

# THE PROTECTIVE EFFECTS OF CAFFEINE FROM UV RAYS IN DIFFERENT SOLUTIONS AND SUSPENSIONS

Zulxhevat ABDIJA<sup>1</sup>, Shemsedin ABDULI<sup>1</sup>, Agron ALILI<sup>1</sup>

<sup>1</sup>University of Tetova, Faculty of Natural Sciences And Mathematics, Republic of North Macedonia

## Abstract

Long exposure of UV rays often causes from skin diseases to skin cancer. There are a lot of substances dedicated as protection against UV rays. In this article we are going to be focused on the protective ability of Caffeine against UV rays. For this goal we have used various Caffeine solutions and suspensions and we have measured the transmission of these solutions and suspensions in range of  $\lambda= 190, 210, 230, 250, 270, 290, 310$  nm. For these measurements we have used UV- VIS spectrophotometer.

*Keywords:* UV rays, Caffeine, Transmission, Spectrophotometer

## 1. Introduction

UV- rays as we know are dangerous for our skin health, long exposure of these rays can cause from skin damages to skin cancer. Sunlight contains about 2% of UV- rays.

- UVA (315–400 nm) 95%
- UVB (280–315 nm), 5%
- UVC (100–280 nm) get absorbed from atmosphere

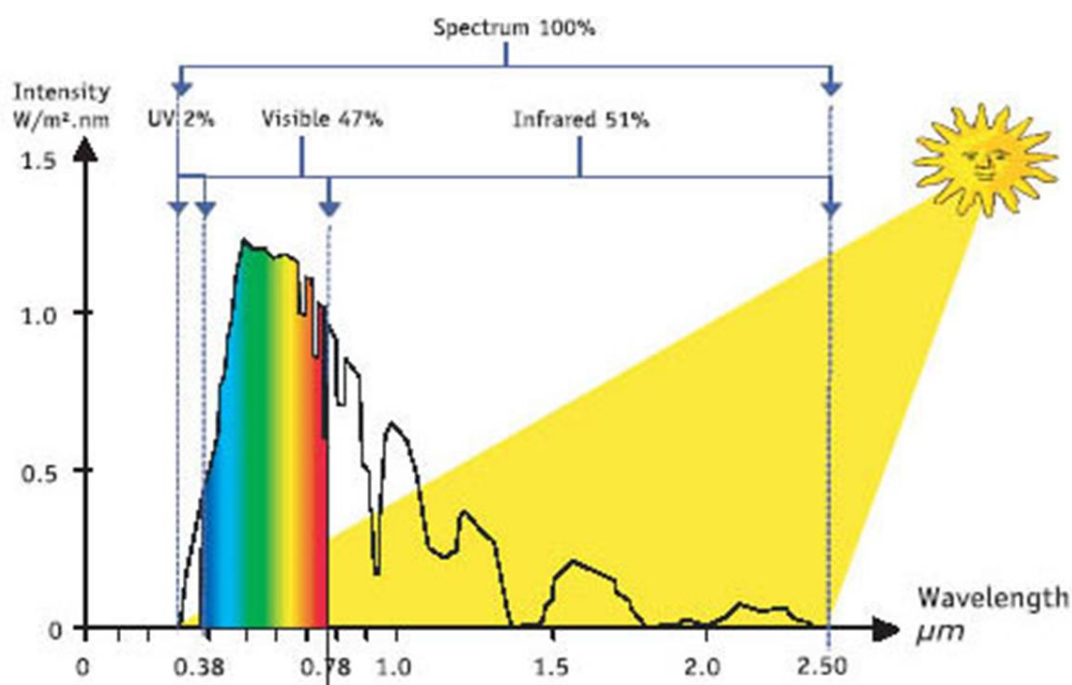
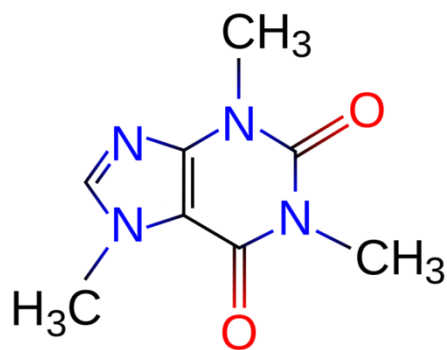


