Influence of different concentration of polysorbate 20 and carbomer on suspension structure

Vesna Savić[1*]; Milica Martinović[1]; Ivana Nešić[1]; Keti Nonevska Vaneva[2]; Petar Jovanović [3]

[1] Department of Pharmacy, Faculty of Medicine, Blvd. Dr Zorana Djindjica 81, 18108 Nis, Republic of Serbia

[2] Messer Vardar Tehnogas, Istočna industrijska zona BB 1040, Skoplje

[3]Petrapharm, Lava Tolstoja bb, Pirot, Republic of Serbia

In previous work, the improvement of the official formulation of *Suspensio album* 7.5% given in Formulae magistrales (MF 2008) was proposed (Savić et al., 2021). This suspension is often compounded in pharmacies since it can be used in the treatment of different skin changes such as acne vulgaris, insect bites, seborrhea, pruritus, etc. Due to its frequent use and having in mind that the stability as well as textural and sensory characteristics are very important for the patients, the improvement of the formulation should be considered.

Objectives

Suspension	1	2	3
Zinc oxide	7.5	7.5	7.5
Talc	7.5	7.5	7.5
Glycerol, 85%	35.0	35.0	35.0
Polyacrylic acid, 1%	1.0	1.0	2.0
Polysorbate 20	0.1	0.2	0.2
Purified water	ad 100	ad 100	ad 100

The purpose of this study was to investigate how further increasing of the concentration of flocculating agent (polysorbate 20) and thickening aengt (carbomer gel) can influence the stability and structure of the suspension *Suspensio album* 7.5% (MF 2008) as well as to compare whether the most stable suspension also has the best textural characteristics.

Methods

Stability test - **Sedimentation rate**

Stability test - **Sedimentation coefficient after 30 minutes of centrifugation** (3000 rpm).

Texture analysis on CT3 Texture Analyzer: hardness cycle 1, hardness cycle 2, adhesiveness, resilience and elasticity

Results

There weren't many differences in suspension coefficient of tested suspensions

The results have shown slight decrease in **Hardness Cycle 2** compared to **Hardness Cycle 1** (the structure weakens after the second compression cycle probably due to sedimentation of solid particles and natural instability of formulation such as suspension) The decrease in the Hardness of suspension 3 compared to suspension 1 indicates that this suspension is easier to spread than suspension 1. All three suspensions show the same value of **Adhesion**. Therefore, it can be said that they do not differ in stickiness. Both **Resilience** and **Elasticity** (indicators of flexibility of the preapration) increased as the concentration of carbomer and polysorbate 80 increased (they were higher considering suspension 2 in relation to suspension 1 and suspension 3 in relation to suspension 2) it can concluded that the consistency and density of the preparation increased.

Conclusion

Although all changes in texture parameters are quite small, changes in concentrations in formulations 1, 2, and 3 are also small, indicating that they do affect texture analysis results. While suspensions 1 and 2 have quite similar parameters, there are small differences in stability and texture compared to suspension 3, which are probably the result of increased concentration of thickening agent (carbomer gel). The increase in the concentration of the flocculation agent (polysorbate 20) did not show an effect on the stability and texture properties of the suspensions.

The authors wish to send their gratitude to the Serbian Ministry of Education, Science and Technological Development (Contract No. 451-03-68/2022-14).