OPERATIONAL MANAGEMENT OF SANOGENEOUS NUTRITION. CASE STUDY COVASNA COUNTY

O.B. OPREA

Abstract: *The paper presents the benefits of bread with grape seed flour, because of its nutrional properties. There was made a case study in Covasna County, taking into account the calculation of the material balance, the choice of the necessary equipment and their location in the production unit. The need for final products was calculated starting from the number of tourists that check in into the Mercur hotel and the number of patience that are using the facilities of the heart hospital, and their need of bread consumption.*
The calculations show the sustainability of the chosen technological solution, which can be applied in medium or large size units.

Keywords: *sanogeneous, functional food, grape seed, nutrition;*

1. Introduction

For each category of food there are several practical and useful ways to measure portions that provide sufficient amounts of essential nutrients for the body without predisposing to fattening. Normally, the amount of calories needed in a woman's diet is 2,000 kilocalories, and in men 2,500 kilocalories. A 500g bread contains about 2,000 kilocalories, so it have concluded that the bread requirement per person per day is 170 g, which means 680 kilocalories. [11, 13].

According to the above-mentioned data, there was made a statistic, of which it been found out that, on average, in all the hotels in Covasna, 5,820 tourists are checked in, including 1,400 during the week and 4,420 at the end of the week, and 20,400 of people per month at the hospital. Starting from the fact that a person requires 170 g of bakery product per day for a balanced diet, during the week's travel for 71 people at hotels and 680 people at the hospital it is needed 127.670 g of bakery product per day and at end of week 190.740 g of bakery product / day of weekend. So in a month, we get a total of 2,553,400 g of bakery product / weekly, 1,907,400 g of finished product / weekend, totaling 4,460,800 g of product per month.

Product range:

- White bread- 500 g
- White bun- 50 g
- Bread from grape seed flour- 500 g
- Bun from grape seed flour- 50 g

2. Management elements in sanogeneous nutrition

Calculation of material balance

Daily production: 100 kg
Ingredients used in the dough production in% for 100 kg.

Preparation of raw materials for 74 kg flour:

$$T_{MP} = C_F+C_D+C_S+C_{A+}C_{FSS}$$

Where:
T_{MP} – the amount of raw material [kg];
C_F – the amount of flour [kg];
C_D – the amount of yeast [kg];
C_S – the amount of salt [kg];
C_{FSS} – the amount of grape seed flour [kg];
C_A- the amount of water [kg];

$$T_{MP} = 66,6+1,71+1,3+7,4+47$$
$$T_{MP} = 124, 01 \text{ kg}$$

Raw material dosage:

$$T_{MPA}= A_{MPA}$$

Where:
T_{MPA} – the amount of raw material [kg];
A_{MPA} – raw material mixture [kg];

124,01 = 124,01 kg.

Dough kneading:

$$A_{MPA}= C_{AF}$$

Where:
A_{MPA} – raw and auxiliary material mixture [kg];
C_{AF} – the amount of kneaded dough [kg];
124,01 = 124,01 (Kneaded dough);

Dough fermentation:

$$C_{AFE}= C_{AF} – P_{FE}$$

Where:
C_{AFE} - the amount of dough resulting from the fermentation process [kg];
C_{AF} - the amount of kneaded dough [kg];
P_{FE} - losses from the fermentation process [kg];
P_{FE} =1%
P_{FE} =1%*C_{AF} = 1% * 124,01 = 1,24 kg
P_{FE} = 1, 24 kg

C_{AFE}= 124,01– 1,24 = 122,76 kg
(Fermented dough)

Dough processing:
C_{APR}= C_{AFE} - P_{PR}

Where:
C_{APR} - the amount of dough resulting from processing [kg];
C_{AFE} - the amount of dough resulting from the fermentation process [kg];
P_{FE} - losses from processing [kg];
P_{PR} =2%
P_{PR} =2% * C_{AFE} = 2% * 122,76 = 2,45 kg
P_{PR} =2,45 kg