Fig 1. Spector of sunlight

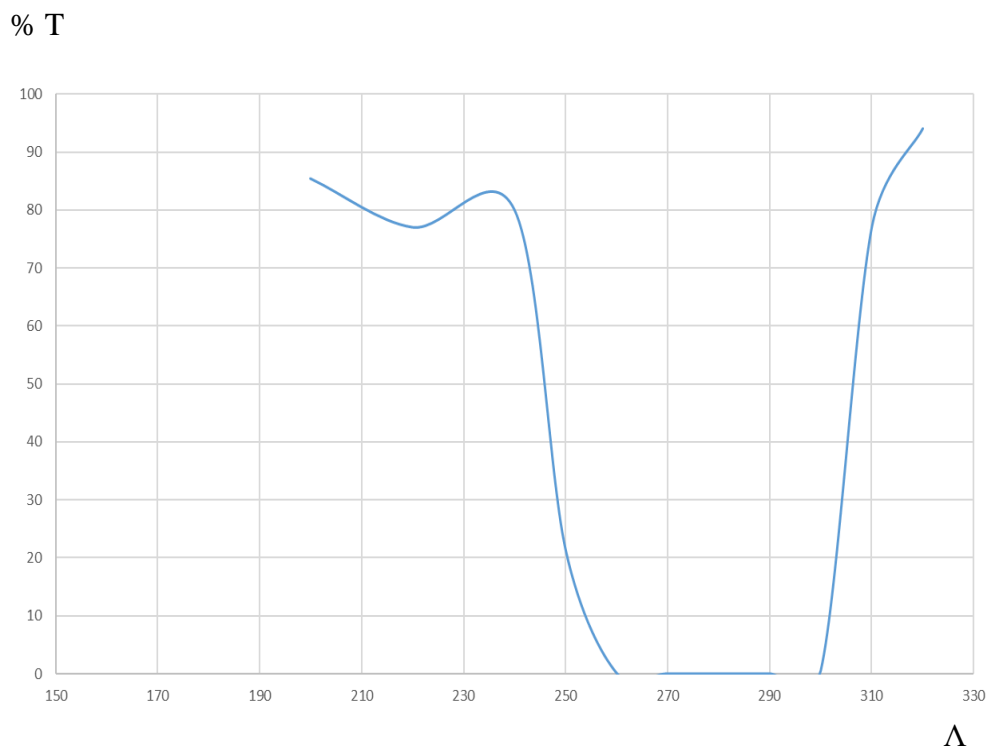
A lot of substances are used for protection against UV- rays (UVB, UVA), while we have been focused on protective effects of Caffeine in different solutions and suspensions.



