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Optimize Multivaried for Confection Of Films Polymers Saw Spin - Coating for Lenses Opthalmics

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ABSTRACT

This work aims the study of the treatment of simple commercial ophthalmic lenses with alternative methodology. It has great originality in the process of coating of ophthalmic lenses without surface treatment by spin-coating method. The preliminary results will make possible the aiming of the research for the confection of layers of coverings of lenses ophthalmic without treatment with some resins here and later covering of lenses produced in our group of research. It will allow the study of the surface of the lenses, which polymer allows to greater adhesion in the lens and which methods of daily pay-treatment if they adapt for improvement of the adhesion of the polymer in the substratum. The project also will allow the study of new coverings in ophthalmic lenses produced in our proper laboratory .This study also aims at to strengthen the conscience of the importance of the research, either basic or applied it, for improvement in the quality of vision of the population.

Keywords: coatings, lenses, alternative methodology.

1. INTRODUCTION

Currently, the number of works of new technologies for application of protective layers (anti-scratch, anti-reflection) in organic lenses is growing. In the case of ophthalmic lenses the better solution for improve the scratch resistance is the application of a layer of a material more resistant. Still, beyond of the treatment anti - scratch, many people prefer a special treatment with anti-reflection coating and photocromatics agents. One of the efficient techniques most common in the confection of films on surfaces is the spin – coating techniques, because it allows getting homogeneous surfaces with excellent qualities optics and thickness of the order of micrometers.

In this study, layers of boron silicate was applied in the surfaces of ophthalmic lenses by spin-coating method to verify the variables of this process that influence the homogeneity of the anti-scratch formed layer, using experimental designer.

2. Materials and Methods

The materials used in this work:

- Commercial ophthalmic lenses, brand Orma 15
- Solution of boron silicate.

Experimental designer with 2^3 fatorial was used to analyze the influence of the three follow variables of the process in the homogeneity of the coatings. For the development of the experimental planning, we have:
Factors:

1. Speed (rpm) - 3000/4500
2. number of layers – 1/3
3. temperature of cure (˚C) – 120/150

The response obtained means homogeneity of the boron silicate layers. After the cured lenses, marks were suggested to indicate the homogeneity of the layers, as a sensorial behavior.

3. Results and Discussion

The eight experiments of coatings of the lenses with boron silicate had been carried through. Applied the boron for spin - coating, the lens was submitted to a thermal cure. Result of the Modeling presented in the Table 2 . The Table of ANOVA is presented of Table 3.

Through the developed experimental planning, it is observed that the Linear Model was not adjusted to the data; probably it would have better adjustment with a Quadratic Model. The gotten answers had had very next values, disabling a good adequacy to the linear model.

With reliable 95%, the value of priced F was of having a good adjustment of the data, was exactly not verified that the one variable of the process that more influenced in the development of the resin films on the lenses was the Speed of Rotation. The amount of resin placed on the lens before applying a turn speed did not intervene, basically because the rotation speed spreads the form resin uniform, in way that the resin excess is discarded, for the proper centripetal force. Thus, one confirms one more time that the Speed of Rotation of the Spinner is basic factor for the homogeneous formation of a complete covering. In the next stages the data with a Quadratic model will be evaluated, to verify if it has one better adjustment to the model, as well as other parameters that can intervene with the formation of polymers films of treatment in ophtalmics lenses.

4. Conclusion

From the results it was possible to evidence that the speed of more appropriate rotation was of 3000 s-1. High speeds make possible one better scattering of the resin and the excess is discarded; the best time of rotation was in the interval of 20/30s, for the studied boron silicate. One better adjustment of the data would be obtained with a quadratic model, since the linear model was not adjusted to the experimental data.

5. References

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6. AUTHORIZATION AND DISCLAIMER

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7. FIGURES

Figure 1 – Technique of Spin Coating

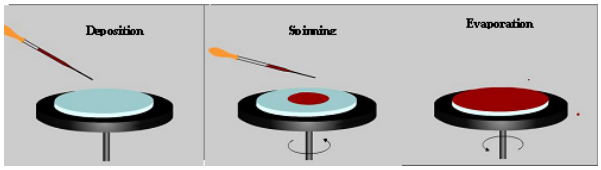

Table 1 – Response and Matrices of the Planning 2^3

Response and Matrices of the Planning 2^3				
Assay	**Homogeneity**	**1**	**2**	**3**
1	9,0	-1	-1	-1
2	6,5	1	-1	-1
3	8,0	-1	1	-1
4	4,8	1	1	-1
5	6,7	-1	-1	1
6	5,7	1	-1	1
7	8,2	-1	1	1
8	6,0	1	1	1

Table 2 – Coefficients of the adjusted polynomial.

Coefficients of the adjusted polynomial	
1	1,1125
2	0,1125
3	0,2125

Table 3 – ANOVA.

Source variation	**Quadratic Addition**	**Nº of g.l.**	**Average Quadratic**
Regression	10.3637	2	5.1819
Residues	3.7950	5	0.7590
Total	14.1587	7	
% explained variation: 73.1969			