C_{APR}= 122,76 – 2,48 kg= 120,28 kg
Dough baking process:
C_{PF}= C_{APR} - P_C

Where:
C_{PF} – the quantity of final product resulting from the baking process [kg];
C_{APR} - the amount of dough resulting from processing [kg];
P_{FE} – losses during the baking process [kg];
P_C=5%
P_C=5% * 120,28 =6,01 kg
P_C= 6,01 kg

C_{PF}= 120,28 – 6,01 = 114,27 kg
(Final product)
Bread cooling process:
C_{PR} = C_{PF}- P_R

Where:
C_{PR} – the amount of final product resulting from the cooling process [kg];
C_{PF} – the quantity of final product resulting from the baking process [kg];
P_R – losses resulting from cooling process [kg];
P_R=3%
P_R=3% * 114,27 kg= 3,42 kg
P_R= 3,42 kg

C_{PR} = 114,27 – 3,42 kg= 110,85 kg
(Final cooled product)
Packing – Storage:
C_{PA-D}= C_{PR} - P_{A-D}

Where:
C_{PA-D}– the amount of final product resulting from the packing-storing process [kg];
C_{PR} – the amount of final product resulting from the cooling process [kg];
P_{A-D}– losses from packing-storing process [kg];
P_{A-D}=0,2%
P_{A-D}= 0,2% * 110,85 = 0,22 kg
P_{A-D}= 0,22 kg

C_{PA-D}= 110,85 – 0,22 = 110, 63 kg
(Packed and stored final product)

Specific consumption:
-for white wheat flour:
CS =1/R*66, 6=1/110, 85*66,6=0,6 kg/kg bread
-for yeast
CS =M/R=1, 71/110, 85=0,015 kg/kg bread
-for water
CS =M/R=47/110, 85=0,42 kg/kg bread
-for salt
CS =M/R=1,3/110, 85=0,01 kg/kg bread
-for grape seed flour
CS =M/R=7,4/110, 85=0,06 kg/kg bread

Technological efficiency:
R = (100 +MA)-(PF + PA + PC+ PR +P)

Where:
MP – raw materials;
PF – losses during the fermentation process;
PA –losses during processing;
PC –losses during baking;
PR – losses during cooling;
P –losses resulting from packing-storing process;
P_{FE} =1%*C_{AF} = 1% * 124,01 = 1,24 kg
P_{PR} =2% * C_{AFE} = 2% * 122, 76 = 2,45 kg
P_C=5% * 120, 28 = 6,01 kg
P_R=3% * 114, 27 kg= 3,42 kg
P_{A-D}= 0,2% * 110,85= 0,22 kg
R=(66,6+1,71+1,3+7,4+47)-
(1,24+2,45+6,01+3,42+,022)
R= 124,01-13,34
R= 110,67/74 kg flour

Preparation of raw materials for 100 kg of finished product:
T_{MP} = C_F+C_D+C_S+$C_{A+}C_{FSS}$

Where:
T_{MP} – the amount of raw material [kg];
C_F - the amount of flour [kg];
C_D – the amount of yeast; [kg]
C_S - the amount of salt [kg];
C_{FSS} – the amount of grape seed flour [kg];
C_A- the amount of water [kg];

T_{MP} = 60,17+1,54+1,17+6,68+42,46
T_{MP} = 112, 03 kg
Raw material dosage:
T_{MPA}= A_{MPA}

Where:
T_{MPA} – the amount of raw material [kg];
A_{MPA} – raw material mixture [kg];

112,03 = 112,03 kg.

