# THE INFLUENCE OF SOME TECHNOLOGICAL FACTORS ON THE MANUFACTURING PROCESS OF SMOKES MEATS

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***Abstract*:** Works proposes the study of the some important technological factors which have influence on the lawsuit of manufacture of fume meats. As factors which can determines a modification of lawsuit of obtaining the finished product, can be enumerates: the time of maturing, the temperature of ebullition and brine concentration. The influence of those proves to be positive in the quality and conservation of fume meats.

*Keywords:* smoked, nitrites, aerosol, meats smoke, smoke in electrostatic field

## 1. INTRODUCTION

By smoked one heard the tender of the meats on the action of smoke produce by the incomplete sawdust or wood burning. The process of achieved smoked, into principal two functions:

- the thermal machining of the products smoked with the object of decreases regular moisture by smoked boiling or cold smoked by autolitic way - enzymatic.
- by the smoked of meats, fish and sausages with the object of positive influence taste and savor.

In the manufacturing process of several meats, the smoke is the phase final and several times the phase the main thing of heat treatment. By smoked the meats obtain a characteristic color, taste, aroma and conservation necessary [1-6]. The smoke is an aerosol forms by a mixture of air and products of sawdust or wood burning incomplete. The agent of dispersion is the air, and the phase disperses is liquid but also solid and gas [7-9]. The particles of smoke (aerosols) have a very large instability near the colloidal solutions, presenting a very intense Brownian movement and there is an easy coagulation. They are covered with a film of air. Consequently the penetration of compose active of smoke is difficult. The composition of smoke depends on fuel and conditions of burning. In general, in smoke exists the following components: gauzes: CO, $CO_2$, $CH_2$, $H_2$, $C_2H_4$; steams; liquids, form by acids: formic, caproic, acetic, furan, angelica, lignocerinic and lactone of the valeric acid; alcohols like methyl, ethyl, allyl, izoamelic and izobutiric; let us cetons like acetone and diacetil; aldehydes like formaldehyde, acetic, dimetil acetaldéhyde and furfuryl alcohol, easy tar containing a mixture of aromatic hydrocarbons, phenols, cresols, xilenols, pirocatechine and derived them; solids constitutes by the coal particles, ashes, etc. [10-17] .

In table no. 1 east has a presentiment of the chemical composition of smoke according to the wood turpentine uses.

*Table 1. Chemical composition of smoke according to the wood nature (% by the contents total) [11]*

| Groups of substances | Wood nature | | | |
|---|---|---|---|---|
| | Beech | Oak | Birch | Fir tree |
| Acids (express in acetic acid) | 5,24 | 5,14 | 4,57 | 3,74 |
| Phenols (express in carbonic | 0,30 | 0,30 | 0,19 | 0,25 |
| acid) Combinations carboxylic | 8,69 | 8,05 | 8,71 | 10,84 |
| (express out of acetone) | | | | |
| Formaldehyde | 1,10 | 1,04 | 0,96 | 1,43 |
| Acetaldehyde | 1,40 | 1,07 | 1,16 | 1,93 |
| Furfural | 0,69 | 1,57 | 0,75 | 1,03 |
| Diacetil | 0,61 | 0,62 | 0,44 | 0,83 |
| Aldehyde - diacetil | 3,79 | 4,30 | 3,31 | 5,22 |

By compose of smoke the largest importance have phenols and aldehydes aromatic and cyclic and also the acetic acid. As methods of smoke are uses the smoke with the cold one, the smoke with the heat, the smoke boiling and the wet smoke, the smoke clean some of smoke and the smoke with the liquids. [12-13]

## 2. METHODS AND MATERIALS

One a uses physico determination - chemical for determines the indices of quality to the nape of the neck smokes out. As methods of analysis one a uses:

- determination of pH
- determination of ammoniac
- nitrite determination 1.

