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RESEARCH ON DEVELOPMENT OF ACIDITY IN PORK LARD DURING THERMAL PROCESSING

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Abstract

At heat treatment of foods containing lipids changes occur in terms of appearance, taste, smell, nutritional value and toxicity. Can be thermally degraded both saturated and the unsaturated lipids, these degradation being evident especially for frying meat.

When frying meat in lard, especially from repeated frying were formed saturated aldehydes and unsaturated ketones, hydrocarbons, lactones, alcohols, acids and esters which make up the volatile fraction. It is also forming: polar nepolimerici compounds of moderate volatile, dimers and polymers acid and dimeric and polymeric glycerides, free fatty acids by hydrolysis of triglycerides.

The changes that the lard suffers at the frying are influenced by temperature, frying time, the existence of metal and type of toaster. To achieve this objective research were performed determinations on 100 samples pork lard after obtaining through melt and after 1-3 uses at frying pork meat of different qualities: nape, chop and flitch. As work material was taken pork lard obtained from melting lard from dorsum and abdominal region which was examined before and after frying in three stages. For all measurements were taken in work one gram of melted lard.

Was followed the influence that successive frying in three different types of meat has on acidity.

Key words: foods, lipids, temperature, meat.

INTRODUCTION

Nowadays are recorded numerous metabolic imbalances attributed on one hand, the reduction of the physical effort, sedentary lifestyle, on the other hand on the increase of nervous solicitation, growth of daily stress and environmental pollution, food pollution implicitly (CIOBANU, 2001, Drug, 2003).

Worldwide, it is recognized that so-called "diseases of civilization", found mainly in Western countries with a high level of living, are the result of nutritional errors (MYAMOTO et al., 2007, Moller, and Wallin, 1998). One of the causes of apparition of these diseases is excessive consumption of lards and especially the type of lard commonly used in food.

In this context, consumption of food preponderantly lipid and especially saturated lards has led to health problems by increasing blood cholesterol (COUET et al., 1997), the formation of athermanous plaques (Philemon, 1998), increasing blood pressure and ultimately increasing the number of patients with heart disease and circulatory (Frank et al., 2001).

Unsaturated lards are less dangerous and contain significant amounts of fat-soluble vitamins useful to the body, which function as antioxidant both in aliments preponderant lipid and in human body, preventing many diseases caused by oxidative stress (Banu, 1982; Gonta, 1971).

Lipids are found abundantly in animal tissues performing in living organism an energetic role (Banu, 1996, Celan, 1958) also fulfill a plastic role entering in the structure of some cellular components and a protective role (Banu, 2001).

Oxidative degradation suffered by lard foods causes the appearance of some direct effects as a result of changes in food products and nutritional changes, and as indirect effects, the possibility of alteration of consumer health and some economic consequences.

Some of the unsaturated fatty acids fulfill important functions in the human body, therefore they were also called essential fatty acids. Some authors call them as vitamin because they are as essential for the body as vitamins are.

Antioxidants not only increase the lifetime of the product (period of validity), but substantially reduce the nutritional and organoleptic depreciation of products, increasing the palette of lipids that can be incorporated into products. As a consequence, through the possibility of maintaining and increasing the number of oils and lards that can be used in foods, antioxidants lead to lower the cost share of lipids in the whole product (TOFANĂ, 2006).

MATERIAL AND METHOD

Commercial hybrid of pork production, increased in the majority of swine farms in our country, is produced by the PIC, is composed of 2-3 maternal and 2-3 paternal lines. For security reasons and due to the continuous improvement of this hybrid is not known the percentage in which enter each line to form the hybrid.

Iodine value determination

Index of iodine (IV) is the amount of iodine, in grams, in addition to 100 g lard. Index of iodine was determined using the Hanus method according to STAS 145/19-90.

Method principle

In specific working conditions, is treated a given quantity of lard with a monobromură iodine solution (Hanus reagent). The excess of monobromură iodine releases iodine of potassium iodide, which is determined quantitatively by titration with sodium thiosulphate.

Reactive

- Chloroform;
- Hanus reagent;
- Potassium iodine, sol. 15% freshly prepared;

- Sodium thiosulphate sol. 0,1N;
- starch, sol.. 1% freshly prepared

Work method

The lard to be examined must be purified, for disposing of accompanying substances (water, protein substances, mechanical impurities). In a bowl of iodine (with glass stopper),of 300 ml, are weighed, on analytical balance, 0.3-0.6 g lard, previously melted, added 10 ml of chloroform under continuously stirring for complete dissolution and 25 ml of Hanus solution. After homogenization, is corked and let 30-60 minutes in the dark. Then add 20 ml of potassium iodide and 100 ml distilled water, with which is washed well the cork and neck of the vessel, so as to not remain traces of iodine on them. In parallel, a blank test is carried out under the same conditions but without the lard. It is titrated rapidly with 0.1N sodium thiosulphate. Around the end of titration (straw color),is added 1 ml 1% starch solution and continue titration drop by drop, until the sudden disappearance of blue color.

Calculation of results

$$\text{Iodine index} = \frac{(V - V_1)\cdot 0{,}01269}{G}\cdot 100$$

of which:

V-volume in ml of sodium thiosulphate sol. 0.1 N, used in blank titration;

V1-volume in ml of sodium thiosulphate sol. 0.1 N, used in titrating the sample to be analyzed;

G - amount of lard, in grams, taken in work;

0.01269 - the amount of iodine in g corresponding to 1 ml of sodium thiosulphate, sol. 0.1 N.

