RELIABILITY OF THE PAPER TYPE FOOD – SUPPLIES PACKAGE, AN ESSENTIAL CONDITION IN REDUCING THE ENVIRONMENTAL POLLUTION

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ABSTRACT: The reliability of the paper package is directly influenced by the conditions of the depositing area and by the nature of the package material. The usefulness of the food - supplies package, vegetal parchment type, used to pack goods having a high greasy level can not overpass 100° C temperature, 70% humidity and a period of 50 hours.

KEYWORDS: reliability, food – supplies package, vegetal parchment.

RESUME: La consistance de papier d'emballage est influencée directement des conditions d'aire de dépôt et de la nature des matériaux d'emballage. L'utilise des quantités d'emballage alimentaire, de tipe parchemin végétal, qui sont utilises d'empaqueteur des biens avec un nivèle grande de glissement ne peut pas dépasse 100 °C, 70 % humidité et un période de 50 heures.

MOTS CLE: consistance, quantité d'emballage alimentaire, parchemin végétal

INTRODUCTION

The development of the package production is tightly linked to the increase of the production of the materials and wide consumption goods. Package is an important economic element, having implications on the rational and efficient use of the raw materials and other materials use.
The need to protect the food supplies has appeared since very old times, together with the concern to conserve and preserve their properties.
The package can be defined as a system, which accompanies the product in all its circulation stages, from the producer to the consumer, achieving handling, preserving and selling functions of the product [1, 2].
The activity of a package starts when it is filled in and finishes with the consumer, and in the end it becomes a household or industrial waste. The packing functions are classified into technical and marketing functions. Practically, the package functions have to respond to the quality demands, through a high reliability to reduce the environment pollution. Out of these functions of the package we can remark: mechanical protection, chemical protection, protection against micro – organisms, protection to light, to high and low temperatures [4, 5].
We cannot omit the functions related to the economic efficiency, thus the package has to suggestively express the content, to mention the price, the quantity of the packed product, its guarantee period and way of use. The image of the packed goods has importance within their commercial circuit, therefore it should be of a good quality and it should reproduce the content as attractive as possible [3].
Out of the complex themes that set the relationship – packed product - reused package-waste, the herein paper intends to present paper package with alimentary use, their stability to the environment action and temperature variations.

METHODS AND MATERIALS

The experimental program has mainly followed the determination of the temperature and humidity variations of the paper alimentary package products.
The style of work used was based on standard experimental programs, referring to the determination of functional characteristics before and after the thermal treatment.

The applied method consisted in the intensive thermal exposure up to 120 °C to different periods of time, under the conditions set in Table 1.

Table 1 – Experimental program for thermal exposure

Temperature range	Time (hours)
100° C +/- 5° C	24 –72 – 100
120° C +/- 5° C	10 – 20 – 30
20°C+ /-5°C, with relative humidity variations: 45% 70%	 24 - 72 –100 24 – 72 -100

The food – supplies package product, vegetal parchment type provided to the experimental program, is part of the group with packing intensive use, under the conditions of some products having 15 % humidity and a fat content greater than 70%.The vegetal parchment paper is a paper assortment used in packaging food–supplies having a high fat content (butter, grease, bakery products, sweets and dairy products).

Table 2 – Specific features of paper package, vegetal parchment type

Denomination of functional characteristics	Measuring unit	Absolute values
Mass	g/m^2	70
Resistance to Müllen bursting: - Dry status - Wet status	kgf/cm^2	 2.0 0.9
Length to tearing	m	8000
Impermeability to greases	sec	600
Impermeability to water	sec	60

RESULTS AND DISCUSSIONS

To present the results to the experimental program the graphic method was used, which illustrates the behavior of the vegetal parchment paper, under the conditions of intensive uses identical to the conditions set in table 1.
Especially, the functional characteristics of the package were followed: length to tearing, resistance to bursting determined by Müllen method.

