

RESEARCH CONCERNING LIGNIN UTILIZATION IN MOULDING MIXTURE TECHNOLOGY

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ABSTRACT: The experimental program achieved in this stage, permits the continuation of research in the sight separation of the lignin and prerequisite for skulls this capitalization. According with this situation our target in this case study is to realize products with original technologies in laboratory conditions, lignin representing filling material, with binders from synthetic resins of polycondensation, to confer the products higher reliability.

KEYWORDS: lignin, moulding, fermentation process.

1. INTRODUCTION

Laboratory researches emphasized that lignin as a result its separation from sulphate residual solution threw precipitation in acid hydride medium, is a product with important specific functional properties, with a large utilization and good efficaciousness in electrotechnics, metallurgy industry and wood industrialization. According with this situation our target in this case study is to realize products with original technologies in laboratory conditions, lignin representing filling material, with binders from synthetic resins of polycondensation, to confer the products higher reliability. With this end in view, the researches realize they straightened in next directions:

- Obtain of blends of fount for the metallurgical industry
- The procurement of plate's fiberwooden.

2. MATERIALS AND METHODS

From viewpoint of affinity against of water, the lignin and binders structurally hydrophilic by-path characterize through irreversible activity whereat is enforced a proper of a resistively concentrations of 1 daN/cmp.

Preparation directed to the introduction of the lignin in variable amounts, from which to is can analyzed this competitively, with the settlement of necessary dose sufficient considerate in the experimental suggested stage.

For the settlement of the influence of the lignin about quality of the blends of fount, he chose the technological used-up program for central cores of average complexity, with the busyness cavities no briefing of surfaces are due to is high-grade.

From this selected range for experimentation the class of the blends of cores III, IV and V. In the table no.1 are rendered the composition constantly the blends of cores, and in the table no. 2 the range of variation of the lignin in the blend of core.

Table no. 1

Pitch class	Compound granular %	Mixture utilization			Sawdust from compound granulometrical %
		Ni %	Quartz %	Essence mixt %	
III.	-----	92.2	3.4	3	-----
IV.	40	50	3	2.5	4.5
V	50	35	8	4	3

Table no. 2

Pitch class	Synthetic binder lignin %					
	1	2	3	4	5	6
III.	0.5	1	1.5	2	2.5	3
V	1.0	1.5	2.0	2.5	3.0	3.5

For the determination of the influence of the lignin about the functional features of the continuations:

- permeability, cmc/minutes
- the levigable component
- the humidity
- the resistance to pressure in the conditions of cruel, daN /cmp
- the resistance to traction, for the dry blend, daN /cmp.

The values of the features determinate for dependent selected variables for lignin are rendered for each class of core in the figures:

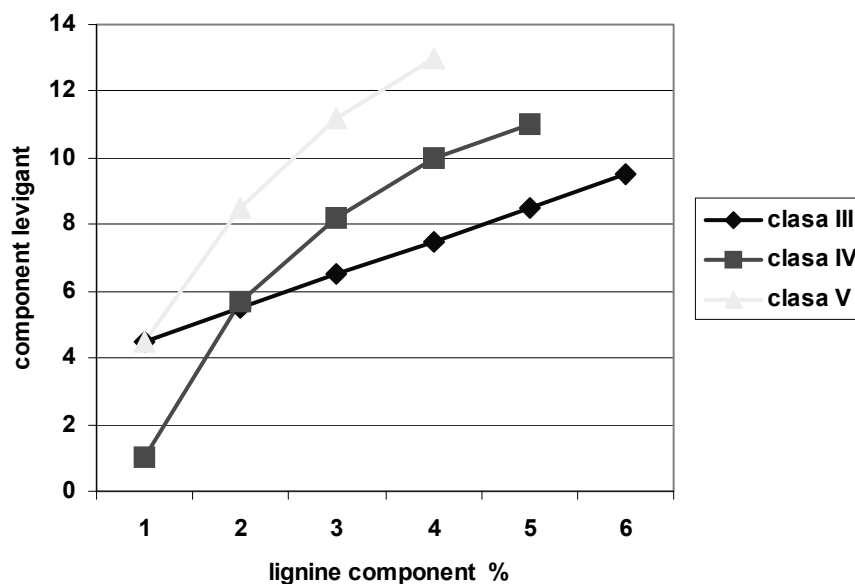


Fig. no. 1 Levigable component variation

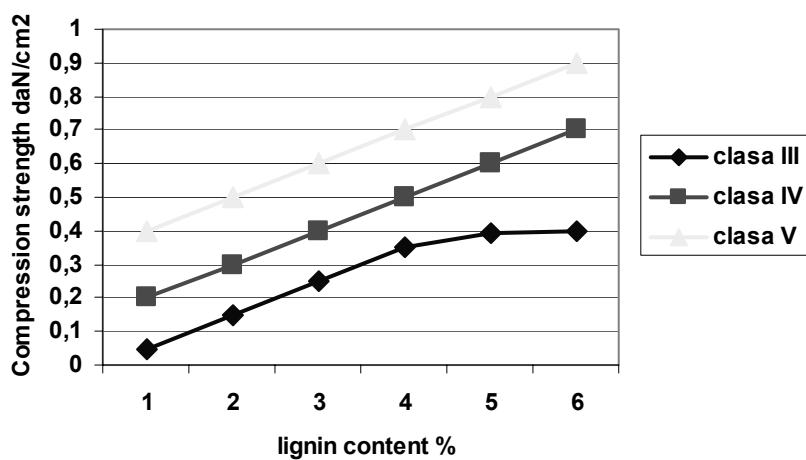


Fig. no. 2. Compression strength according lignin content

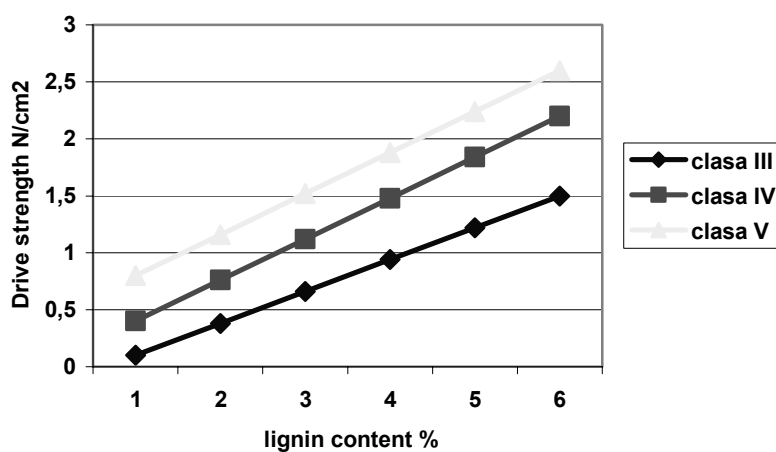


Fig. no. 3. Drive strength according lignin content

The characteristics pitch mixture variation, obtained in experimental programmer determinate according lignin content:

Table no. 3.

Pitch mixture characteristics variation					
Pitch class	Permeability (cmc/minut)	Humidity (%)	Levigable component (%)	Compression strength (daN/cmp)	Drive strength (daN/cmp)
III	80	6.5	6.0	0.45	0.60
IV	80	6.5	10.5	0.30	0.85
V	80	6.5	14.5	0.80	1.26

The standard characteristic for pitch molding mixture with novolac utilization:

Table no. 4

The standard characteristic for pitch moulding mixture with novolac utilization:

Pitch class	Permeability (cmc/minute)	Humidity (%)	Levigable component (%)	Compression strength (daN/cmp)	Drive strength (daN/cmp)
III	> 70	3 – 4.5	4 – 7	0.15 – 0.2	0.40 – 0.60
IV	> 70	4 – 5.5	8 – 10	0.10 – 0.2	0.80 – 1.00
V	> 70	5 - 7	10 - 14	0.40 – 0.70	0.80 – 1.20

From results of experimental programmer analyze and a comparison for the products realized with a novolac admixture we have:

➤ the lignin obtained threw a precipitation with 9% humidity and 90% active substance has positively effect on experimental products characteristics, these belong to...classes and in this case lignin utilization in exactly proportions to 5%, in this case novolacul.

➤ Compression strength and drive strength for dry mixture with lignin admixture. Maximal values obtained in 5% admixture lignin conditions.

Table no. 5

Strength characteristics		
Pitch class	Compression strength (daN/cmp)	Drive strength in dry conditions (daN/cmp)
III	0.45	0.70
IV	0.25	0.85
V	0.80	1.4

The lignin quantity increase over 5 % is not justified technical-economic; the influences on functional characteristics are unimportant. Lignin admixture efficiency in molding mixture established important strength increases in limits 11.6 – 22.2 %.