Dough kneading:

$$A_{MPA} = C_{AF}$$

Where:
A_{MPA} - raw and auxiliary material mixture [kg];
C_{AF} - the amount of kneaded dough [kg];

112,03 = 112,03 (kneaded dough);

Dough fermentation:

$$C_{AFE} = C_{AF} - P_{FE}$$

Where:
C_{AFE} - the amount of dough resulting from the fermentation process [kg];
C_{AF} - the amount of kneaded dough [kg];
P_{FE} – losses resulting from fermentation process [kg];
P_{FE} =1%
P_{FE} =1%*C_{AF} = 1% * 112,03 = 1,12 kg
P_{FE} = 1, 12 kg

C_{AFE}= 112, 03– 1, 12 = 110, 91 kg
(Fermented dough)

Dough Processing:

$$C_{APR} = C_{AFE} - P_{PR}$$

Where:
C_{APR} - the amount of dough resulting from processing [kg];
C_{AFE} - the amount of dough resulting from the fermentation process [kg];
P_{FE} – losses resulting from processing [kg].
P_{PR} =2%
P_{PR} =2% * C_{AFE} = 2% * 110,91 = 2,21 kg
P_{PR} =2, 21 kg

C_{APR}= 110,91 – 2,21 kg= 108,7 kg

Dough baking process:

$$C_{PF} = C_{APR} - P_C$$

Where:
C_{PF} – the quantity of final product resulting from the baking process [kg];
C_{APR} - the amount of dough resulting from processing [kg];
P_{FE} – losses resulting from baking process [kg].
P_C=5%
P_C=5% * 108,7 =5,43 kg
P_C= 5,43 kg

C_{PF}= 108,7 – 5,43 = 103,27 kg (Final product)

Bread cooling process:

$$C_{PR} = C_{PF} - P_R$$

Where:
C_{PR} – the amount of final product resulting from the cooling process [kg];
C_{PF} – the quantity of final product resulting from the baking process [kg];
P_R – losses resulting from cooling process [kg];
P_R=3%
P_R=3% * 103,27 kg= 3,09 kg
P_R= 3,09 kg

C_{PR} = 103,27-3,09 kg= 100,18 kg
(Cooled final product)

Packing-storing process:

$$C_{PA\text{-}D} = C_{PR} - P_{A\text{-}D}$$

Where:
C_{PA-D}– the amount of final product resulting from the packing-storing process [kg];
C_{PR} – the amount of final product resulting from the cooling process [kg];
P_{A-D}– losses resulting from the packing-storing process [kg];
P_{A-D}=0,2%
P_{A-D}= 0,2% * 100,18 = 0,2 kg
P_{A-D}= 0,2 kg

C_{PA-D}= 100,18 – 0,2 = 99,98 kg
(Packed and stored final product)

Specific consumption:

-for white wheat flour

CS =1/R*66,86=1/99,98*66,85=0,66 kg/kg bread

- for yeast

CS =M/R=1,54/99,98=0,015 kg/kg bread

- for water

CS =M/R=42,46/99,98=0,42 kg/kg bread

- for salt

CS =M/R=1,17/99,98=0,01 kg/kg bread

- for grape seed flour

CS =M/R=6,68/99,98=0,06 kg/kg bread

Technological efficiency:

R=(100 +MA)-(PF + PA + PC+ PR +P)

Where:
MP – raw materials;
PF – losses during the fermentation process;
PA – losses during dough processing;
PC – losses during baking;
PR – losses during cooling;
P – losses during packing-storing;
P_{FE} =1%*C_{AF} = 1% * 112,03 = 1,12 kg
P_{PR} =2% * C_{AFE} = 2% * 110,91 = 2,21 kg
P_C=5% * 108,7 = 5,43 kg
P_R=3% * 103,27 kg= 3,09 kg
P_{A-D}= 0,2% * 100,18= 0,2 kg
R=(60,17+1,54+1,17+42,46+6,68)-
(1,12+2,21+5,43+3,09+0,2)
R= 112,02-12,05
R= 99,99/66,86 kg flour

Table 1. *Quantities of bakery products manufactured per month [1]*

Unit	Occupancy rate during the week	Occupancy rate at the end of the week	Gram product/ day during the week	Gram product/ day at the end of the week	Gram product /month during the week	Gram product /month at the end of the week	Total product/ month
HOTEL	71	442	12.070	75.140	241.400	751.400	4.460.800
HOSPITAL	680	680	115.600	115.600	2.312.000	1.156.000	
TOTAL	751	1.122	127.670	190.740	2.553.400	1.907.400	