**Fig 2.** Structure of Caffeine

## 2. Experimental and results

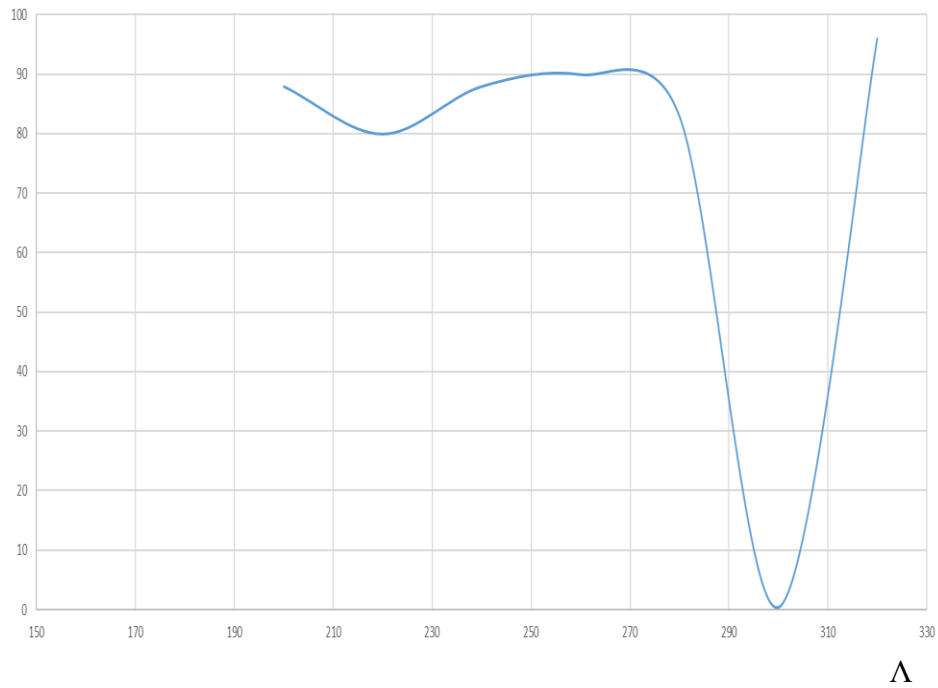
We have defined the spectrum of absorption of Caffeine solution in pure water and have gotten these results:



**Fig 3.** UV- Rays' absorption of Caffeine solution in pure water

We have also defined spectrum of absorption of Caffeine solution in alcohol 96% and we have gotten these results:

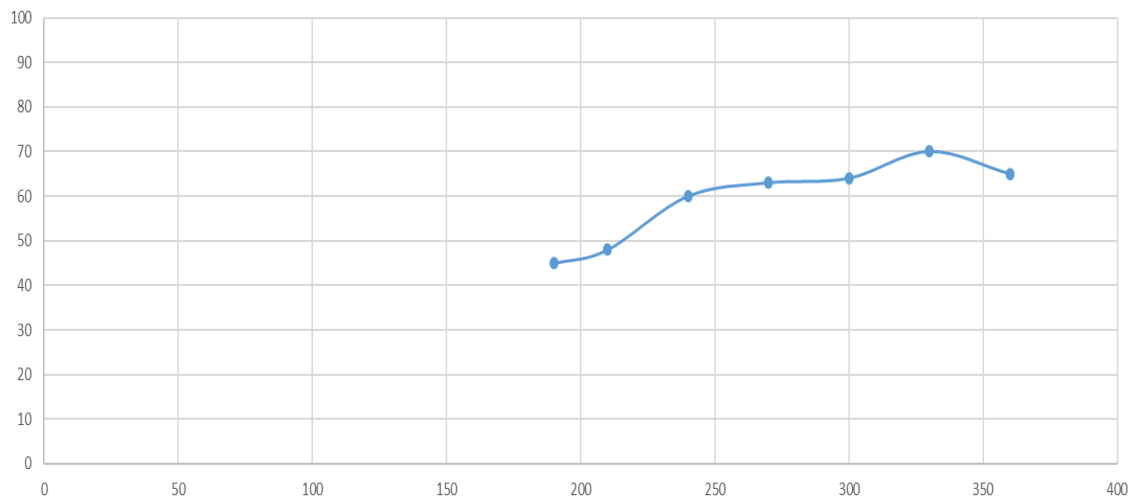
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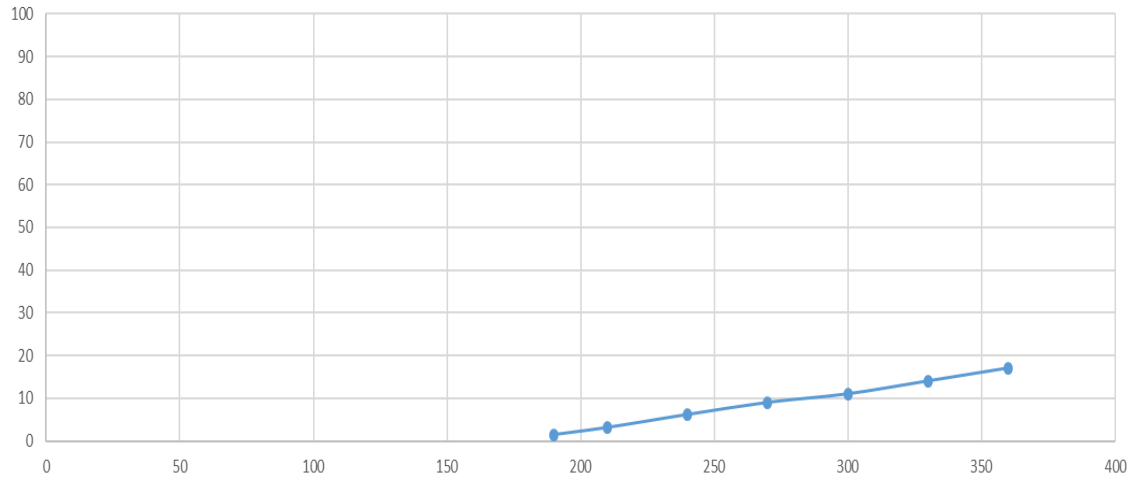
**Fig 4.** UV- Rays' absorption of Caffeine solution in alcohol 96%

