



“Variantor” functional spectral filter that stimulates trichromats see as dichromats

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Objectives

In everyday life people with color vision anomalies are faced with various difficulties: like recognizing transportation maps, books and others. “Variantor” allows people with normal color vision to understand what the world looks like to people with color vision anomalies; and which color combinations are confusing for color deficient people [1-2]. Spectral transmittance of the filter was designed so that the magnitude of color differences for a normal observer with the filter would be close to those for color dichromats

Goal. Test: if dichromacy will appear to trichromats who are wearing these glasses; and if the spectacle of the proposed changes will be presented by means of measurements with anomaloscope and Ishihara color vision tests.

Tasks:

- Test their effectiveness with color tests
- Transmittance spectrum of the «Variantor» spectral filter.
- Trichromat + glasses. Results using everyday stimuli.

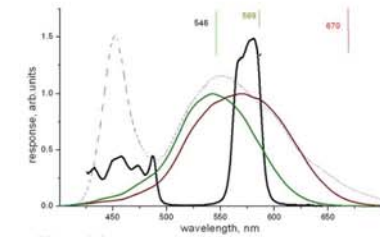
Method

Spectrally glasses were measured in order to determine a spectrum of light which they absorb. (Figure 1). The spectrum was assessed in relation to the visible light spectrum with that part they «cut out». In order to assess the effectiveness of the spectacle we used 3 stimuli: Ishihara plates (Figure 2), anomaloscope (Figure 3), and book «Find 10 differences» (Figure 1). In the experiment participated:

- trichromats,
- person with color deficient,
- trichromats + spectral filter.

Results

- «Variantor» absorbed spectrum from 495 nm till 555nm. (Figure 1)
- Trichromat + «Variantor» response was much slower and was more difficult to distinguish objects than for person with color anomaly and without glasses (Figure 2).
- Trichromat + glasses- results showed that anomaloscope can't reveal if the person is trichromate, dichromate because anomaloscopes transmitted signals are monochromatic and they belong to the spectrum which is absorbed by the filter (Figure 3).
- It is much more harder to distinguish what is seen in Ishihara plates when you are wearing the glasses (Figure 4).



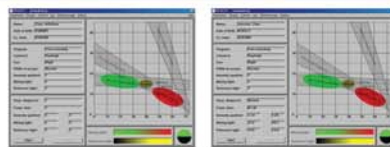
(Figure 1)



(Figure 2)

Summary

- «Variantor» spectral filter absorbs the visible light in region from 495nm till 555nm.
- Vision of trichromate + «Variantor» glasses becomes red-green color deficient.
- It is much more harder with «Variantor» glasses to distinguish color combination what we see in everyday life.



(Figure 3)

Task	Trichromat	Person with color vision deficiency	1. Trichromat + glasses	2. Trichromat + glasses	3. Trichromat + glasses
1.	3	x	3	3	3
2.	5	x	2	2	2
3.	29	x	x	x	x
4.	78	21	21	21	21
5.	7	x	x	x	7
6.	16	x	x	16	x
7.	traceable	x	x	x	x
8.	2 lines (red, purple)	1 line-purple	1 line-purple	1 line-brownish	1 line-purple

(Figure 4)

References

1. Nakauchi S, Onouchi T, Katou H, Oda H, Gamagori S, Wa M. Method for forming functional spectral filter. National University Corporation Toyohashi University of Technology, Itoh Optical Industrial Co. United States Patent Feb. 14, 2007.
2. Shinomori K, Nakauchi S. Approach to color appearance by color vision deficient observers. 23rd Annual Meeting of the International Society for Psychophysics, Tokyo, Japan, 20-23 October, 2007