Table 2. *Monthly production [1]*

Product	Gram product/ pcs	Gram product/ day during the week	Total pcs/day during the week	Gram product/day at the end of the week	Total pcs/day at the end of the week	Gram product/ month during the week	Total pcs/month during the week	Gram product/ month at the end of week	Total pcs/ month at the end of the week	Total pcs of product/ month
White bread	500	26.172	52	39.102	78	523.447	1.047	391.017	752	1.799
White bun	50	37.663	753	56.268	1.125	753.253	15.065	562.683	11.254	26.319
Bread from grape seed flour	500	26.172	52	39.102	78	523.447	1.047	391.017	752	1.799
Bun from grape seed flour	50	37.663	753	56.268	1.125	753.253	15.065	562.683	11.254	26.319
Total		127.670		190.740		2.553.400		1.907.400		

Table. 3. *Material balance [1]*

Raw materials	Quantites for 74 kg flour (110,67 kg final product/ 74 kg flour)		Quantities for 100 kg final product	
	Amounts in U.M.	Quantities in %	Quantities in U.M.	Quantities in %
Wheat white flour	66,6 kg	90	60,17 kg	90
Grape seed flour	7,4 kg	10	6,68 kg	10
Compressed yeast	1,71 kg	1,71	1,54 kg	1,71
Salt	1,3 kg	1,3	1,17 kg	1,3
Water	47 L	47	42,46 L	47

Table 4. *Raw materials for bakery products from grape seed flour and wheat white flour [6]*

Type	U.M.	Quantity	Price [lei/Kg]	Value (lei)
Wheat white flour	Kg	1.342,03	1,15	1.543,33
Grape seed flour	Kg	148,99	27,40	4.082,32
Compressed yeast (Pakmaya)	Kg	34,35	4,6	158,01
Salt	Kg	26,1	0,35	9,13
Water	L	946,13	2,9/m^3	2,74
TOTAL		2.497,6		5.795,53

Table 5. *Raw materials for bakery products from wheat white flour [6]*

Type	U.M.	Quantity	Price [lei/Kg]	Value (lei)
Wheat white flour	Kg	1.491,02	1,15	1.714,67
Compressed yeast (Pakmaya)	Kg	34,35	4,6	158,01
Salt	Kg	26,1	0,35	9,13
Water	L	946,13	2,9/m^3	2,74
TOTAL		2.497,6		5.795,53

Table 6. *Consumables [2]*

Type	U.M.	Quantity	Price [Lei]	Value [Lei]
Thermal insulating cotton gloves up to 200 ° C to remove products from the oven. A pack of 10 pcs	buc	1	50	50
White coats	buc	2	10	20
Brushes	buc	4	15	60
Disposable lid of white thin vlies, for food industry 100 pcs	buc	1	28	28
Paper napkins, 21.5 x 25 cm, 200 pieces / set, green	buc	2	3,72	7,44
Plastic boxes for transporting bread with a capacity of 25pcs of bread of 500g/box*	buc	335	15	5.025
Diesel**	L	150	4,24	636
TOTAL			**106,72**	**801,44**

* It was calculated that 335 plastic vessels will be need because of the total quantity of bread, 5% will not be transported but will be produced for the restaurant, so from the 3,598 pieces produced 3,418 pieces will be transported, for which 135 vessels are required and 180 will remain for the Mercury Restaurant. Of the 52,638 buns, 50,006 will be transported to the other hotels and the cardiology hospital, which requires 200 crates and 2,632 buns will stay at the hotel.

** It is assumed that the loaded car has an average consumption of 9L /100km and 7L not loaded. By delivering in the Covasna resort daily, the driver makes 50 km, it is calculated an average of 5 l of fuel per day, so the monthly fuel consumption is 150 liters [10].