The utilization of the lignin in the aim obtains the plates fiberwooden he achieved equal-phase of laboratory, produced experienced be of 15 mm thickness. Step in this technology the product is referred merely to the utilization of the lignin in size reported to the used-up as the adductive.

The program followed the technological efficiency of the procurement of pal through utilization of products of adulterant derivatives from the composition of the wood.

The used-up lignin in the formation of the blend form at the: woody sawdust, woody flour, resin of polycondensation with the condition preservation constantly the addition of wooden guy and watery, supplementing adulterant with the lignin reported to resin in variable size feather to 65% from total blend. In the table no. 5 is rendered the amount of used-up lignin in the experimental recipes.

Table no. 6

The content of submissiveive lignin experimentation						
Number of the recipe	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆
Addition of lignin, %	1.5	2.5	3.5	4.5	5.5	6.5

In the experimental program continuations the prerequisite for final temperature of the process of polycondensation of the blend lignin resin phenolformaldehyde.

Knowing the thermo areas of polycondensation resin, just from the initial phase, to the recipe R1, he utilized the temperature of 140°C and big to 145°C, the explanation is influence the lignin in the formation of polymer, through the presence of the groups of the hydroxyls. The quality of the composition obtained in experimental conditions is presented in the table no. 6.

Table no. 7

The optimum characteristics of the product obtained from characteristic recipes

Characteristics	Value of the experiments
Density (Kg/mc)	1010
Absorption of the water in 24 of hours (%)	20.6
Swell in thickness (%)	12.5
Limit of resistance to flexion (Kf/cmp)	22.5
Limit of resistance to flexion (Kf/cmp)	46

In figures no.4 and 5, was analyzed and established the addition of lignin, depending on the functional features: Limit of resistance to flexion, the absorption of the water in 24 of hours and the swell on thickness in 24 of hours.

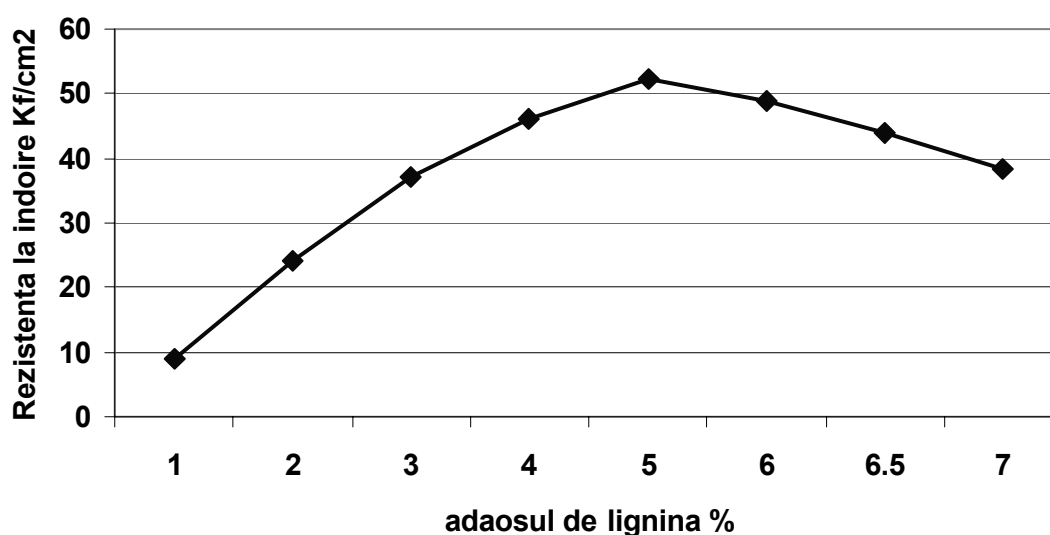


Fig. no. 4 The influence of the addition of lignin about the resistance to flexion