In the 4<sup>th</sup> Figure we can see that the maximum of absorption is about 300nm. We think that this is as a result of interaction between Caffeine and Alcohol molecules.

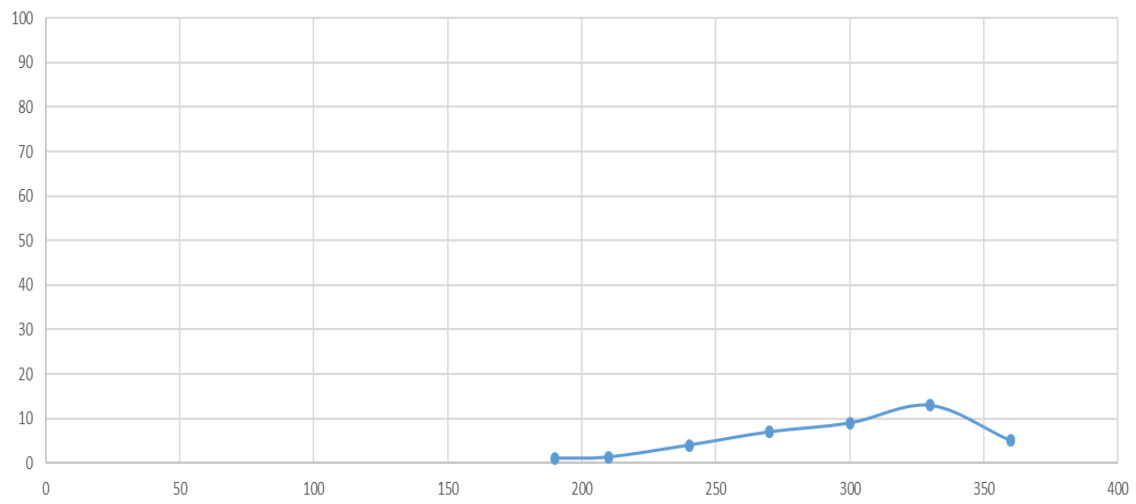
% of transmittance of the disperse system : 0.02g Caffeine in 10ml vegetable oil



