

THE MICROBIAL ANALYSIS IN A BREAD FACTORY IN DAMBOVITA COUNTY

Magda Gabriela Bratu, Daniela Avram, Daniela Maracinaru

Valahia University of Targoviste, Faculty of Environmental Engineering and Biotechnology,
Unirii Bd. 18-24, 130082, Targoviste, Romania

E-mail: gabriela_brt@yahoo.com

Abstract

The aim of this paper is to determine the degree of microbial charge of the air in a bread factory. In food industry the air represents one of the biggest risks of microbiological contamination (with bacteria, yeast, mildew) of food products with repercussions in the sanitary area (intoxications) as well as in industrial area (modification of organoleptic properties of products, rebutting in fabrication, depositing problems, etc. For food industry it is very important that the air is not filled with microorganisms, because these microorganisms are moving in this space and they arrive on raw material and on the finished product. The product about to be fabricated can constitute the medium of culture for the multiplication of microorganisms if the conditions of temperature and humidity are favourable. Generally one must avoid as much as possible the phenomenon of stagnation of products in contact with surfaces and air. The bacteriological analysis of air happens usually and especially in rooms where the aerial transmitting of infections must be avoided because it constitutes a means of control of sanitary conditions. For the bacterial content of air there are no standards so far. There have been made propositions based on researches with the help of which we can estimate the degree of contamination of the air in production spaces. In food industry the number of mezofil germs must not surpass 600/ m³ and the fungus 300/m³.

Keywords: the degree of microbiological contamination, bacteria, yeast, mildew

1. INTRODUCTION

The atmosphere, although it does not have its own microbiote which can grow and develop in the air, contains permanent microorganisms. From the point of view of their nature they are viruses, bacteria and microscopic fungi. The great majority of these microorganisms come from soil, surfaces, water and vegetation.

The structure and density of microbial flora in the air changes where there exist organized human collectivities. Besides germs from the nature there appear also adapted germs to human and animal parasite (polluting microbiote). , their density in the air raising in function of the density of the population in that area. Also the rate between flora from nature and flora of human origin changes, the last being able to become predominant in condition of indoor when there exist dirt, agglomeration, and/or deficient ventilation.

There are in the atmosphere these two groups of microorganisms (flora from nature and flora of human and animal origin). Flora from nature plays an important role in the biological processes (fermentation, biodegradation of some substances, etc). They are important for

human pathology especially to the extent they can constitute allergens; also there exist in nature fungi and actinomycetes conditioned pathogene but the frequency of the diseases they produce is rare. Microorganisms of human origin or animal can be grouped in : saprofitas, conditioned pathogene and strict pathogene. The saprofitas ones do not play a role in the infection pathogeny, while germs conditioned pathogene and precisely pathogene can get specific diseases. In this case air can constitute a way of transmitting these diseases.

The air plays an epidemiological important role constituting the way of transmission for a great number of pathogene agents. The infectious diseases which transmit through air are first from the point of view of frequency at least in the temperate area of the earth. The survival in the air of pathogene germs depends on a series of factors . Generally the air does not offer conditions of development of microflora of human origin, its survival being limited by the existence of unfavourable conditions. As a consequence air temperature suffers great variations and only by chance it corresponds to optimal conditions for the metabolism of

mezophil flora (35-40⁰); nor air humidity does not fulfil the requests of bacteria from this group, as well as through its value generally low of relative humidity as well as through permanent oscillations that it presents.. Generally we can consider that the spores from microscopic fungi and spored bacteria have the biggest resistance following the vegetative forms of bacteria and viruses.

Indifferent of the forms under which they can be found in the air, pathogene germs and conditioned pathogene can provoke illness on exposed organisms, first of all by breathing the contaminated suspensions (drops, drops nuclei, dust), provoking illnesses of the respiratory system or some infectious illnesses that have as gate the respiratory system [1, 2].

2. MATERIALS AND METHODES

The bacteriological analysis of the air is not practiced but exceptionally in order to diagnosticate epidemics (respectively by putting in evidence the pathogene agent in the air in case of epidemics) because it does not have a significant meaning.

Because the density of germs from animals and humans is very low in the atmosphere of the units of production the method has as application domain the appreciation of sanitary conditions in the buildings.

Because it follows to establish the potential of airy transmitting of pathogene germs and conditioned pathogene germs, the bacteriological analysis of the air does not has the purpose of putting in evidence a certain pathogene microorganism but the measure in which the air is filled with microflora of human or animal origin. Thus we need to use certain bacteriological indicators of air contamination.

One of these indicators is represented by the total number of germs which develop at 37 degrees (the mezophil flora in the air) . The semnification of this indicator consists in the fact that it allows us to appreciate the measure in which the air is filled with microflora of human or animal origin because the incubation temperature of 37 degrees develops mainly this flora. The incidence allows to make

appreciations on the sanitary conditions in a room (ventilation, cleaning state) which influence the transmitting of infections through air. It presents the disadvantage that the temperature of 37 degrees does not selection only the mezophil flora existing a number sufficiently big of psihrophil germs that can develop at this temperature. By the simplification of the determination it remains the indicator the most currently utilized.

In this purpose we will prepare a series of materials:

- Boxes Petri sterile ;
- culture mediums
- agar tomato sauce for bacteria;
- agar malt for yeast and mildew;

In the room where the control takes place we distribute in more points four boxes : two with agar tomato sauce and two with agar malt before and after hygenisation.

All the boxes are opened and are left for crop between 5 and 15 minutes the case be. Usually the necessary time is 5 minutes.

