyceryl Isostearate did not induce significant cutaneous reactions with or without UV irradiation. ²¹	No Data Available	No Data ¹⁰

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Genotoxicity Assays	FDA Guidance - 50mg or less per day	FDA Guidance - 50mg or less per day	FDA Guidance - 50mg or less per day	Negative. ²⁰	Data show that glyceryl monooleate is not genotoxic. ²⁰	Half life of 7.5 days in the brain. NOAEL ²⁸	None, effects on Embryo Heart Development in Chickens
ADME/PK-Intended Route	Flashed off completely in 90 seconds 9.72 g (Dose range 3.31–17.28 g) below LOD ²¹	The majority of the applied dose evaporated from the skin's surface ²²	21CFR582.5580 This substance is generally recognized as safe when used in accordance with good manufacturing or feeding practice. ²³	Phytantriol skin permeability relatively low. No metabolic effect at cosmetic doses <2% ²⁴	The metabolic fate is summarized in the reference. triglyceride and diglyceride metabolism, describes the metabolic pathway ²⁵	Pharmacokinetic studies indicate that MSM is rapidly absorbed in rats [63,64] and humans, taking 2.1 h and <1 h, respectively.	No Data Available
28-Day Toxicity (2 Species) - Intended Route	Superceded by Human 21-Day CDIT ¹⁵	Superceded by Human 21-Day CDIT ¹⁵	No relevant data available- Superceded by Human 21-Day CDIT ¹⁵	Superceded by Human 21-Day CDIT ¹⁵	Non-toxic. ¹³ Superceded by Human 21-Day CDIT ¹⁵	5000mg/kg rat & rabbit - route not listed - LD50,	No signs of toxicity in all the body organs and there are no alterations in physiological action. ³ Superceded by Human 21-Day CDIT ¹⁵
90 Day Toxicity	Ethyl alcohol is minimally-absorbed through the skin. In a study that followed the 90-day National Toxicology Program4 (NTP) study, ethyl	Dermal effects have also been studied in animals after direct application of acetone to the skin, though evidence is mixed. Chronic low doses	No adverse effects releated on D-Panthenol could be observed after oral exposure for 90 days. ²⁸	A Derek data base analysis of Phytantriol tested for all alerts (DSM Nutritional Products 2004b). No alerts were found.	Classification: Acceptable ¹³	NOAEL ^B @ 1.5 g/kg/day ¹⁴	In chronic 180 day oral toxicity study, showed no signs of toxicity and hence exposure to this extract at up to 1000 mg/kg b.wt/dayis NOAEL ²⁹

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	alcohol caused a marginal increase in survival in males ²⁶	do not appear to be problematical. ²⁷					Superceded by Human 21-Day CDIT ¹⁵
Embryo-Fetal Toxicology	“Very little evidence to suggest that ethyl alcohol is genotoxic in somatic cells. “ (UNEP 2005, citing Phillips 2001). ²¹	No statistically significant differences in the incidences of miscarriage, perinatal death rate, or malformations were found between those exposed to a acetone, and those not exposed ²³	No adverse effect observed Dose descriptor: NOAEL 1 000 mg/kg bw/day ³⁰	Phytantriol did not induce chromosome aberrations in cultured human lymphocytes when tested to its limit of cytotoxicity. ²⁰	Class known not to be reproductive or developmental Toxicants ¹³	NOAEL 1 g/kg/day ¹⁴	Coleus forskohlii extract was not mutagenic. ²⁹ NOAEL ^{31 32}
Reproductive Toxicity	EPA concludes that the "collective weight of evidence is that the NOAEL for developmental effects in animals is high, typically ~6,400 mg/kg bw, compared to maternally toxic effects at 3,600 mg/kg bw. ²¹	Acetone alone had no effect on indices of fertility ²³	Reproductive toxicity Shall not be classified as a reproductive toxicant. ³³	No published studies on the reproductive and developmental toxicity of Phytantriol were available. ²⁰	Class known not to be reproductive or developmental Toxicants ¹³	Mammalian in vivo micronucleus test: NR: No response or significant increase ³⁴	No Teratogenicity ²⁹ ^{35 36}

^A HI Dose = 1 mL

^BNOAEL: The no-observed-adverse-effect-level in drug safety evaluations

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- ¹ Final Report on the Safety Assessment of Phytantriol International Journal of Toxicology, 26(Suppl. 1):107–114, 2007 Copyright © American College of Toxicology ISSN: 1091-5818 print / 1092-874X online DOI: 10.1080/10915810601163947
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- ³ Yadav H, Vangoori Y, Sayana SB, Evaluation of toxic effects of Coleus Forskohlii, Asian Journal of Medical Sciences Dec 2022 Vol 13 Issue 12
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- ⁵ US FDA Guidance for Industry Q3C — Tables and List (ICH) guidance for industry Q3C Impurities: Residual Solvents (1997)
- ⁶ Raabe HA Wilt N IIVS Forskolin Dermal Tox Report
- ⁷ Ethyl alcohol 200 Proof MSDS, University of Pittsburgh, Nano.Pit
- ⁸ 2.11 Dermal Toxicological Profile for Acetone, Atlanta (GA): Agency for Toxic Substances and Disease Registry (US); 2022 Jun. CHAPTER 2, HEALTH EFFECTS. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK590387/>
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- ¹⁰ SDS Methyl Sulfonyl Methane
- ¹¹ Material Safety Data Sheet Forskolin ACC# 91387
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