### 2.1. The determination of pH

The determination of pH is realizes conforms STAS 9065/8 - 74 by the method to paper of indicator. [6]. The principle of this method represents the pH after the paper color of indicator of pH, after the coloring of that with extractive acquired honest analysis. The mode of works were realizes by the preparation of extractive of nape of the neck of pig smokes out, filtration of this and after the moistening of the paper of indicator with some drops of extractive. The pH obtained varies between 5 and 7.

### 2.2. The ammoniac determination

The ammoniac determination was carries out conforms STAS 9065/7 - 74 by the method to the Nessler reagent. The principle of the method is that ammonia forms with the reagent Nessler one precipitates with a force coloration, that to allow the identification of some ammonia traces. The mode of works A represents the preparation of extractive, the filtration of that, and after one introduced 1 ml of extractive and after one addition 1 until au10 tastes of reagent Nessler one agitates the test-tube after each tastes additions. One has to follow the modification of coloring and the degree of clarifies solution.

### 2.3. Nitrite determination

The nitrite determination is realizes conforms STAS 9065/9 - 74 by the Lombard method - Zambelli. The principle of the method represents the comparative literature between the intensity of colors composes azoic yellow - orange forms to follow of them the reaction of the sulfanilic acid, phenol and nitrites of extractive aqueous, with a scale standard of the sodium nitrite solutions obtained under same the conditions. The mode of works was respects like: into a test-tube one introduced 1 ml of extractive, prepares and after filter, 11 ml of water and 1 reactive ml Zambelli. It is agitates and wearies in rest 10 minutes, after that we addition with 1 ml solution of ammoniac. East has agitated is for 10 minutes one compares visually colors it obtained with the scale standard in conformity with table nr 2:

*Table nr. 2 - Scale standard*

| Nr. of the test-tubes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard solution of sodium nitrite, ml | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| water, ml | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Zambelli reagent, ml | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ammoniac solution, ml | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| total volume, ml | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| nitrite contents of sodium, mg | 0 | 0,001 | 0,002 | 0,003 | 0,004 | 0,005 | 0,006 | 0,007 | 0,008 | 0,009 | 0,01 | 0,011 | 0,012 |
| nitrite contents mg correspond to 100 G produced | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

More use methods of knowing the optimal of experiment are with the assistance of the programs experimental of the factorial type. The key stage of technological lawsuit of manufacture of nape of the neck of pig is smokes out it of product. In this article we carry out the optimization of lawsuit of smokes out with the nape of the neck of pig. For that we are carries out 27 of test. Like variables we considered the technological following parameters: the NaCl contents, the temperature of ebullition of nape of the neck of pig and the time of smoke out, conforms the dates present in table nr. 3:

*Table 3. Values of the technological parameters*

| Nr.crt. | Parameters ($X_i$) | Value minim ($X_i^{min}$) | Value maxim ($X_i^{max}$) | $\Delta X_i$ | $X_i^{med}$ |
|---|---|---|---|---|---|
| 1. | NaCl, % | 5,5 | 13 | 3,75 | 9,25 |
| 2. | Temperature,˚C | 50 | 90 | 20 | 70 |
| 3. | Time, min. | 30 | 60 | 15 | 45 |

The functions answer to follow is:

$Y_1 = 14,64 + 0,63x_1 + 0,5x_2 + 0,25x_3 + 0,36x_1x_2 + 0,284x_1x_3 + 1,14x_1^2 + 0,75x_2^2$

$Y_2 = 25,16 + 2,93x_1 + 2,2x_2 + 0,36x_3 + 3,86x_1x_2 + 0,53x_1x_3 + 2,2x_1^2 + 6,66x_2^2$

$Y_3 = 12,4 + 3,6x_1 + 1,35x_3 + 1,25x_1x_3 + 0,42x_2x_3 + 3,6x_1^2 + 1,1x_2^2 + 2,75x_3^2$

## 3. RESULTS AND DISCUSSIONS

By put the mathematical model, we calculate the variables realities of the processes. Thus, one obtained the following actual values of the point optimal:

- for the function of $Y_1$ answer, it is has to say the pH: $X_1 = 5,92\%$; $X_2 = 67,6°C$; $X_3 = 119,85$ min.
- for the function of $Y_2$ answer, it is has to say the naked tale of ammoniac: $X_1 = 6,7\%$; $X_2 = 70,64°C$; $X_3 = 43,125$ min.
- for the function of $Y_3$ answer, it is has to say the nitrite contents: $X_1 = 13,97\%$; $X_2 = 72,06°C$; $X_3 = 36,9$ min.

