INFLUENCE OF THERMAL PROCESSING ON PORK LARD PEROXIDE INDEX

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Abstract

This paper is based on research results on the influence it has successive frying in three stages of various types of meat on the degree of peroxidation after each frying being taken lard samples to determine the acidity and the degree of peroxidation. When frying pork chops after frying I peroxide value (PV) is 1.20 meq O_2/kg, and at flitch samples PV 1.40 meq O_2/kg. After frying II in the case of neck sample PV has the value of 1.20 meq O_2/kg. At the pork chop samples PV takes the value of 1.40 meq O_2/kg, and for flitch samples PV is 1.30 meq O_2/kg. After frying II PV is 1.40 meq O_2/kg and for pork chops PV has a value of 1.50 meq O_2/kg. At the flitch peroxide value PV takes the value 1.20 meq O_2/kg.

Key words: peroxide, thermal, food.

INTRODUCTION

Lipids constitute a class of organic substances with diverse chemical structure, but resembles the characteristic properties: they are insoluble in water and slightly soluble in polar organic solvents (ethyl ether, petroleum ether, benzene, toluene, chloroform, etc.). (Banu , 2002; Banu and Vizireanu, 1996). They are found in animal tissues performing in living organism especially an energetic role and can be considered as the main storage form of energy. (BANU 2002; CELAN et al, 1958). They also fulfill a plastic role because they enter in the structure of cellular components and protective role (Banu, 2001; POP, 2009).

Lipids from food and those used in food preparation, improve their sensorial properties, because its smell and taste specific and serve as solvents for flavor ingredients (Huss, 1988), stimulates digestion and absorption and using trofinelor of food improve them (Banu et al. 1982).

Food lipids are also the fat-soluble vitamins solvents, ensuring their introduction into the body through the gastrointestinal tract (HUHGES, 1995). Among unsaturated fatty acids a particular importance have linoleic acid, linolenic and arahidronic also called essential fatty acids that cannot be synthesized by the organism, they must be brought from alimentary contribution (HUSS, 1988; KOMPRADA, 2002; KRIS-RTHERTON et al, 2003).

Essential fatty acids brought by diet can be used by the human body in the following directions: direct production of energy (Kimura et al., 2007), to obtain the deposit triglycerides (Liu et al., 1998), constituent of membrane phospholipids (Miyamoto et al., 2007).

Lack of essential fatty acids in the diet causes serious metabolic disorders such as growth retardation, dermatitis, hair loss, necrosis, kidney damage, accumulation of fat in the liver, reproductive disorders (Banu et al., 1982). In adipose tissue it was found that the proportion of fatty acids is carried out mostly on β-oxidation route and a small proportion is converted to prostaglandins (CIOBANU, 2001 DAVIES, 1987).

MATERIAL AND METHOD

The commercial hybrid for pork meat 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 entering each line to form the hybrid.

Peroxide value (PV) represents the content of peroxide and other oxidizing substances in a certain amount of product that oxidizes potassium iodide, liberating iodine, was performed according to ISO 74:2006 3976/IDF Milk Determination of fat-peroxide value . Peroxide value is expressed in milliequivalents of peroxide to 1 kg of product micrograms of active oxygen in 1 g of product and millimoles of peroxide to 1 kg of product.

Dissolve the fat in a mixture of chloroform / methanol, then add ferrous chloride and ammonium thiocyanate. Bivalent iron ($Fe2 +$) of ferrous chloride is oxidized to trivalent iron by peroxides present in the sample. In the presence of ammonium thiocyanate is forming a red complex, whose intensity is proportional to the amount of peroxides. Reading of results was done with UV - VIS T60U spectrophotometer.

Lard before frying was considered blank and lard after frying I, II and III of the experimental evidence.

Peroxide value, expressed in milliequivalents of active oxygen for 1 kg of lard, is calculated using the formula:

$$\text{Peroxide index} = \frac{Abs}{55{,}84 \times m} \times \frac{1}{b} \text{ milliequivalents } O_2/\text{kg}$$

m- lard mass taken for determination, in g;
Abs - absorbance read at spectrophotometer;
55.84 - atomic mass Fe^{3+} needed to express the results in milliequivalents;
b - slope of the calibration.

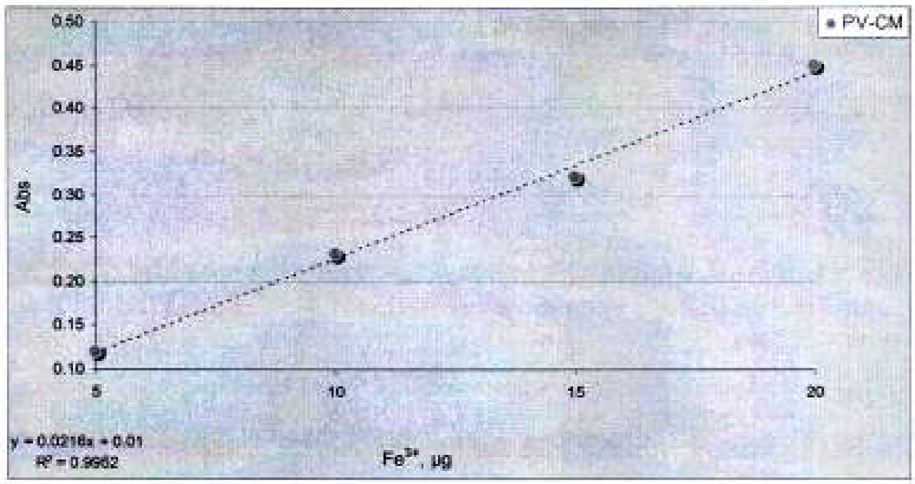

Fig. 1. PV calibration curve prepared with CM mixture
Source: spectrophotometer instructions

RESULTS AND DISCUSSIONS

Before frying pork lard obtained by melting bacon from dorsal region had a peroxide index of 0.85 meq O_2/kg.