Table 7. *Fixed asset depreciation (purchase value>2500 lei)*

Name	Purchase value	Quantity	Duration of liquidation (years)	Monthly liquidation
Flour sifter type SF100	12.780,64	1	10	106,50
Agitator with fixed tank type SILVER 50	7.858,64	1	10	65,48
Hydraulic divider type sq20	28.989,67	1	10	241,58
Fermentation type TELBO	19.347,89	1	10	161,22
Steam oven type RING model MSR 4	58.535,43	1	10	487,79
Car for transport (Volkswagen Transporter T5)	17.855,1	1	5	297,58
TOTAL	301.986,27	1		1360,15

3. Technical and constructive ellements regarding the establishment of a bakery factory with sanogeneous products. Case study covasna balnear network

In the balnear network of Covasna sanogenic foods could be approached, which have positive effects in the following cases: allergies, bronchial asthma, rheumatism, dermatological diseases; neurosis, insomnia, psychosomatic diseases; parasitosis, chronic infections, viral diseases; Chronic intoxication, hypercholesterolemia; gastro-duodenal ulcer, enterocolitis, biliary dyskinesia; deficiencies in vitamins and minerals; states of exhaustion and stress [15].

The Covasna balnear resort is a complex tourist product, competitive on the domestic and foreign tourism market. It is an internationally renowned balnear resort; Covasna is situated at an altitude of 564 m at the foot of the western slope of the Breţcu Mountains, in the southern part of Târgu Secuiesc, 31 km from Sfântu Gheorghe and 60 km from Brasov.

Due to the specific geological conditions, Covasna is rich in springs of various mineral waters and natural CO2 emissions. In 1882, mineral water from the Horgasz spring was awarded at Trieste. Researches made over time by specialists and researchers, as well as the results of balnear treatments, have permanently imposed Covasna among the most important health facilities [18].

So Covasna is a balnear resort with a tradition of treating cardiovascular diseases with natural factors: carbonated mineral water, natural mofetes (post-volcanic carbon dioxide emissions), as well as rich in negative aerosols, due to the forests from surroundings.

The variety of natural cleansing agents as well as facilities in the treatment base, offer the possibility of simultaneous treatment of several diseases, which confers the great complexity of the resort [10].

The "MERCUR" complex in Covasna belongs to a large investor in Bucharest, TTS (Transport Trade Services) SA, which was built and put into use in the beginning of December 2015, with a special architecture designed to accommodate Romanian and foreign tourists, and treatment base.

The hotel's maximum capacity is 57 rooms. And because business tourism is practiced, the hotel also offers a specially designed meeting and event space, two conference rooms (100 seats) with adequate facilities.

Table 8. *Calculation of the surface required for storing the raw material*

Raw materials	Specific upload	Needed upload
Flour, Grape seed flour	650 kg/m^2	5m^2
Yeast	120kg/m^3	1 m^3
Salt	150 kg/m^2	1 m^2
TOTAL		9 m^2

The constructive solution chosen in terms of both the construction and the products is to achieve the objectives related to:

- Introducing an innovative product on the market, namely bread from grape seed flour;
- Daily production of 52 pieces (26,172 g) of 500 g white bread, 753 pieces of white bread bun 50 g (37,663 g) the same quantities of bread from grape seed flour products during the week, and at the end of the week, production of a total of 78 pieces of white flour bread of 500 g (39,102 g), 1,125 white bread buns of 50 g (56,268), respectively 78 pieces of grape seed flour bread (39,102 g) and 1,125 grapes seed flour buns (56 268g);
- Allows sufficient work space;
- The machines are located in accordance with the manufacturing process and the space between the machines varies according to the working process of the machine, the space required for the maneuvers.

The following machines and equipments are presently in the restaurant's kitchen [9]:

1. TED-AF14EKOMTN Double refrigerated cabinet - capacity 1400 l;
2. FKR-GN600FISH Refrigerated cabinet for fish - GN2/1;
3. TED-AF07EKOMTN Refrigerated cabinet - capacity 700 l;
4. TED-AF07EKOMTN Freezer cabinet - capacity 700 l;
5. TED-TF02EKOGN Cold table with 2 doors - capacity 310 l;
6. VES-FKG371 Vertical refrigerating cabinet - capacity 35 l;

