A Nutritional Eye Washing Solution (NEWS) Concentrated that Could Improve the Sharpness of Vision

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Abstract

The age-related macular degeneration (AMD) caused vision loss for millions of patients worldwide. Lutein and Zeaxanthin can reduce the blue light and ultraviolet damage to the retina and decrease the rate of AMD. However, lutein is difficult to be dissolved in water, the lutein as a dietary supplement through mouth may be only very small amount that can reach the eyes. This is a try to use two herbs and four vitamins put in a concentrated nutritional eye washing solution, and use two drops of that concentrated eye washing solution mixed in every one milliliter of saline, and put in an eye cup to wash the eyes, that may benefit to the easier absorption of those nutritional elements by the eye. Expectedly, that kind of novel eye washing solution may have some benefit for eye health and a sharp vision.

Introduction

Lutein and Zeaxanthin can reduce the blue light and ultraviolet damage to the retina and decrease the rate of age-related macular degeneration (AMD) [1]. It is known that AMD had caused vision loss for millions of people around the world. By feeding the body with antioxidants, such that lutein, it activates the body’s self-healing property, enable the body to perform detoxin, repair and rejuvenate the sick cells, thus, it strengthens immune function and even reverse aging. However, lutein is insoluble in water [2]. So, it is difficult to dissolve lutein by saline and other aqueous solvent that may greatly decrease its absorption through digestive system. Free lutein is absorbed at a higher rate than lutein esters [3].

The eye is about 7~8 g in weight. Two eyes are about 15 g totally. If the average human body is about 50 kg, two eyes are only 15/50,000 of the body weight, or, 0.0003 of the body weight. Suppose that one man uptakes a 20 mg lutein pill and if lutein is evenly distributed to the whole body, two eyes can only get 20 mg × 0.0003=0.006 mg of lutein, or each eye gets 3 µg of lutein. In my preliminary experiment, I learnt that lutein is very difficult to be dissolved in water and alcohol. The uptaking of lutein by mouth, it might stick to the foods, and only small amount of lutein can be absorbed by the digestive system. So, it is quite possible that when a man takes 20 mg lutein pill, one eye can only get about 1 µg of lutein or even less. And we know that the diameter of retinal artery, that can transport lutein to the retina, is rather small. So, it is reasonable to consider that eyes are always under the malnutrition condition of lutein supply. We may say that aged people, especially for those who have bad circulation or blood vessels cumulated with lipids due to long time of eating bad oily foods are in a state of thirsty of lutein, which will cause blur eye or the ultraviolet light hurt to the eye, or eye pain, or macular degeneration, etc.

Here is a protocol to prepare a nutritional eye washing solution (NEWS). This experiment took six hours to complete (from November 10, 2017, 8:00 pm to November 11, 2017, 2:00 am). Previously, I had tried to prepare eye wash solution containing lutein. However, I felt that it was very difficult to dissolve lutein in saline or alcohol. With the successful of this preliminary experiment, I decide to use 1/250 Triton X-100 in 190 proof of Mohawk liquor (grain alcohol) as the organic solvent to dissolve oily substances.

Preliminary experiment

This pre-experiment is for the selection of the best solvent to dissolve Lutein:

Figure 1-Explanation of the experiment procedure and result

Figure 1: Solubility of lutein in Mohawk 95% alcohol containing different concentration of Triton X-100.

Add 0.75 ml of Mohawk liquor, 190 proof (95% Alcohol) to each well. Add 0.25 ml of Triton X-100 (Sigma Co.) to the well No. 1. Mix it thoroughly. Then, take 0.25 ml liquid out from well No. 1 and transfer it to the well No. 2, mix it in the way similarly to well No. 1, and transfer 0.25 ml of the mixture from well No. 2 to well No. 3, and to make a diluted series until the well No 5 and discharge the final 0.25 ml of liquid taken from well No. 5. So, the concentration of Triton X-100 in 95% alcohol will be that:
Well No. 1 = \(\left(\frac{1}{4}\right)^1\), or, 1/4, or, 25% of triton in 95% alcohol.
Well No. 2 = \(\left(\frac{1}{4}\right)^2\), or, 1/16, or, 6.25% of triton in 95% alcohol.
Well No. 3 = \(\left(\frac{1}{4}\right)^3\), or, 1/64, or, 1.5625% of triton in 95% alcohol.
Well No. 4 = \(\left(\frac{1}{4}\right)^4\), or, 1/256, or, 0.3906% of triton in 95% alcohol.
Well No. 5 = \(\left(\frac{1}{4}\right)^5\), or, 1/1024, or, 0.098% of triton in 95% alcohol.