In this time the microorganisms in the air deposit on the surface of the culture medium then the petri boxes are closed , packed and thermostated. The petri boxes with agar tomato sauce are thermo stated 48 hours at the temperature of 37⁰C and the petri boxes with agar malt are thermostated 5 days at the temperature of 25-28⁰C.

After thermostation we count the developed colonies and we make a calculation so in the end we appreciate the number of microorganisms/m³ of air.

Calculation Formula:

No. of microorganisms/m³ air

$No = A \times 100 \times 100 / (S \times \theta)$

A=medium number of collonies/petri box;

S=surface of the box (cm²) ;

θ =time coefficient.

In function of collecting, time θ can be :

-5 minutes $\theta=1$;

-10 minutes $\theta=2$;

-15 minutes $\theta=3$.

In conformity with Ordinul MS 976/1998 for approving Hygene Norms regarding production, processing and depositing,

transportation and unpacking of foods the maximal values admitted in the unities in food industry for microbiote are

For bacteria-maximum 600 microorganisms/ m³air;

- For yeats and mildew -maximum 300 microorganisms/ m³air [2,3,4].

3. RESULTS AND DISCUSSION

In order to have a practical exemple we effectuated a series of analyses of the air at the bread factory S.C.MARIOT B.M. COM. S.R.L.

- In the deposit of prime material
- In the producing rooms
- In the bread deposit

In figure 1 and 2 it is represented the bacteria / yeats and mildew filling, in the points of analysis before and after hygenisation.

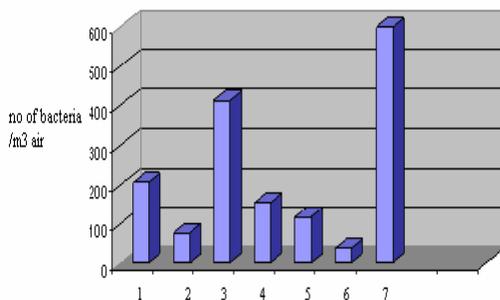


Fig.1 The bacteria filling in the points of analysis before and after hygenisation

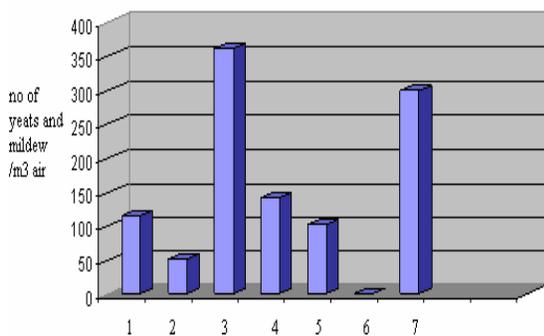


Fig. 2 The yeats and mildew filling in the points of analysis before and after hygenisation

1 - deposit of prime materials before hygenisation; 2- deposit of prime materials after hygenisation; 3- the fabrication room before hygenisation; 4—the fabrication room after hygenisation; 5 - bread deposit before

hygenisation; 6 - bread deposit after hygenisation; 7 - the value maximum

4. CONCLUSIONS

In point of work 1 respectively deposit of prime materials according to table 1 the total number of microorganisms / m³ does not surpass the maximal value admitted (322 collonies/ m³air before hygenisation and 129 collonies/ m³air after hygenisation, compared to 900 collonies/ m³air).

In the case of bacteria collonies the values obtained before 206 collonies/ m³air and after hygenisation 77 collonies/ m³air do not surpass the limit maximum admitted : 600 collonies/ m³air. Also in the case of yeast collonies and mildew the values registered do not surpass the value maximum admitted (116 collonies/ m³air, respectiv 52 collonies/ m³air, fata de 300 collonies/ m³air).

In point of work 2 according to table 1, respectively the fabrication room, the total number of microorganisms/ m³air before (774 collonies/ m³air), and after hygenisation (297 collonies/ m³air) nu depaseste valoarea max. admisa (900 collonies/ m³air).

In the case of bacteria collonies the values registered are situated under the limit maximum admitted of 413 collonies/ m³air and after hygenisation (155 collonies/ m³air).

The value registered before hygenisation in the case of yeast collonies and mildew surpass the limit maximum admitted (361 collonies/ m³air, fata de 300 collonies/ m³air).

In point of work 3 respectively bread deposit the total number of microorganisms is 76% lower before hygenisation and with 96% after hygenisation than the value maximum admitted. The values registered in the case of collonies of bacteria are 81% less than before and 94% after hygenisation than the value maximum admitted. In the case of collonies of yeast and mildew the values obtained are 66% lower before hygenisation and with 100% after hygenisation than the value maximum admitted where we notice the efficieny of hygenisation.

Table 1. The results obtained regarding the hygiene in the air in crop points

No. Crt.	Crop point	Height of crop	No. collonies si bacteria/turntable	No. collonies yeast and mildew/turntable	No. bacteria/ meter cube air	No. yeast and mildew/ meter cube air	No. microorganisms/ meter cube air
1.	Deposit prime material	Before hygenisation	16	9	206	116	322
		After hygenisation	6	4	77	52	129
2.	Room of fabrication	Before hygenisation	32	28	413	361	774
		After hygenisation	12	11	155	142	297
3.	Bread deposit	Before hygenisation	9	8	116	103	219
		After hygenisation	3	0	38	0	38
Media		Before hygenisation	19	15	245	193	438
		After hygenisation	7	5	90	65	155

As per whole unity from table 1 we notice that the total number of microorganisms/m³air is 34% less before hygenisation and after with 79%.

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