Because this model cannot be presented in three-dimensional space one goes presented graphic according to two parameters, the third constant remainder with the value 0, which represents the center of field of selected variation.When the brine concentration is constant results the graphic following:

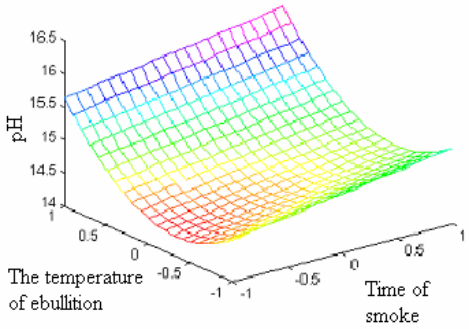


*Fig. 1. The influence of the temperature of ebullition and time of smoke on they pH of smokes meat, when the brine concentration is maintained in the field centers*

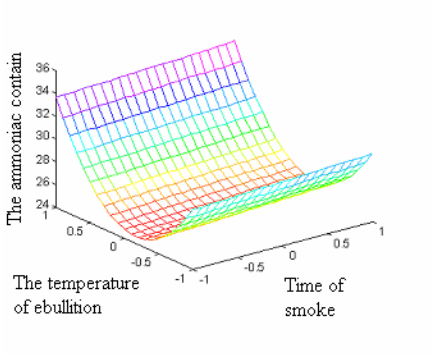


*Fig. 2. The influence of the temperature of ebullition and time of smoke on the ammoniac contain of smokes meat, when the brine concentration is maintained in the field centers*

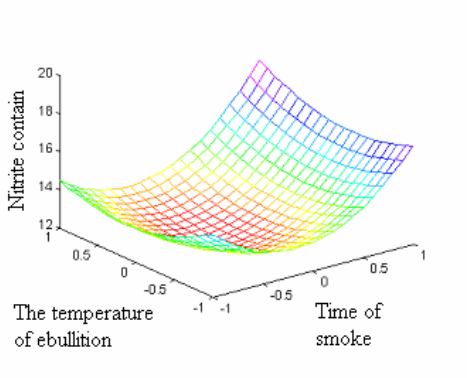


*Fig. 3. The influence of the temperature of ebullition and time of smoke on the nitrite contain of smokes meat, when the brine concentration is maintained in the field centers*

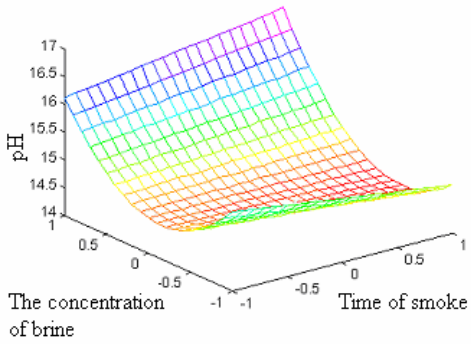


*Fig. 4. The influence of the concentration of brine and time of smoke on the pH of smokes meat, when the temperature of ebullition is maintained in the field centers*

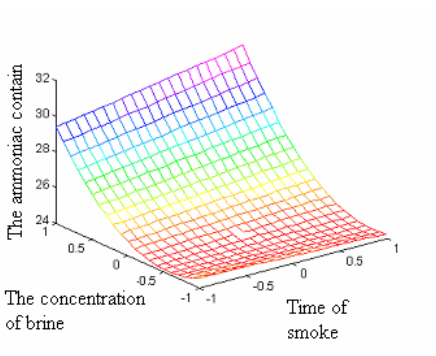


*Fig. 5. The influence of the concentration of brine and time of smoke on the ammoniac contain of smokes meat, when the temperature of ebullition is maintained in the field centers*