7. TED-TF03EKOGN Cold table with 3 doors - capacity 400 l;
8. MET-TAVR/20 Hot-ventilated cupboard;
9. TED-AF06EKOMTTNPV Refrigerated cabinet - capacity 600 l;
10. EUT-ST805ST2 Dishwasher - SteelTech18-00;
11. TED-TF04EKOGN Cold table with 4 doors - capacity 620 l;
12. ANG-FX101E3 Mixed electric oven capacity 10 trays GNII;
13. ANG-190TP0 - Gas cooker;
14. COZ-BTEB718H Hot bain-marie mass – capacity 5xGNII;
15. ANG-190FT2G - Fry-top gas supply surface striated;
16. ANG-190GRG BBQ with ceramic rock;
17. ANG-091FR3E Electric fryer;
18. ANG-091FRIG Gas feed fryer;
19. Vessels, utensils, machinery.

Thus, the mini factory has a total of 120 m2 of which:
• Storage space of raw materials: 12 m2;
• Production department: 77 m2;
• Final product cooling section: 1.8 m2;
• Final product storage space: 12 m2;
• Dressing room: 11 m2;
• Bathroom: 3 m2;

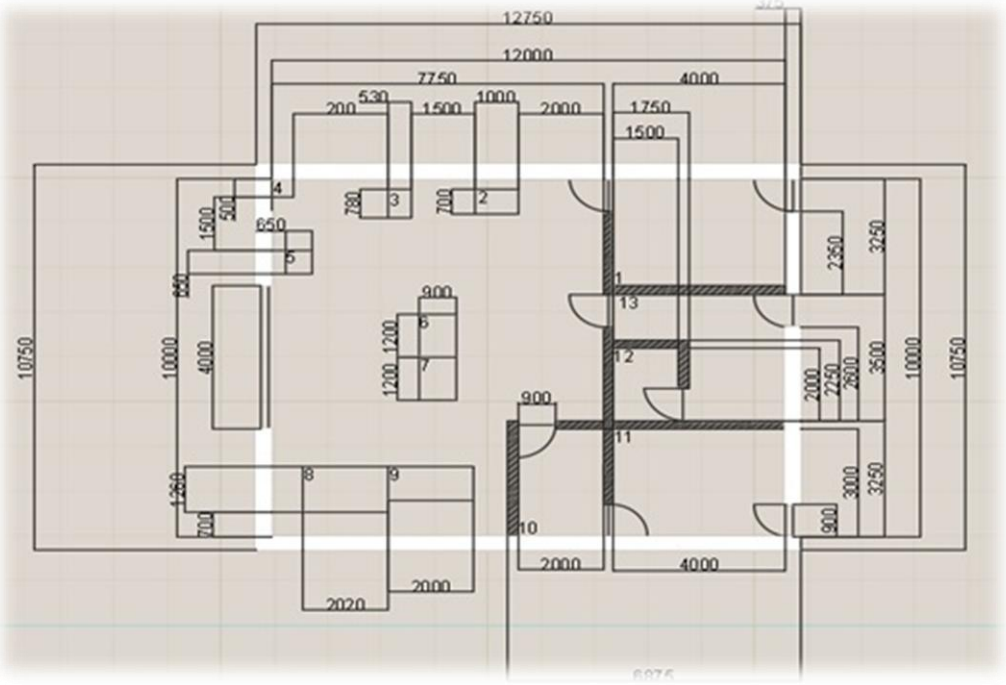

Fig. 1. *Mini factory outline. Mercur Hotel [6]*

Conclusions

Bread is a common food product in almost all the world's societies.
Prepared bread from grape seed flour is considered a functional food and has the following benefits for human health:

- Antioxidant;
- Self-destruction of cancer cells;
- Detoxification;
- Protects joints;
- Stimulates anabolism;
- It is recommended to use it in special diets (for weight loss, for diabetics, for people with heart problems).

Considering the technology of bread making with the addition of grape seeds, the economic calculations required for the implementation were carried out in a public food unit in Covasna. This is intended, on the one hand, for the in-house consumption of hotel and restaurant customers, and on the other hand it provides products for the medical units in the area and for those with different health problems.