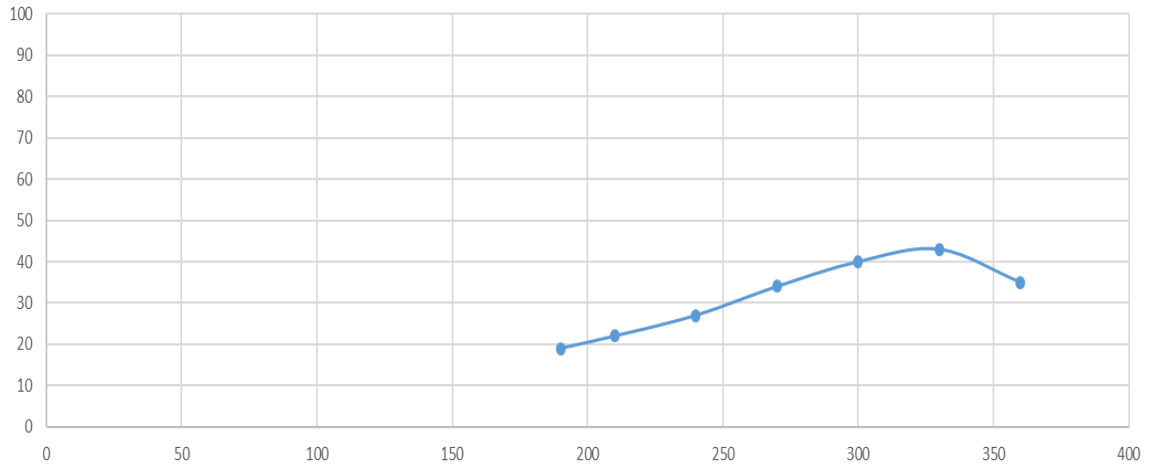
% of transmittance of the disperse system: 0.02g Caffeine in 10ml olive oil



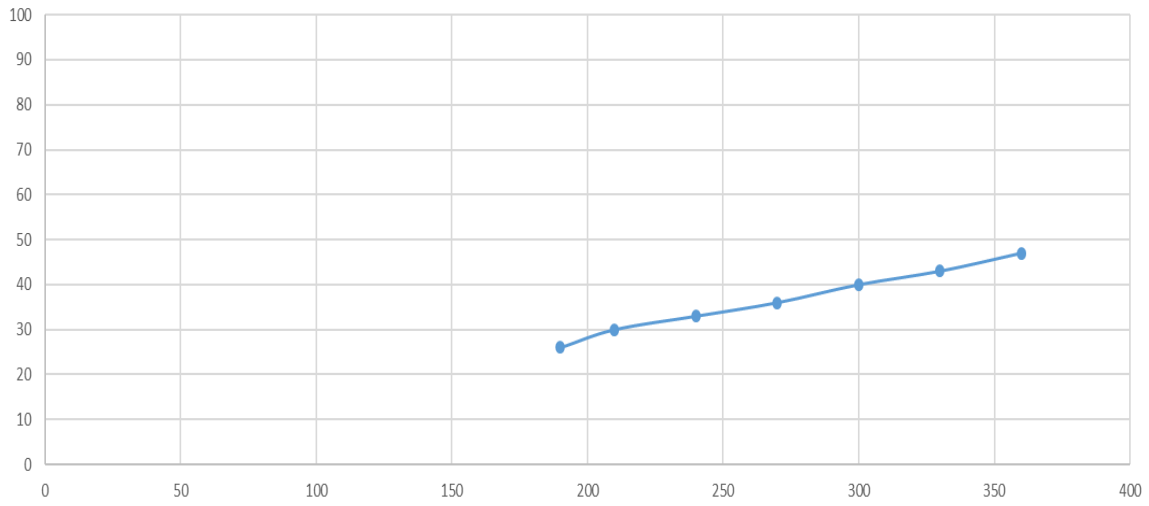
% of transmittance of the disperse system: 0.02g Caffeine in 10ml castor oil