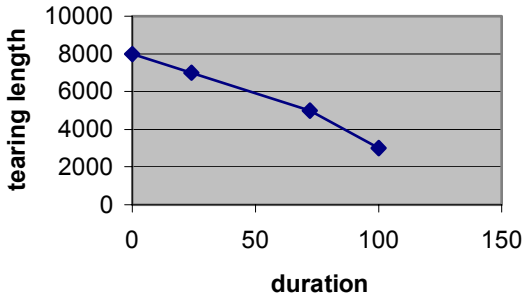

Figure 1. Variation of tearing length [m] when thermally exposed to 100℃+/- 5°C

Upon a thermal exposure to 100°C +/-5°C achieved through a thermal – adjustable sterilizer upon the air circulation, the length bursting decreases, suggestive being the data expressed in percentage loss of characteristic:

1 – initial status
2 – exposure to 24 h, 12.5% loss
3 - exposure to 72 h, 37.7 % loss
4 - exposure to 100 h, 62.7 % loss

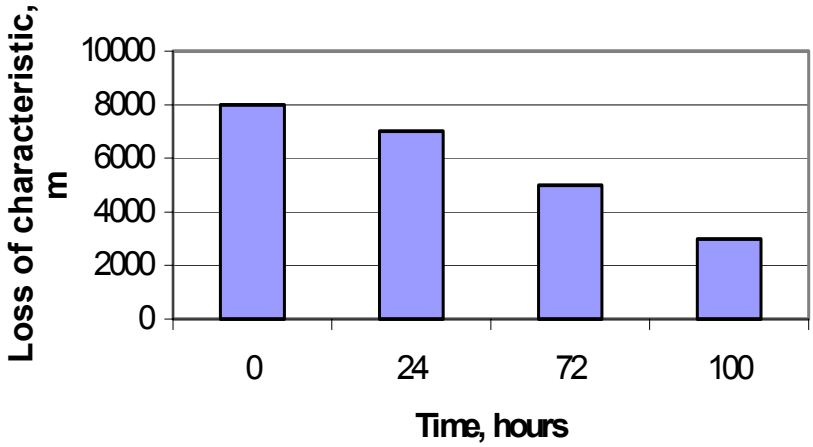

Figure 2. Loss of characteristic, m

The result for this characteristic concludes the loss of the functional capacity of the package after 72 hours.
The values expressed by percentage loss of characteristic allow the conclusion: the package becomes unusable after 100 running hours, characteristic, which also express the package material giving up under pressure.

Table 3 - The characteristic loss for resistance to bursting

Exposure	Duration	Characteristic loss for resistance to bursting
1 – initial status		
2 – exposure to 100° C+/- 5° C	24 h	14.3 % loss
3 – exposure to 100°C +/- 5° C	72 h	25 % loss
4 – exposure to 100° C +/- 5 °C	100 h	50 % loss

Table 4 - The reduction of the impermeability level to grease was presented.

Exposure	Duration	Impermeability with greases (sec)
1 – initial status		600
2 – exposure to 100° C+/- 5° C	24 h	520
3 – exposure to 100°C +/- 5° C	72 h	400
4 - exposure to 100° C +/- 5 °C	100 h	310

The temperature variation negatively influenced the impermeability level with greases. After 100 h storage to a 100°C temperature the package loses its functional property of being impermeable with a high greasing level, the idea being not to use that because of the negative implications on the quality of the packed product.
The behavior of the vegetal parchment as a package under variable conditions humidity of the storage area is shown in table 3.

Table 5. Variation of functional characteristics, depending on the conditions of the storage area humidity

Qualitative conditions	Measuring unit	Storage conditions: 20 °C	
		45 % relative humidity	70 % relative humidity
Mass	g/m^2	70	73
Resistance to bursting	kg/cm^2	2.0	1.8
Impermeability to greases	sec	600	320

Package exposure to a 20 °C temperature and 45 % storage area humidity do not negatively influence its quality. Storage at relative humidity conditions of 70 % imply the existence of some hydrolytic destruction reactions of the chemical composition of the paper package, destruction which negatively influence its functional quality, with 50% reductions of impermeability to greases, against the initial status, thus excluding the package functional quality.

CONCLUSIONS

The reliability of the package products depends on the group they are in. With the paper package the thermal and humidity environment conditions negatively influence the functional qualities.
The experimental determinations achieved have confirmed the preservation of the storage functional qualities of the package under high thermal conditions of 100 °C and 70 % humidity only for a period not longer than 70 hours.

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