



Description

HydroEye is a unique, patented oral formulation that helps provide relief for dry eyes. Its proprietary blend of key nutrients works to produce a healthy tear film and support ocular surface health.

HydroEye Highlights

- Offers relief for dry eyes with a proprietary blend of omega-3 and omega-6 fatty acids, vitamin A, antioxidant vitamin C and other nutrient cofactors involved in fatty acid metabolism
- Promotes long-lasting relief with continued use; results typically experienced within 30-60 days
- Made from premium ingredients and manufactured according to the highest quality standards
- Two capsules taken orally, twice daily
- HydroEye is an effective stand-alone formulation for dry eye support*

* HydroEye can be safely combined with OcularRx® to add comprehensive multinutrient support for eyes and full body health, or with MaculaRx Plus™ to add powerful macular protection for individuals concerned about age-related vision loss

What is Dry Eye?

Dry eye syndrome (keratitis or keratoconjunctivitis sicca) is characterized by chronic dryness of the eye's conjunctiva and cornea due to inadequate tear fluid or excessive loss of tears. People with dry eye frequently experience itching, burning or gritty sensations. Some also notice a flood of tears after eye irritation. These symptoms can be aggravated by prolonged visual efforts such as reading, working on the computer, driving or watching TV. Environmental factors such as low humidity, air travel, heating or air conditioning, and contact lens wear can also contribute to or worsen dry eye. A recent study suggests that in addition to discomfort, dry eye may also reduce visual function during everyday activities such as reading or driving (1).

Causes of Dry Eye

Many researchers view the ocular surface, along with the main tear gland and the nerves connecting them, as a functional unit. The cornea, conjunctiva, accessory

tear (lacrimal) glands, and oil secreting (meibomian) glands are all considered part of the ocular surface. When one part of this unit is compromised, normal support of the ocular surface can be impaired (2).

In Sjögren's syndrome, for example, damage to the lacrimal gland causes diminished tear formation and dry eye. Conditions such as rosacea can affect the oil producing glands. By altering the quality of the tear's oily outer layer, tears evaporate more readily and dry eye can result. Dry eye commonly follows surgical procedures such as laser in-situ keratomileusis (LASIK) and photorefractive keratectomy (PRK) (3). Even aging and the loss of hormones after menopause can disrupt ocular surface support and promote dry eye (4).

Inflammation: An Important Factor in Dry Eye

Although the causes of dry eye are varied, evidence strongly points to chronic inflammation as a common underlying factor (2,5,6). Researchers believe that ocular distress from dryness can lead to cellular damage and the release of small proteins called cytokines that initiate or amplify the body's immune and inflammatory response. Increased levels of cytokines have been detected in the tear fluid and conjunctiva of people with dry compared to normal eyes (7). Certain cytokines prompt cells to produce other compounds that play a role in the development of inflammation such as prostaglandins, enzymes and free radicals.

Dietary Fats: Pro- or Anti-inflammatory

Dietary fatty acids are stored in cell membranes. With injury or insult, some of these fatty acids

can be mobilized and transformed into prostaglandins, small hormone-like compounds that help regulate a variety of processes in the body, including inflammation.

Dietary fats include the omega-6 and omega-3 families. Some of the members of these families become the building blocks for prostaglandins. Certain fatty acids can be metabolically converted to prostaglandins which tend to be anti-inflammatory (PGE1 and 3). Two examples are gamma-linolenic acid (GLA) of the omega-6 family and alpha-linolenic acid (ALA) of the omega-3 family. Other fatty acids form prostaglandins that support inflammation (PGE2) (8).

The typical American diet is rich in meats, dairy and other oils containing fatty acids that can become pro-inflammatory prostaglandins. The American diet is also less abundant in fish and oils whose metabolic products are anti-inflammatory. Altering the kinds of fats we consume can influence the kinds of prostaglandins produced, and favorably affect the body's inflammatory environment (9).

Rationale for Key Ingredients

Black Currant Seed Oil (1500 mg) and Cod Liver Oil (3.2 mg) Cod liver oil contributes omega-3 fats. Black currant seed oil provides both omega-3 and omega-6 fatty acids in the optimal, recommended ratio of about 1:4-5 (10).

Black currant seed oil supplies linoleic acid and gamma-linolenic acid (GLA), a unique omega-6 fatty acid found only in ultra trace amounts in most dietary oils. GLA can be converted to less inflammatory prostaglandins (PGE1), which appear to support normal tear secretion (11). In a double-blind cross-over study of Sjögren's patients with dry eye,





Suggested Use: Two capsules taken orally twice daily, with or after a meal.

Precautions: Using HydroEye with anticoagulants, such as coumadin, may increase their effect. Prothrombin time can be assessed by your primary care physician to ensure the safe addition of HydroEye to your anticoagulant regimen.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

Supplement Facts				
Serving Size 2 Capsules				
Servings per Container 60				
	Amount Per Serving	% Daily Value	Total Daily Intake at 4 Capsules Per Day	% Daily Value
Calories	10		20	
Calories from Fat	10		20	
Total Fat	1 g	2%*	2 g	4%*
Vitamin A (from retinyl palmitate)	1040 IU	21%	2080 IU	42%
Vitamin C [from calcium ascorbate (Ester-C®)]	90 mg	150%	180 mg	300%
Vitamin B-6 (from pyridoxal 5 phosphate)	6.3 mg	315%	12.6 mg	630%
Magnesium (from magnesium sulfate)	20 mg	5%	40 mg	10%
Black Currant Seed Oil [15.6% gamma linolenic acid (GLA)]	750 mg	†	1500 mg	†
Mucin Complex (60% mucin)	250 mg	†	500 mg	†
Cod Liver Oil	1.6 mg	†	3.2 mg	†

* Percent Daily Values are based on a 2,000 calorie diet
 † Daily Value not established

Other Ingredients: Gelatin, Water, Vegetable Shortening, Glycerine, Lecithin, Beeswax, Titanium Dioxide, and Caramel Color.