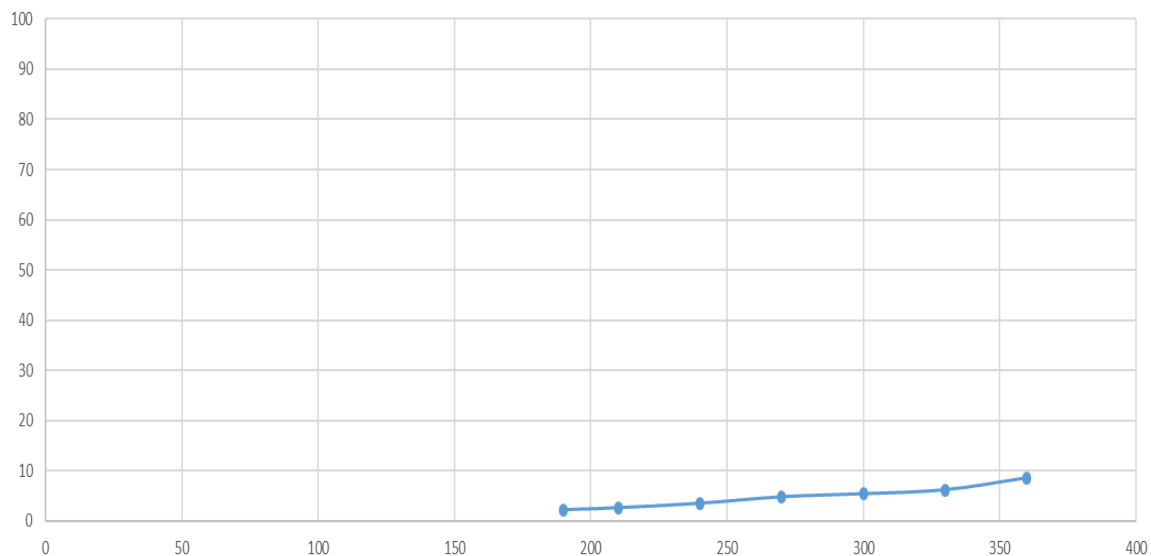
% of transmittance in the disperse system: 0.02g in 10ml coconut oil



% of transmittance in the disperse system: 0.02g Caffeine in 10ml almond oil



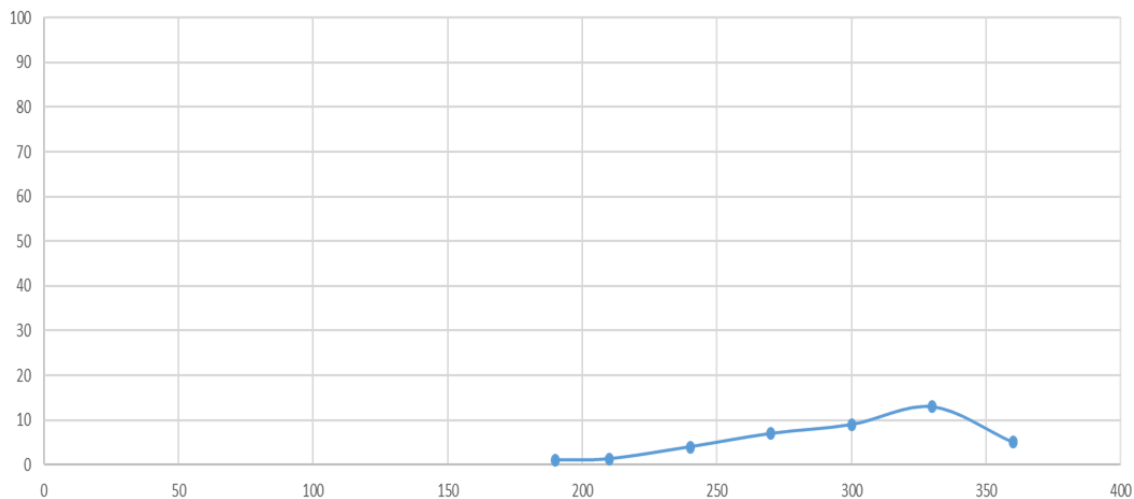
% of transmittance in the disperse system: 0.03g Caffeine + 10ml almond oil + 0.03g zinc oxide