RESULTS AND DISCUSSIONS

Before frying pork lard obtained by melting Bacon dorsal region has an acidity of 0.35 g% oleic acid.

After first frying the acidity of this lard rises to 1.02 g% oleic acid when frying pork nape. When frying pork chops after first frying the acidity increase up to 1.03 g% oleic acid. In case of flitch samples the acidity is 0.86 g% oleic acid. After second frying in case of nape samples the acidity reaches the level of 1.14 g% oleic acid, at the chop the acidity of fried lard is 1.15 g% oleic acid, and in the case of flitch the lard acidity is 1.02 g% oleic acid.

After the second frying the acidity at the nape samples is 1.20 g% oleic acid, in the case of pork chop the acidity of fried lard is 1.25 g% oleic acid, and at the flitch lard acidity reaches 1.15 g% oleic acid (Figure 1).

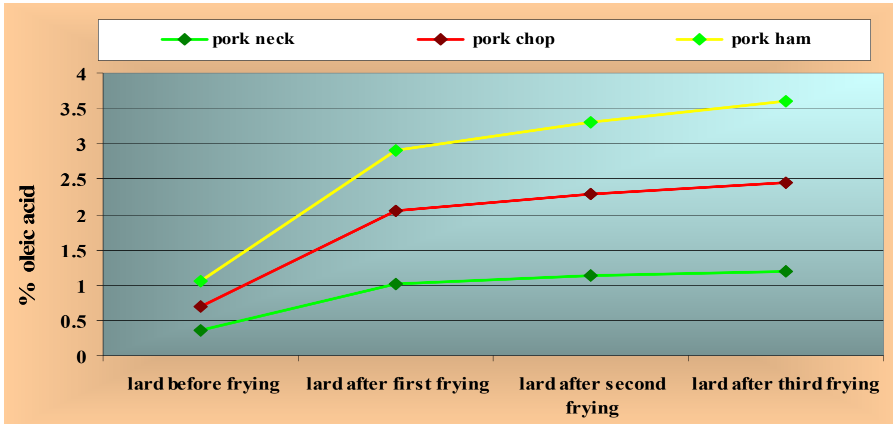

Fig. 1. Evolution of acidity in the pork lard obtained from the dorsal bacon during thermal processing

In the case of using pork lard obtained from abdominal bacon is noticed at the lard before frying an acidity of 0.29 g% oleic acid.

After first frying acidity increased up to 1.05 g% oleic acid in the case of pork nape, 1.06 g% for oleic acid in the case of chops and to 0.98 g% oleic acid in case of frying flitch.

After the second frying acidity increases to 1.16 g% oleic acid in frying pork neck, 1.30 g% oleic acid in frying pork chops and 1.04 g% oleic acid in frying flitch.

After third frying, the acidity increases to values of 1.25 g% oleic acid in pork neck, 1.30 g% oleic acid at the frying of pork chops and 1.10 g% oleic acid in frying flitch (Figure 2).

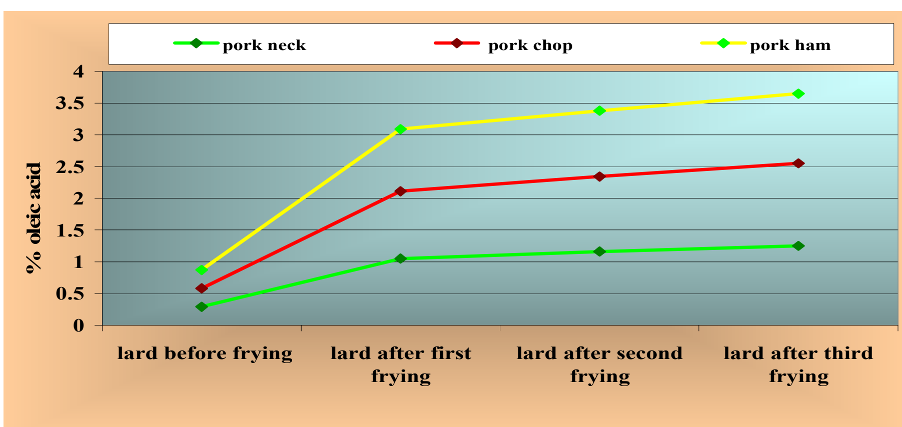

Fig. 2. Evolution of acidity in the pork lard obtained from the abdominal bacon during thermal processing

CONCLUSIONS

- The lard obtained from melting abdominal and dorsal bacon has similar values of acidity, higher values are found by melting abdominal bacon;
- During frying I, II and III increases acidity, in this case higher acidity values were recorded in frying the lard obtained from melting the abdominal bacon;
- After third frying both lard cathegoriest has organoleptic changes that require its removal from the consumption. Organoleptic changes occur in values over 1.15 g% oleic acid;
- Through the study conducted on pork lard peroxidation by different frying systems can be seen that it depends on the type of product under frying and baseline of lard in which is fried.
- Changes in pork lard peroxidation in different frying systems depend on the type of product under frying and baseline of lard in which is fried;
- Correlations were established between the value of chemical and physical indicators and the freshness of some animal fats.

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