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THE POSSIBILITY OF COLORING AND PRINTING SANITARY-HYGIENIC PAPER WITH NATURAL DYES

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ABSTRACT: - This article presents the results of a study of the possibility of coloring and printing sanitary-hygienic paper products with natural dyes based on local flora, which have medicinal properties. The results of studies of the effect of the composition of the dye solution on the coloristic and qualitative properties of paper are also presented. As a result of the results obtained, it is possible to propose an economically advantageous technological mode for the production of new ranges of hygienic and sanitary papers.

KEYWORDS: Natural dye, extract, pomegranate peel, walnut pericarp, sanitary and hygienic paper, coloring, printing, coloristic characteristics, color intensity, plants of local flora.

INTRODUCTION

Currently, one of the essential point for the development of our Republic is the introduction of waste-free technologies in all sectors using secondary and local resources. In this regard, new innovative ideas aimed at saving natural and energy resources are in great demand. Taking into account the rapid development of the pulp and paper industry, we can say that with the development of the production of food, textile, light and other industries, the demand for various paper ranges are increasing. Also, situation related to the spread of viruses and quarantine measures, currently the demand for sanitary

and hygienic paper production ranges has increased significantly. In this matter, the use of natural dyes to give them color and printing is relevant. As a raw material for the production of natural dyes, plants of the local flora with medicinal properties are offered.

Based on the foregoing, as a result of the development and introduction of new resource-saving technologies in the production of current products with high demand based on the replacement of expensive materials with local natural resources, it is possible to achieve significant economic benefits and tangible environmental and social efficiency in this industry [1].

Considering these arguments, the development of technology for staining sanitary and hygienic paper assortment with natural dyes is an urgent issue. Especially important is the use of waste from local plants in the production of natural dyes.

This paper presents the results of research aimed at studying the possibility of coloring and printing sanitary and hygienic paper products with natural dyes obtained from the waste of such plants that grow widely in our region as pomegranate crusts and walnut pericarp.

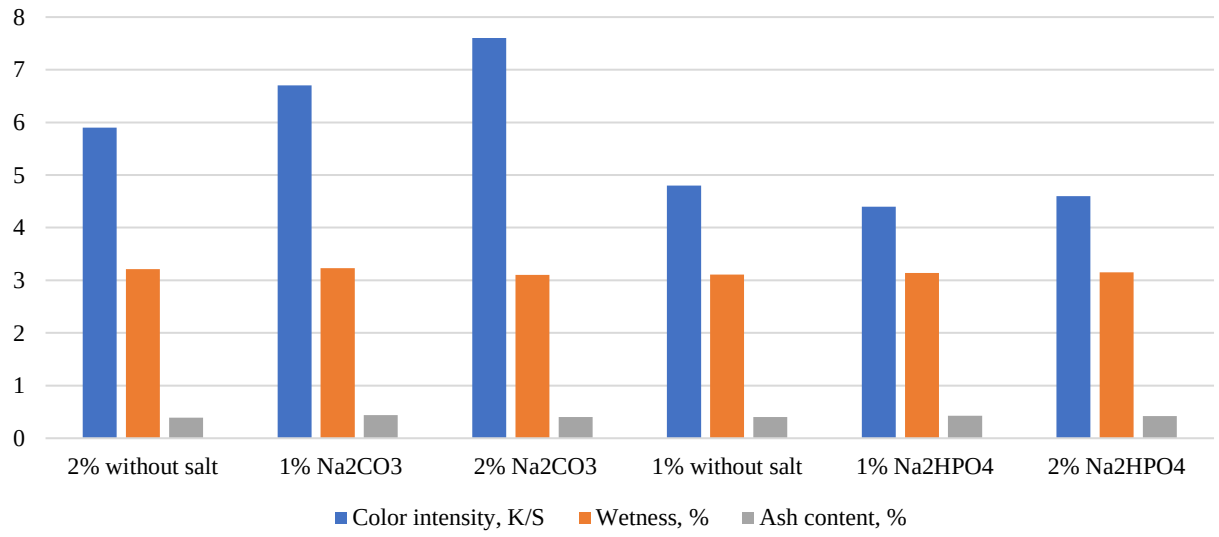

Fig. 1. The effect of the composition of natural dyes based on pomegranate peel on the coloristic and qualitative characteristics of paper

It is clear from Figure 1. that in the case of the use of natural dyes based on pomegranate crusts in the presence of Na2CO3 electrolyte, the color intensity indicators are almost twice as high as compared with NaHPO4 electrolyte.

