

TEHNOLOGICAL LINE FOR OBTAINING PRE-PACKED UNDER VACUUM MEAT, PRESERVED BY UV IRRADIATION AND REFRIGERATION

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Abstract

This document aimed to present a technological line designed in order to introduce the mixed preservation procedure (UV irradiation and refrigeration) in production of the pre-packed under vacuum meat in order to increase the preservation's duration by 100%.

Keywords: pre-packed meat, UV irradiation of meat

INTRODUCTION

Several researches' studies regarding the possibility to increase the preservation's duration of the meat and meat products using some mixed procedures of refrigeration and UV irradiation in certain conditions have been conducted. After all these studies it was reached to the conclusion that if at the carved meat it is used together with the refrigeration, a irradiation of the entire external surface of the meat for 10 minutes at 10 cm between the source and product, with mercury lamp of low intensity, LF 106S (UV irradiation of a 254 nm wavelength) it can be observed a increase of the preservation's duration by 100%. This increase is happening in the conditions of preserving the main qualitative characteristics of meat and do not induce transformations that to be toxic for the human organisms.

STUDY OBJECTIVE

This study aimed to design a production line of the pre-packed under vacuum meat, beef and pork, by re-equipping an existing line, adding in the production flow a UV irradiation band, obtained through computer assisted design in certain conditions.

RESULTS AND DEBATES

It was having in view the design of a production line of pre-packed under vacuum pork and beef with weight of 500 g, 1000 g and 2000 g, with a medium capacity of 1620 kg/ 8

hours (considered at the weight of 1 kg/package), in order to correspond to production capacities already existing in factories with medium capacity.

In this way the design take into consideration the inclusion and the integration the pre-packed meat technological line of an UV irradiation equipment of the meat resulted from carving before pre-packing under vacuum in thermo-contractible foils, followed by their preservation in cooling space by refrigeration. Initially, in a production section for pre-packed beef or pork, that is functioning at the conditioning temperatures (8-10⁰ C), are compulsory necessities the next equipment for a medium mechanization:

- ♦ An aerial line for transport of pork semi-carcass or beef quarters refrigerated;
- ♦ A dicorotor saw for breaking by sectioning of the big anatomical portions;
- ♦ A band for carving- un-bone - choosing built from stainless plate, provided with plastically blats with a processing capacity of approximate 20 t carcass / 8 hours, the other resulted meat having like designation the processing for meat products, canned food or market;
- ♦ A pre-packing under vacuum equipment with this destination, in thermo-contractible foils from special plastic materials;
- ♦ Inoz carriages of 200 kg for collecting the carved meat from carving band;
- ♦ Reel carriages provided with stainless plates for taking-over the pre-packed meat from the under vacuum packing machine and its transport for cooling by refrigeration;

- ♦ A refrigeration tunnel for the pre-packed meat.

For the new designed production line, for the pre-packed meat bound for mixed preservation by UV irradiation and refrigeration, is necessary the inclusion in the production flow of an UV irradiation equipment, which has to be in compliance with the next requirements:

1. To have the processing capacity correlated with the other equipments capacities from the technological line;
2. To be included in the line in the designed area so it can assure the continuity of the production process and it can satisfy the technological requirements. It has to be mentioned that the UV irradiation operation has to be performed after carving and before the pre-packing because the UV irradiation penetrate the plastic foils only in a very small percent, totally inefficient from meat preservation point of view.
3. Repositioning of some equipments from the processing technological line has to be in conformity with the labor protection norms regarding the assurance of the access couloirs, of the distances between the equipments or between the equipments and walls.
4. To re-correlate the utilities necessary (electricity, washing water);
5. To calculate the labor necessary (qualified operators for the UV irradiation equipment);
6. To assure the protection equipment necessary for the staff, which operate with the irradiation band (protection glasses and gloves).

The UV irradiation equipment was calculated by computer-assisted design (image 1), obtaining a computerized module, which can be modeled and transformed in different prototypes with new characteristics depending of the production technologies requirements.

The model studied is composed from a band executed from stainless gauze, which is moving in the active area through a reflectories

aluminum tube, provided on all around with UV 106 S lamps, put on a frame and having the possibility to adjust the position and the distance between the irradiation source and product (the pre-packed meat). The processing capacity of this model is approximate 2 t/ 7.5 hours and the dimensions are 2000 mm length and 500 mm width.

The equipment boundary lines are 2500 mm length, 900 mm width and 1500 mm high.

One person, qualified for the adjustment of the equipment too, operates it.

Due to the presence of the reflectories tube and to some rubber or plastic materials curtains, installed to the loading and evacuation of the product, the irradiation equipment does not have any danger for the section staff.

The location of the new pre-packing meat bound for the mixed preservation by refrigeration and irradiation is presented in image 2.

CONCLUSIONS

- ♦ Introduction in the production line of an UV irradiation equipment, realized by computer-assisted design, allow the production of new superior variants, capable to satisfy the producer requirements
- ♦ By re-equipping (which means low investments) it is succeed to assure the pre-packed meat production with higher preservation qualities because the prolongation of meat preservation duration is 100%;
- ♦ The costs of investment are very low, which lead to the possibility to recuperate the funds in a short period of time.