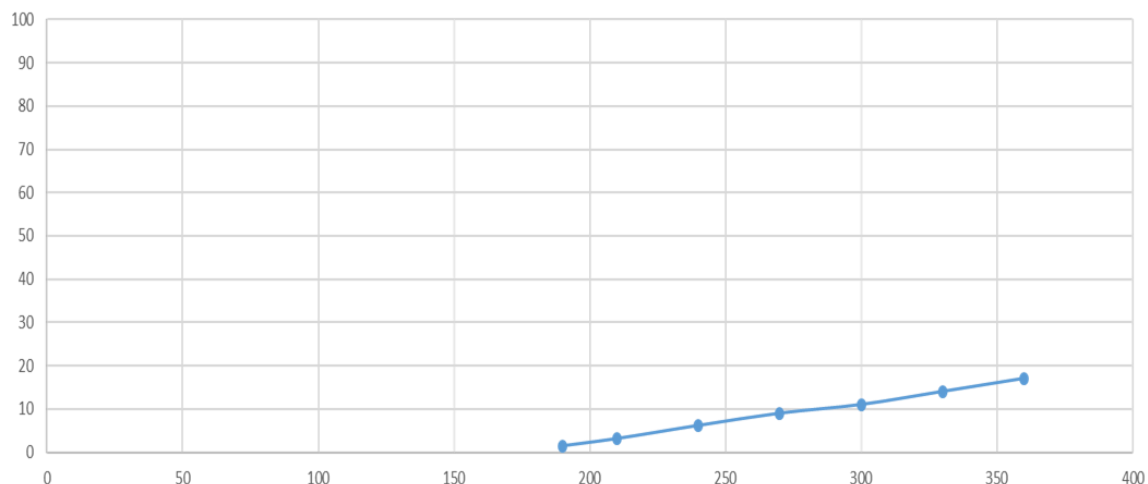
### 3. Conclusion

As we can see from the results of the experimental work, Caffeine has protective effect against UVA and UVB rays in particular in these disperse systems:

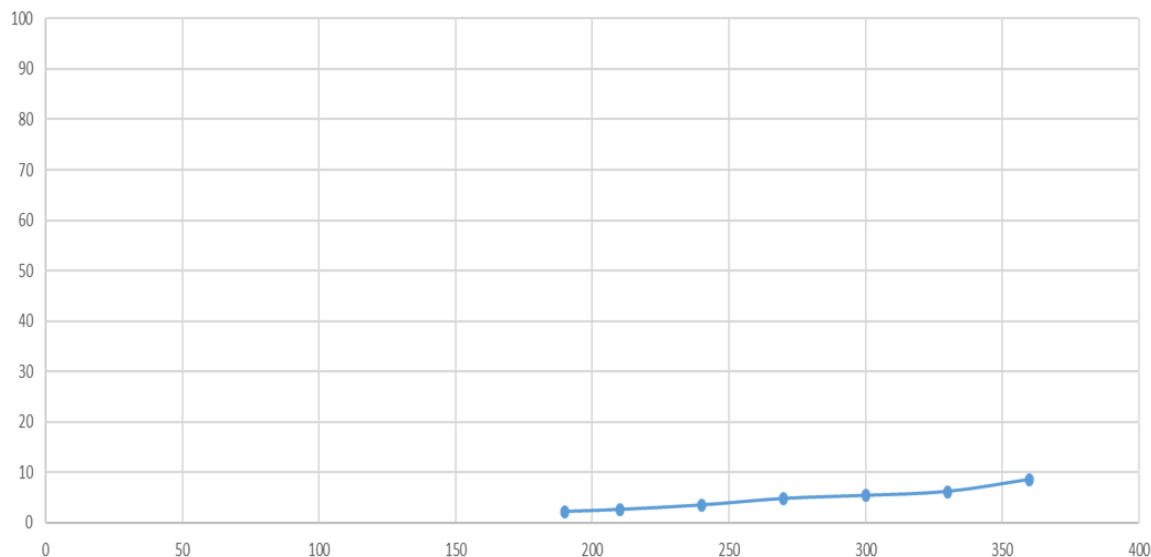
% of transmittance of the disperse system: 0.02g Caffeine in 10ml castor oil



% of transmittance of the disperse system: 0.02g Caffeine in 10ml olive oil



% of transmittance in the disperse system: 0.03g Caffeine + 10ml almond oil + 0.03g zinc oxide



## References

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