Use five brush-like tooth pickers and each one was loaded with a small amount of red-brown color lutein as it was shown on the top of the photo, stir each individual lutein-loaded tooth picker in each well.

The best solubility of lutein is in well No. 2 and 3. The well No. 4 is almost close to totally dissolving with minimum amount of Triton X-100 used. The well No. 5 has a lot of un-dissolved lutein. The well No. 1 has small amount of undissolved lutein as well.

**Figure 2**—The experiment procedure and result

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Add 0.75 ml of spring water to each well. Add 0.25 ml of Triton X-100 (Sigma Co.) to the well No. 6. Mix it thoroughly. Take 0.25 ml out and transfer it to the well No. 7, mix it and similarly. Then, transfer 0.25 ml out and transfer it to the well No. 8 to make a diluted series until the well No. 10 and discharge the final 0.25 ml taken from well No. 10. So, the concentration of Triton X-100 in water will be that:

Well No. 6 = \(\left(\frac{1}{4}\right)^1\), or, 1/4, or, 25% of triton in water.
Well No. 7 = \(\left(\frac{1}{4}\right)^2\), or, 1/16, or, 6.25% of triton in water.
Well No. 8 = \(\left(\frac{1}{4}\right)^3\), or, 1/64, or, 1.5625% of triton in water.
Well No. 9 = \(\left(\frac{1}{4}\right)^4\), or, 1/256, or, 0.3906% of triton in water.
Well No. 10 = \(\left(\frac{1}{4}\right)^5\), or, 1/1024, or, 0.098% of triton in water.

Use five brush-like tooth pickers and loaded with the red-brown color lutein as it was shown at the top of the photo, stir each individual lutein-carried tooth picker in each well. Only the well No. 6 the lutein was partially dissolved. But, lutein in the wells No. 7 to 10 all can’t be dissolved.

**Figure 3**—The experiment procedure and result

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Add 0.75 ml of Mohawk liquor 190 proof (95% Alcohol) to each well. Add 0.25 g of poly-glycerine to the well No. 11. It can’t be dissolved evenly when it was warmed few second in a microwave oven. Take 0.25 ml of warmed and partially dissolved poly-glycerine in alcohol out and transfer it to the well No. 12, mix it well and transfer 0.25 ml on the mixture out and transfer it to the well No. 13, and to prepare a diluted series until the well No. 15 and discharge the final 0.25 ml from well No. 15. So, the concentration of poly-glycerine in 95% alcohol will be that:

Well No. 11 = \(\left(\frac{1}{4}\right)^1\), or, 1/4, or, 25% of poly-glycerine in 95% alcohol.
Well No. 12 = \(\left(\frac{1}{4}\right)^2\), or, 1/16, or, 6.25% of poly-glycerine in 95% alcohol.
Well No. 13 = \(\left(\frac{1}{4}\right)^3\), or, 1/64, or, 1.5625% of poly-glycerine in 95% alcohol.
Well No. 14 = \(\left(\frac{1}{4}\right)^4\), or, 1/256, or, 0.3906% of poly-glycerine in 95% alcohol.
Well No. 15 = \(\left(\frac{1}{4}\right)^5\), or, 1/1024, or, 0.098% of poly-glycerine in 95% alcohol.

Use five brush-like tooth pickers and loaded with the red-brown color lutein as it was shown on the top of the photo, stir each individual lutein-carried tooth picker in each well. None of any wells can dissolve lutein. But, the solution has shown certain yellow color. That means a small amount of lutein is extracted by the poly-glycerine in 95% alcohol. Well 13 and 14 looks less lutein in the well or on the wall of the wells. Actually, the lutein was sticked on the toothpicks and be discarded.

Based on the above three experiments, I decided to use 1/250 Triton X-100 in 95% Mohawk alcohol as the medium to disperse lutein, vitamin A, E, and other organic materials.

The experimental procedure includes the preparation of two phase solutions. Then, mix the organic phase with the water phase to form a concentrated "Nutritional Eye Washing Solution". It is a stock solution and must be stored in a refrigerator. Dilute it ten times with saline to form a working solution.