Black Currant Seed Oil and Cod Liver Oil (Continued)

supplemental GLA and linoleic acid was found to significantly improve overall ocular scores (12).

Black currant seed oil also contributes alpha linolenic acid, an important omega-3 fatty acid. A controlled study in healthy older individuals found that black currant seed oil decreased production of pro-inflammatory prostaglandins (PGE2), and improved immune function in these volunteers compared to those receiving a placebo (13).

Vitamin C (180 mg)

Vitamin C is the most abundant water-soluble antioxidant in tear fluid. It acts to neutralize free radicals and helps recharge the antioxidant vitamin E. Biomarkers of oxidative damage have been found to be higher in the tear fluid of dry eye patients compared to controls (14). Recently, levels of vitamin C were found to drop significantly in the tears of people undergoing laser surgery - procedures known to generate free radical activity (15). In addition to its free radical fighting role, vitamin C may also stimulate the formation of less inflammatory prostaglandins from GLA metabolism (16).

Other Essential Nutrients

HydroEye delivers vitamin A, an essential nutrient for the health of the epithelial cells of the eye's cornea and conjunctiva. Vitamin A is also required for the manufacture of mucin, the primary component of the mucous or innermost layer of the tear film (17). HydroEye contributes mucin, which is secreted by goblet and epithelial cells of the conjunctiva to protect, lubricate, and ensure even distribution of tear fluid. Loss of goblet cells has been associated with chronic inflammation of the ocular surface in tear deficient dry eye (18).

Dietary shortfalls of magnesium and vitamin B6 are not uncommon, especially among women and older individuals (groups in which dry eye commonly occurs). HydroEye includes these nutrients, which are important cofactors for the conversion of linoleic acid from black currant seed oil into GLA. One of the critical catalysts for this conversion is an enzyme, whose activity declines with nutrient deficiencies (19), as well as with age, certain diseases, increased stress hormones and excessive intakes of saturated fats (13).

References

- Goto E, et al. Impaired functional visual acuity of dry eye patients. *Am J Ophthalmol* 133: 181-186, 2002.
- Stern ME, et al. The pathology of dry eye: the interaction between the ocular surface and lacrimal glands. *Cornea* 17: 584-589, 1998.
- Ang RT, et al. Dry eye after refractive surgery. *Curr Opin Ophthalmol* 2: 318-322, 2001.
- Azzarolo AM, et al. Androgen support of lacrimal gland function. *Endocrine* 6: 39-45, 1997.
- Baudouin C. Dry eye: an unexpected inflammatory disease. *Arch Soc Esp Ophthalmol* 76: 205-206, 2001.
- Plugfelder SC, et al. Diagnosis & management of dry eye: A 25-year review. *Cornea* 19: 644-649, 2000.
- Solomon A, et al. Pro- and anti-inflammatory forms of interleukin-1 in the tear fluid and conjunctiva of patients with dry eye disease. *Invest Ophthalmol Vis Sci* 42: 2283-2292, 2001.
- Sardesai VM. Review: Biochemical and nutritional aspects of eicosinoids. *J Nutr Biochem* 3: 562-579, 1992.
- Zuier RB, et al. Gamma-linolenic acid treatment of rheumatoid arthritis: A randomized, placebo-controlled trial. *Arthritis Rheum* 39: 1808-1817, 1996.
- Yehuda S and Carasso RL. Determination of the optimal omega-3 to omega-6 ratio. *Proc Natl Acad Sci* 90: 10345-10349, 1993.
- Horrobin DF, et al. Treatment of the sicca syndrome and Sjögrens syndrome with EFA, pyridoxine and vitamin C. *Prog Lipid Res* 20: 253-254, 1981.
- Oxholm P, et al. Patients with primary Sjögrens syndrome treated for two months with evening primrose oil. *Scand J Rheumatology* 15: 103-108, 1986.
- Wu D, et al. Effect of dietary supplementation with black currant seed oil on the immune response of healthy elderly subjects. *Am J Clin Nutr* 70: 536-543, 1999.
- Augustin AJ, et al. Oxidative reactions in the tear fluid of patients suffering from dry eye. *Graefes Arch Clin Exp Ophthalmol* 233: 694-698, 1995.
- Bilgihan A, et al. Ascorbic acid levels in human tears after photoreactive keratectomy (PRK), transepithelial photoreactive keratectomy, and laser in situ keratomileusis (LASIK). *J Cataract Refract Surg* 27: 585-588, 2001.
- Horrobin DF, et al. The regulation of prostaglandin E1 formation: A candidate for one of the fundamental mechanisms involved in the action of vitamin C. *Med Hypotheses* 5: 849-858, 1979.
- Tei M, et al. Vitamin A deficiency alters the expression of mucin genes by the rat ocular surface epithelium. *Invest Ophthalmol Vis Sci* 4: 82-88, 2000.
- Kunert KS, et al. Goblet cell numbers and epithelial proliferation in the conjunctiva of patients with dry eye syndrome treated with cyclosporine. *Arch Ophthalmol* 120: 330-337, 2002.
- Bordoni A, et al. Dual influence of aging and vitamin B6 deficiency on delta-six desaturation of essential fatty acids in rat liver microsomes. *Prot Leukot Ess Fatty Acids* 58: 417-420 1998.



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