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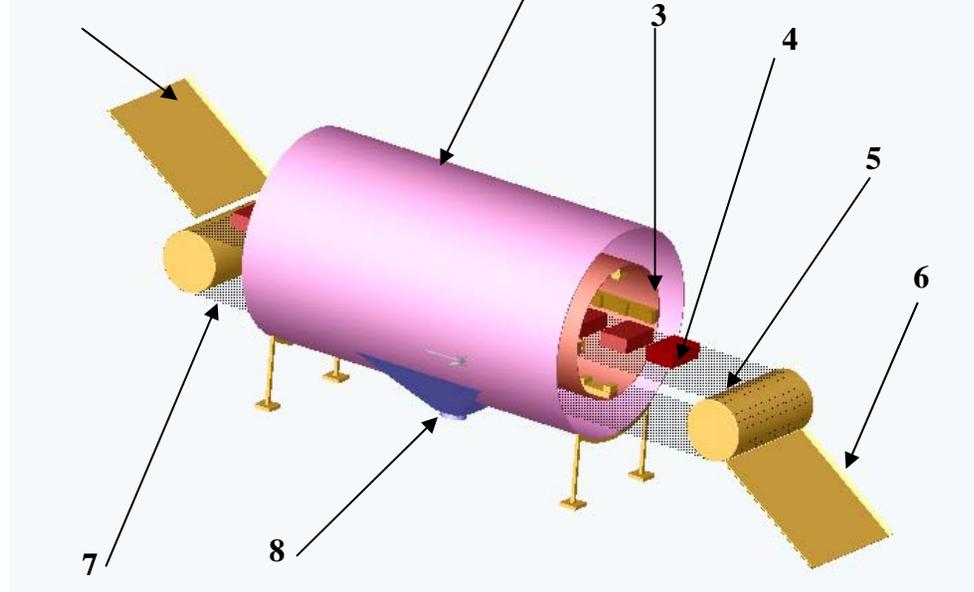


Image 1. 1. Loading device; 2. Rolling carcass; 3. Refractories tube; 4. UV irradiation lamp; 5. Semi product; 6. Evacuation device; 7. Transport band from stainless gauze; 8. Collecting funnel

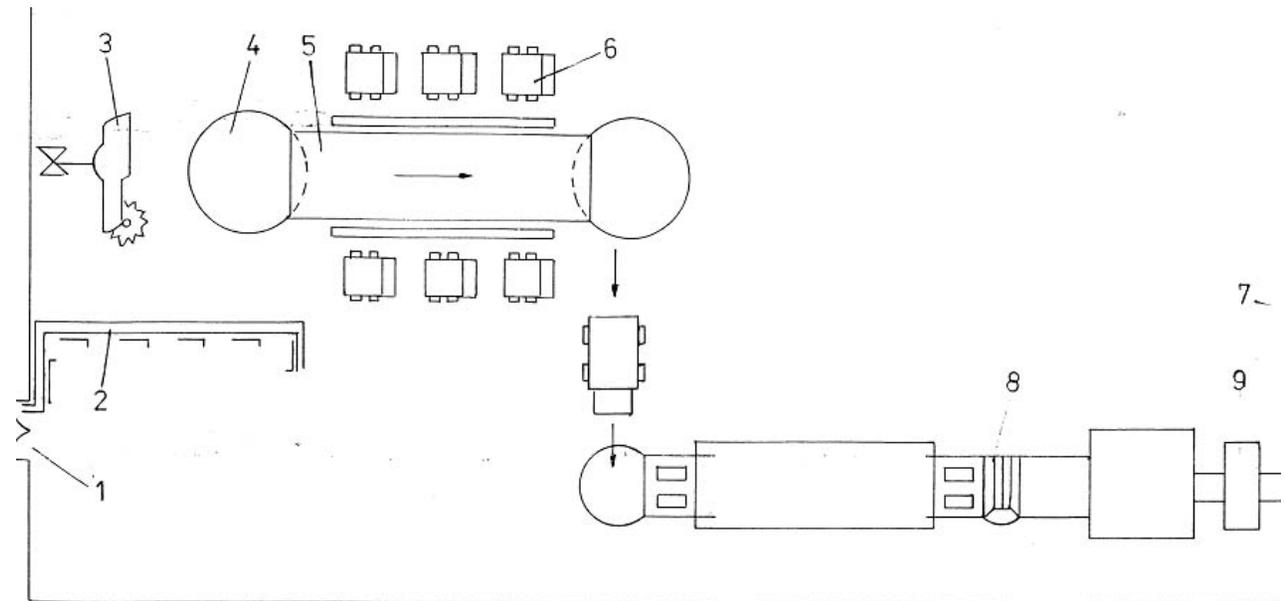


Image 2. 1. Door for loading raw materials 2. Aerial line for carcasses transport 3. A dicorotor saw 4. Table for meat 5. Stainless curving band 6. Carriage 7. Door for evacuation of the products 8. UV irradiation band 9. Pre-package under vacuum equipment