MEANS OF SLOWING DOWN THE DEGRADATION PROCESS OF HOME MADE BREAD THROUGH PACKAGING

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Abstract
The packagings and packaging materials that the food stuff comes in contact with, besides the protection function from the environment and the promoting and marketing ones, have to respond to an essential request specifically to the chemical stability of the packed product. The home made bread packaging in punctured and unpunctured polypropylene foils contributes as well to the prolonging of the fresh maintenance of bread as a result of the slowing down of modifiers action that determines the staling of the bread but in the case of the bread packed in micropunctured foil there can be mentioned the disadvantage of alteration of the following organoleptic properties: "the staling taste", the drafting and lack of flavour.[1] All these changes that take place during the storage are called staling and they have a considerable economic importance for the bread industry for it generally has a the most important influence on limiting the shelf life of bread products.

Keywords: PP- polypropylene, UV- ultra violet radiation

1. INTRODUCTION

The packaging is the last stage in bread fabrication process. The conventional type of packaging applied in the normal bread industry uses the atmospheric air and the packaging/wrapping materials generally approved by law.[9]
The study contains the results of some bread packaging systems specifically the bread packaging in normal atmosphere in two ways: in unpunctured polypropylene foil and in micropunctured polypropylene foil.[2]
The polypropylene chemical and mechanic features properties are very good fact that makes it a better packaging material than polyethylene. These features include:
– (water, fat, acid, UV radiation, light etc.) resistance, good processing (on the packaging line), transparency, antimoisture, high printabily;
– traction resistance;
– specific low weight;
– non toxicity;
– smell proof;[3,4]
Almost 80% of the bread is mostly packed in polyolefine packagings, an essential thing for: hygene, bread protection towards deterioration and external environment actions maintenance of its preservation, providing information regarding the nutritional qualities, ingredients or other label information for the consumer.[5]

2. MATERIALS AND METHODS

Materials

Bag – PP foil (30 μm)

Bag – micropunctured PP foil (30 μm) 20 punctures/inch^2

Table 1. Means of determination for the quality indicators of bread used in experiments[6]

Quality indicators	Determination method
Mass, kg	STAS 90-98
Volume, cm^3/100g	STAS 90-98
Raport H/D	S.R.91.2007 pct5
Porosity, % vol	S.R.91.2007 pct6
Elasticity, %	S.R.91.2007 pct7
Humidity, %	S.R.91.2007 pct.10
Acidity, acidity grades/100 g	STAS 90-88

3. RESULTS AND DISCUSSION

The bread was analysed after 3 hours of oven extraction as it follows:

– in unpunctured polypropylene (PP) foil, 30 μm thick;
– in micropunctured (20 punctures/inch^2) polypropylene PP oil, 30 μm thick

Table 2. The quality indicators of bread used in experiments

No.	Physico-chemical determinations	Obtained values		
		Initially	5 days	
			Bread in unpunctured PP foil	Bread in punctured PP foil
1	Mass, kg	0,418	0,424	0,392
2	Volume, cm^3/100 g	392	399	451
3	Ratio H/D	0,65	0,66	0,56
4	Porosity, % vol	88	88	87
5	Elasticity, %	99	99	99
6	Humidity, %	46,3	45,7	44,0
7	Acidity, acidity grades / 100 g	1,0	1,0	1,0

Table 3. The microbiological analysis of bread packed in punctured and unpunctured foil

Analysis period, days	Yeasts and molds, ufc/g	
	Bread packed in unpunctured PP foil	Bread packed in punctured PP foil
1	< 10	< 10
2	< 10	< 10
3	< 10	< 10
4	Mold stains	< 10
5	Mold invasion	Mold stains

The bread volume, H/D ratio, porosity, elasticity and acidity didn't show important modification. They were linked to the water content (humidity) and presented a slow value reduction.
The bread samples packed in punctured foil after 3 days presented a rough/hard cover and in the section there was noticed a modification of the core, exactly the roughing of ½ of it in the cover-core direction.
In the fifth day mold stains started to appear on the inferior side of the bread (the "bread foot") and the cover and ½ of the core were very rough.
The low bread humidity determined the molds growth inhibition.
The bread samples packed in unpunctured foil didn't show significant modifications in 3 days. In the fourth day the samples presented yeasts and molds colonies on ¾ of the bread surface and on the fifth day strongly developed molds were observed on the entire surface of the bread.
The molding process/mildwy is favourized by bread preservation in unproper conditions respectively an average air humidity greater than 80% and temperatures between 24 and 30^0 C. The sporus on the cover's surface germinate in the conditions in which the cover arrives at the minimum humidity necessary for this process, then the mold gradually penetrate through the porus the core of the bread spreading throughout it. Through mold development a series of processes are started: the bread loses in weight, its appearance is modified due to the characteristically coloured mold colonies, the taste is altered as a result of the action of some compounds produced by the mold that imprints in the bread the characteristic taste of it making it unproper for consumption.
In the case of bread packaging in plastic bags the spreading of the sporus found on the cover can be favourized these ones being able to produce a massive molding also favourized by the relative high air humidity in the waterproof package.

4. CONCLUSIONS

The conclusions that can be derived after the experiments led on the bread packed in micropunctured foil present on one hand the advantage that it prolongues the microbiological shelf life but on the other hand the disadvantage of alteration of organoleptic properties: "the staling taste", the drafting and lack of flavour.
All the unwilling changes that take place during the storage are called staling. The staling has a considerable economic importance for the bread industry for it limitates the shelf life of bread products. The staling is a

complicated process that involves changes for all the bread's components and actually there is an organoleptic answer for all these changes called "the staling taste".[7] While facts like the decrease of flavour and the dry taste sensation are measured through the testing of staled bread taste the common method used by the consumer is the "test of pressuring" in which the staling equals the resistance appeared at the hand pressure upon a slice of bread during its storage.[8]

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