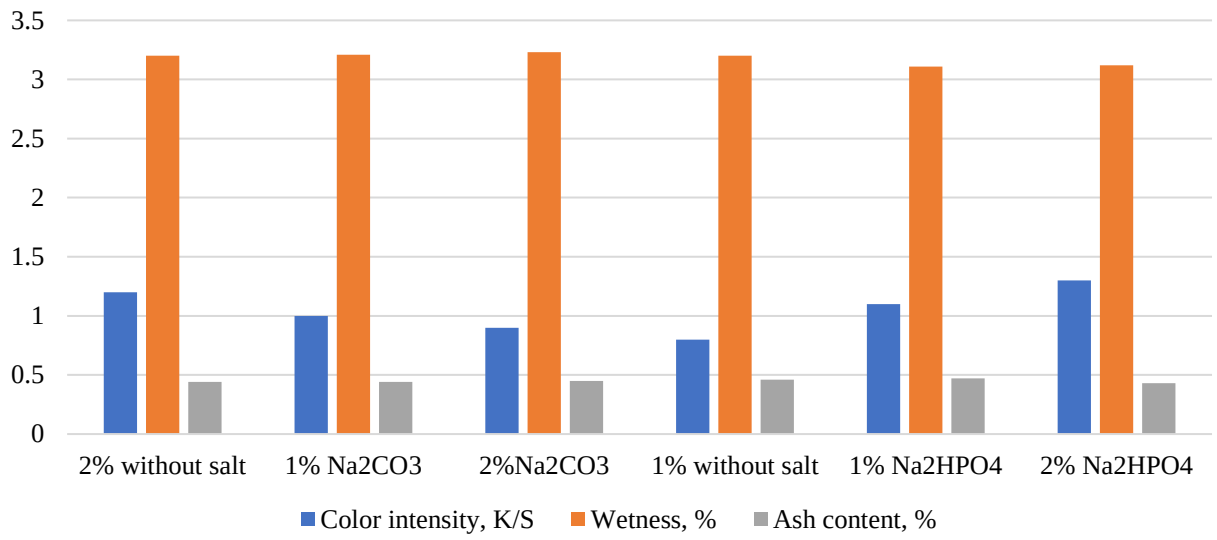

Fig. 2. The effect of the composition of natural dyes based on walnut crust on the coloristic and qualitative characteristics of paper

According to the qualitative characteristics, both electrolytes showed approximately the same parameters in dyes based on both plants.

In that way, in order to coloring the sanitary and hygienic products of paper with a dye based on pomegranate peel, a dye solution with the presence of NaHPO4 electrolyte, even 1% concentration, can be recommended. Also, for the dye obtained from walnut crusts, an electrolyte of Na2CO3 with a 1% concentration should be used. The results obtained fully satisfy the color intensity requirement for these paper ranges.

The influence of the composition of the extract of natural dyes on the coloristic and qualitative characteristics of paper used for hygienic purposes (27 g/m2)

Extract composition	Dye concentration, %	Color intensity, K/S	Color tone (visually)	Break length, mm		Ash content, %	Wetness, %	Environmental pH
				transverse direction	machine direction			
Extract of pomegranate crusts								
Without dye	-	0,25	White	200	320	0,38	3,01	7,0
In an aqueous solution	1	4,8	Light yellow-green	200	315	0,40	3,11	7,0
	2	5,9		200	315	0,39	3,21	7,0
	1	6,7		210	310	0,44	3,23	7,5

in Na_2CO_3 solution	2	7,6	Dark yellow-green	210	310	0,40	3,10	7,5
in NaH_2PO_4 solution	1	4,4	Various shades of yellow-green	210	315	0,43	3,14	7,0
	2	4,6		210	315	0,42	3,15	7,0
Walnut Pericarp Extract								
In an aqueous solution	1	0,8	Light red-brown	200	315	0,46	3,20	7,0
	2	1,2		200	315	0,44	3,2	7,0
in Na_2CO_3 solution	1	1,0	Various shades of red-brown	210	310	0,44	3,21	7,5
	2	0,9		210	310	0,45	3,23	7,5
in NaH_2PO_4 solution	1	1,1		210	315	0,47	3,11	7,0
	2	1,3		210	315	0,43	3,12	7,0

According to the data given in the table, it can be concluded that in the use of natural dyes based on pomegranate peel and walnut pericarp in both variants, when coloring paper with an aqueous dye solution, the intensity and tone of colors are lighter compared to dye solutions obtained in the presence of electrolyte salts (Na2CO3, NaH2PO4). Also, an increase in the concentration of the dye also contributes to an increase in these indicators. The staining process did not significantly affect the quality and strength characteristics of the samples, which fully meets the requirements of the paper of this range.

The use of natural dyes based on such discarded waste as walnut pericarp, pomegranate crusts and many others in the dyeing of hygienic paper makes it possible, along with improving the quality of coloring, to replace imported synthetic dyes with affordable and cheap raw materials, and also gives medicinal properties to the paper. The use of the above waste for the production of sanitary and hygienic paper assortment opens up great economic opportunities for private and small enterprises, due to the increase in the competitive and export ability of goods.

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