**A. Water phase solution preparation:**
Heat sterilized and grounded to small pieces of stem of Tinospora cordifolia.....4 g
Boric acid................................................0.05 g
Himalayan salt ........................................0.8 g
Aspirin (81 mg/pill) .....................................0.081 g
Vitamin C (Pharbest Co. 500 mg/pill) .............0.5 g
Barbering hydrochloride (0.1 g/pill cut half).......0.05 g
D-sorbitol (Sigma Co.) ..........................................0.01 g

Put the above seven items in a tea bag, cook in 120 ml of boiling spring water for more than 10 min. The water will reduce the volume to less than 100 ml passing through a sheet of Whitman No. 1 filter paper. Add more boiled spring water to bring the final volume of 100 ml.

B. Organic phase preparation:

In a small plastic cup, add 10 ml of 1/250 Triton X-100 in Mohawk Liquor (190 proof). Then, add with the following items:

Vitamin A (GNC, 10,000 IU/soft gel capsule) .......... 10,000 IU
Vitamin E (Rugby, 400 IU/soft gel capsule)................400 IU
Lutein (Spring Valley 20 mg with Zeaxanthin 0.8 mg/gel capsule)........0.02 g
Borneol................................0.5 g
Musk oil (Planned, but, this time not added, because of supply unavailable)....5 drops
Phosphatidylserine (GNC, 100 mg/capsule) ......................0.1 g

Warm them in a microwave oven for few seconds to help dissolving. By passing through a filter paper, more than half of the mixture will be adsorbed by the filter paper and can’t be recovered. Wash the filter paper with 2~3 ml of 1/250 Triton X-100 in Mohawk liquor (190 proof), bring the final volume to 5 ml.

C. Preparation of the concentrated nutritional eye wash solution:

Add the B (organic phase) solution to A (water phase) solution with vigorous stir. It will form a yellowish turbid solution, which may contain micelles of lutein, oily vitamins and borneol. Use a sterilized syringe to suck 5 ml mixture and let it passing through a 0.2 or 0.45 micron film to exclude larger particles and bacteria. Repeat several times of the procedure, until 100 ml of mixture all done. Transfer the solution into several sterilized small eye-drop plastic bottles. Keep them in refrigerator.

Add every 2 drops of the 'Concentrated Nutritional Eye Wash Solution Containing Two Herbal Extracts and Four Vitamins' to 1 ml of saline to form a working solution. You may need to prepare 2~3 ml and put it in an eyecup to wash your eyes. Wash the eyes twice or more per day. The physiological flushing saline, vial of concentrated eye wash solution and eye cup (red scale=2 ml) are shown in Figure 4. The final concentration of lutein is around 20 mg × 1/2 × 1/100 × 1/10, or 10 µg/ml, which is several times higher than that the eyes obtaining lutein by oral administration through mouth of lutein 20 mg/tablet, absorbed by the digestive system, and transmitted to the retina.

Two volunteers, one after glaucoma surgery, Mr. X, age of 84. His left eye is more blur and the image is smaller, only the left eye had used the eye wash solution for one week, the right did not do eye-washing as a control. He felt that the image is brighter with the left eye and the image is larger than before. Another volunteer Mr. Y age of 81, after right eye retinal pucker removal surgery, he still had blind spot in the left-down center of the eye for four years, with the original vision only 20/200. After he used the eye washing for 7 weeks, his vision improved to 20/100, and close to 20/75. A self-drawing Amsler chart is shown in figure 5. The side effect had not shown obviously in both two volunteers. But, it needs to observe continuously.

Figure 4: From left to right: The physiological flushing saline, vial of concentrated eye wash solution and eye cup (red scale=2 ml).
Figure 5: Volunteer Mr. Y self-drawing Amsler Chart. The red circle enclose the area of blind spot before using NEWS, the vision exam was 20/200. The blue circle enclose the area of blind spot after using NEWS about 7 weeks (the last 11 days used 1/250 Triton X-100 in 95% Mohawk alcohol to dissolve lutein), the vision exam was 20/100. The green circle enclose the area of blind spot after using NEWS for 8 weeks (the last two weeks used 1/250 Triton X-100 in 95% Mohawk alcohol to dissolve lutein), the vision exam was 20/75.

References
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