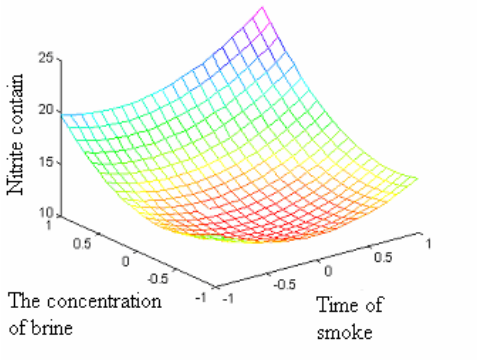


*Fig. 6. The influence of the concentration of brine and time of smoke on the nitrite contain of smokes meat, when the temperature of ebullition is maintained in the field centers*

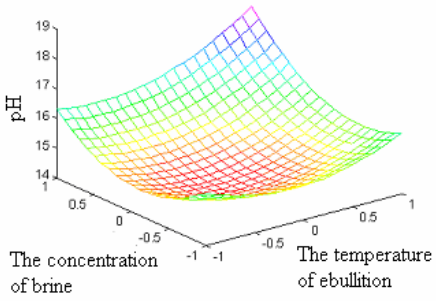


*Fig. 7. The influence of the concentration of brine and the temperature of ebullition on the pH of smokes meat, when the time of smoke is maintained in the field centers*

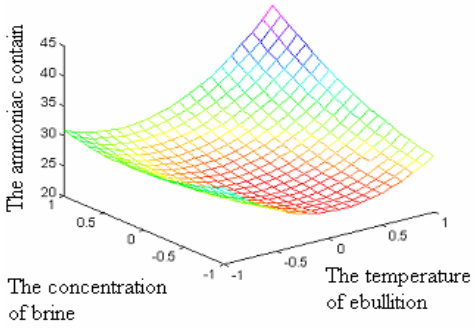


*Fig. 8. The influence of the concentration of brine and the temperature of ebullition on the ammoniac contain of smokes meat, when the time of smoke is maintained in the field centers*

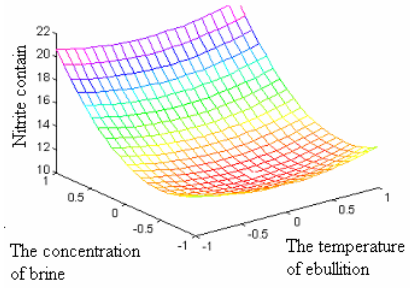


*Fig. 9. The influence of the concentration of brine and the temperature of ebullition on the nitrite contain of smokes meat, when the time of smoke is maintained in the field centers*

## 4. CONCLUSIONS

As one can also observes that analytical method of calculates equations that also by the chart one can conclusion same the conclusions.

We can mentions the fact that the graphic method is a method which does not give less information concrete but has the advantage of present in unit the effects of the parameters. By representations one can distinguish the roundness from surfaces, or is the case, but also the maximum and minimum fatty with the effects of the quadratic coefficients, but also at the point of inflection.
According to whether one can observes between the actual values of optima we can conclusion the following observations:

- the percent optimal of brine is framed in the field of 5,5 - 13% use in experimental program, therefore the field of variation should not be reconsiders;
- the temperature optimal of ebullition is framed in the same way in the field of 50 - 90°C uses in the experimental program not being necessary the reconsideration;
- time optimal of smoking is not framed in the interval of 30 - 60 min in the case of pH being necessary the reconsideration of field of variation, but in the case of ammonia contents and in the case of nitrite contents it is framed resulting useless the reconsideration from field.
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As conclusion general one can say that the nape of the neck of pig tends to smokes out optimal when the brine concentration and the temperature of ebullition are mention within the acceptable limits of initial field to choose.

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