The calculations show the sustainability of the chosen technological solution, which can be applied in medium or large size units.

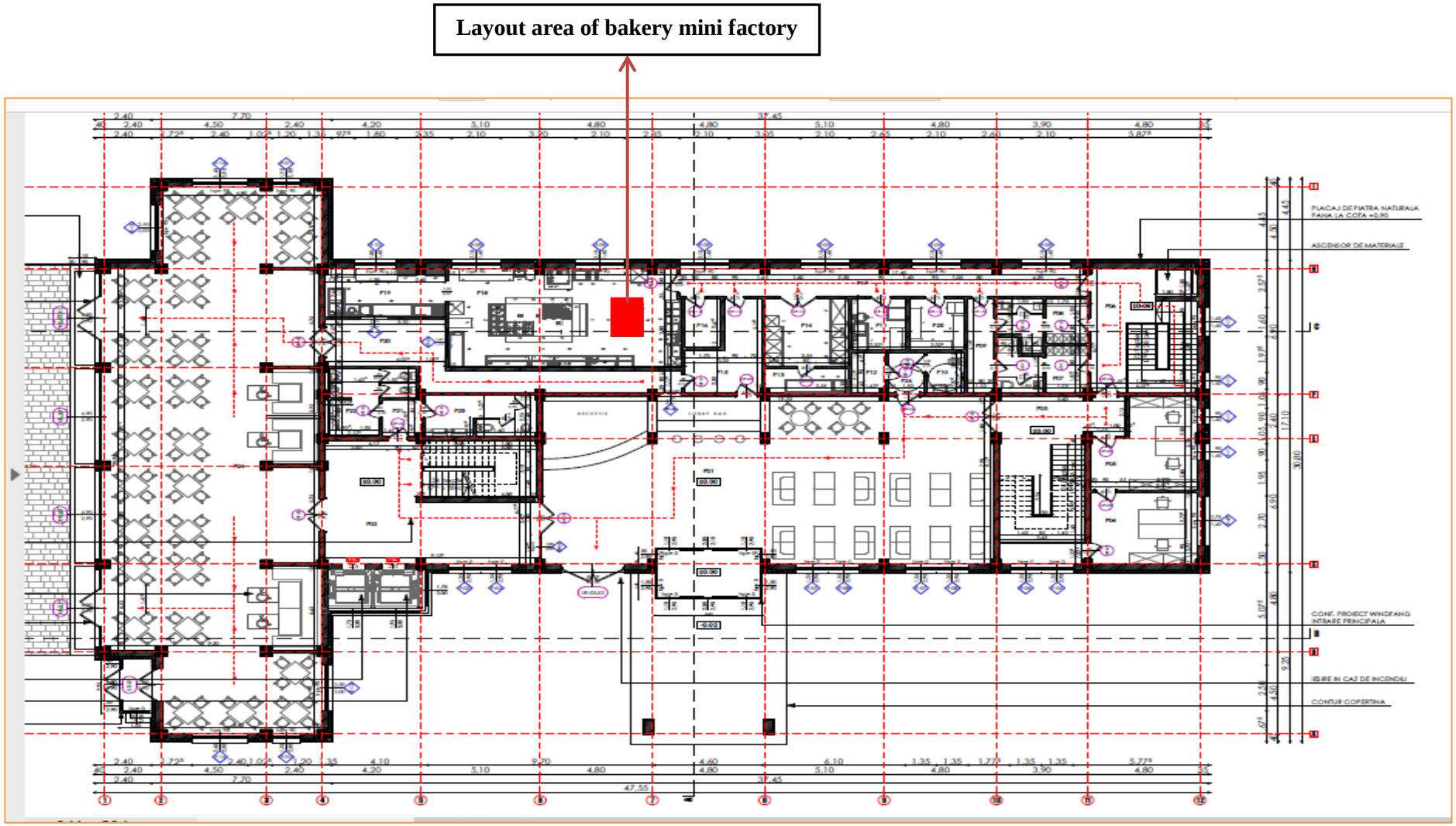

Fig. 2. *Ground floor Mercur Hotel [16]*

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