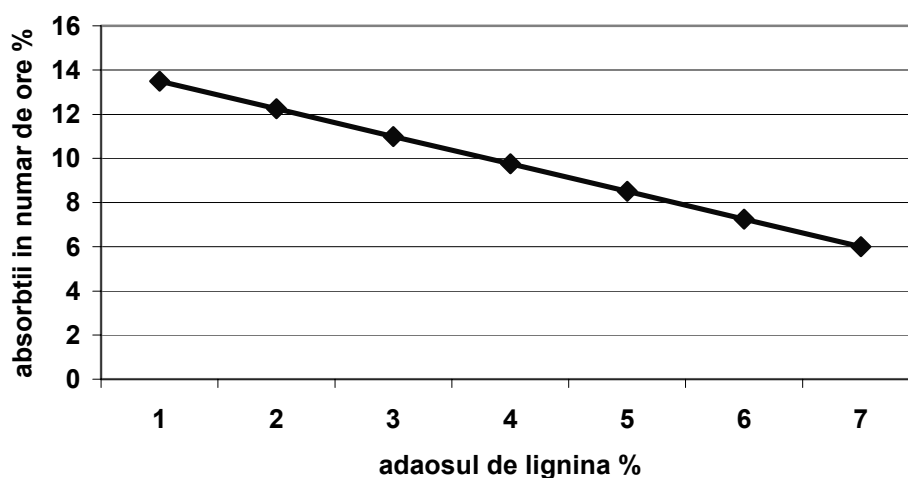


Fig. no. 5 The variation of the adsorption of the water depending on the addition of lignin

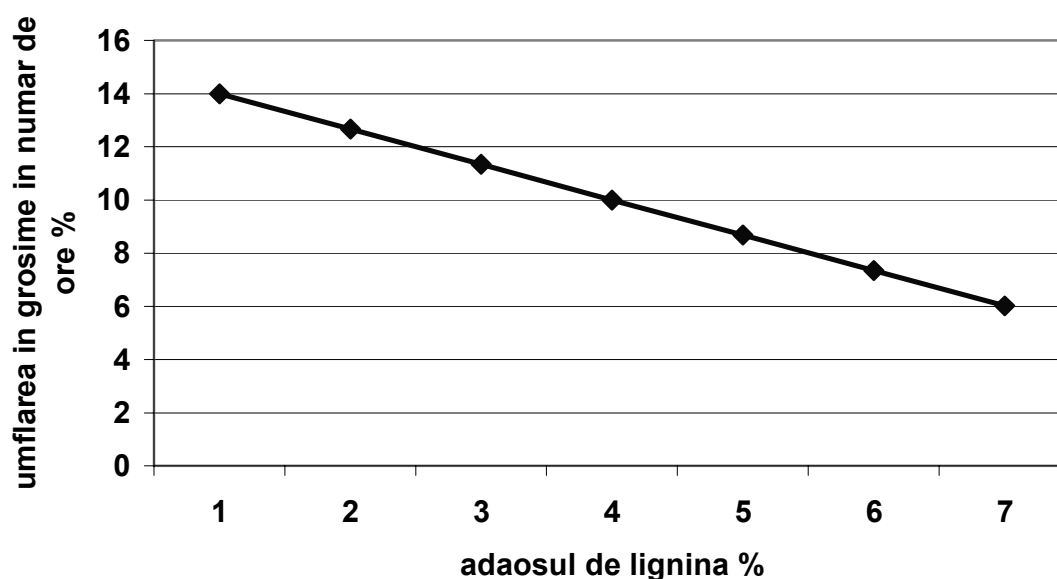


Fig. no. 6. The variation swells in thickness depending on the addition of lignin

4. CONCLUSIONS

On the strength of experimental determinations rendered in the tables and the figures no. 4, 5 and 6 is can noticed that:

- the functional features eighth are obtained in the of a conditions the additions of lignin of 5 - 5. The features Are reconcilable with the conditions enforced in the in force norms.
- the addition of lignin causes the watery decrease and the swell, produced be characterized the reduced hygroscopicity, gived be the process seconds of polycondensation of the lignin with the phenic in existing excess in the composition of the phenol resin.

▪ the lignin obtained through precipitation with chlorine hydride can be used-up in the technology of the pale guy.

Through the experimental program achieved in this stage, permits the continuation research in the sight separation of the lignin and prerequisite for skulls this capitalization. After the separation of able to hurried lignin, the worn-out solution can be entered in the natural circuit of biological treatment, excluding at that rate the primary stages and existing seconds in the classic circuit of defecation.

5. BIBLIOGRAPHY

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