After first frying peroxide value went up to 0.9 meq O_2/kg for frying pork neck. When frying pork chops after first frying peroxide index is 1.20 meq O_2/kg and in case of flitch samples PV acidity takes the value of 1.40 meq O_2/kg.

After second frying in case of neck samples the peroxide index reach 1.20 meq O_2/kg. At the pork chop samples the peroxide index of fried lard is 1.40 meq O_2/kg . In case of flitch samples PV is 1.30 meq O_2/kg.

After third frying the peroxide index in neck samples is 1.40 meq O_2/kg, for pork chops 1.50 meq O_2/kg and 1.20 meq O_2/kg for the flitch. (Figure 2).

In the case of using pork lard obtained from abdominal bacon fat is established at the lard before frying a peroxide index of 0.96 1.20 meq O_2/kg.

After first frying peroxide value increased to 1.06 meq O_2/kg at the nape samples, 1.30 meq O_2/kg to chop sample and 1.0 meq O_2/kg at frying the flitch.

Peroxide value reaches after frying II to 1.30 meq O_2/kg for pork neck, 1.60 meq O_2/kg the pork chops and 1.20 meq O_2/kg the flitch.

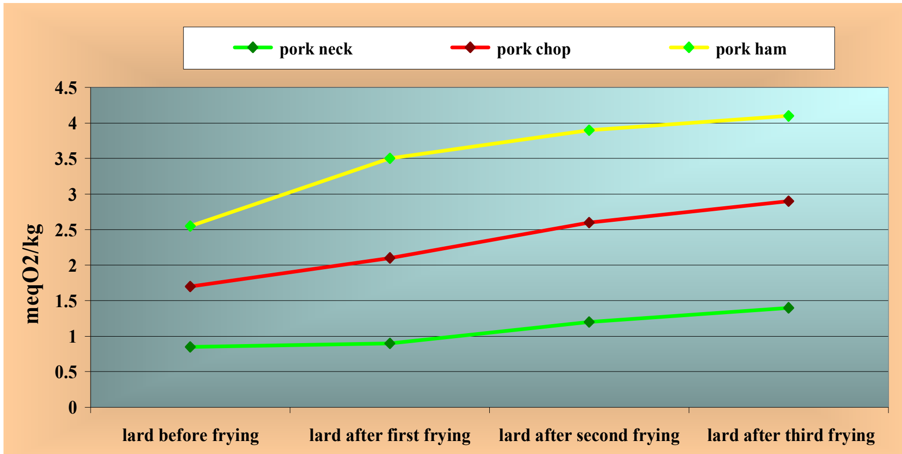

Fig.2. Evolution of the peroxide index in the pork lard obtained from the dorsal bacon during thermal processing

After third frying, peroxide index increased to values of 1.05 meq O_2/kg for frying pork neck, 1.70 meq O_2/kg for frying pork chops and 1.30 meq O_2/kg for frying flitch. (Figure 3)

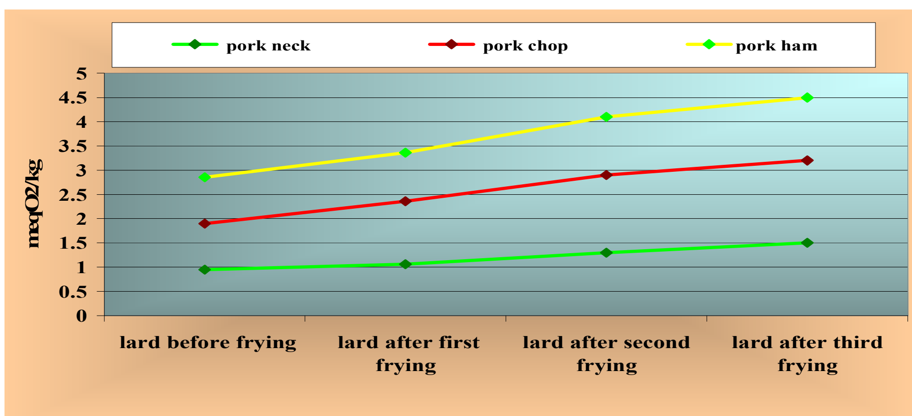

Fig.3. Evolution of the peroxide index in the pork lard obtained from the abdominal bacon during thermal processing

CONCLUSIONS

In result of the research the following conclusions can be drawn:

- during frying I, II and III increase peroxide value and in this case higher values were recorded in frying the lard obtained by melting the abdomen bacon;
- after third frying both lard categories have organoleptic changes that require its removal from the consumption. Organoleptic changes occur at values over 1.5 meq O_2/kg of peroxide index;
- through the study conducted on pork fat 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;
- peroxidation changes in pork lard in different frying systems depend on the type of product under frying and baseline of lard in which is fried.

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