A GOOD OPENING IN USING OF THE PERMEABLE POLYMER SAUSAGE CASINGS

Kazanski M., Pereplyotchokov I., Mouradian M.

ATLANTIS-PAK Co. Ltd., B.Sadovaya str., Rostov-on-Don, Russia

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Background

Recently in some countries of Europe the number of cases of disease of beef bovine spongiform encephalopathy has increased. It has resulted not only in appreciable reduction of consumption of beef, but also promoted introduction of additional restrictions on the use of the products received in processing beef carcasses on slaughterhouses. In particular it concerns natural animal and fibrous sausage casings. Manufacturers of sausages began be afraid to apply such casings sins in this case it is difficult to trace the material from which they are made. Therefore requirements for the sausage casings prepared from on alternative raw material have increased.

Objective

In these conditions a good solution can be the replacement of natural animal and fibrous sausage casings by the artificial sausage casings made from thermoplastic polymeric materials (for example, polyamide). Now a lot of cooked and liver sausages, frankfurters and various pastes are produced from such casings. Polymeric sausage casings have high mechanical strength, ability to shrink and both low water and smoke permeability. It allows to preserve sausages longer and to make products with a pleasant gentle taste. However such casings have a big disadvantage - they are moisture and components of a smoke impermeable. Therefore, when using polymeric casings, it is impossible to apply traditional technology and to prepare smoked sausages with an appetizing crust. Such sausages are very popular with the majority of consumers. It has served as a stimulus to develop polymeric sausage casings from moisture and a smoke permeable films.

Materials and methods

It is possible to divide smoke and vapor permeable films into two groups: porous and non porous [1]. Not all of these films are suitable for the manufacturing of sausage casings. In the literature the following requirements are given for sausage casings which are used in making smoked sausages and frankfurters:

1. big mechanical strength and ability to keep the form after filling sausage with mince;
2. it should be shrinkable
3. stability at contact with sausage meat;
4. low oxygen permeability
5. high vapor permeability.

Certainly, porous films will be permeable for smoke and moisture, but low mechanical strength and inability to shrink do not allow to make sausage casings from such films. Besides high oxygen permeability will not allow to keep ready products in these casings for a long time. It is preferable, that artificial sausage casings were made from continuous selective –permeable films. These films can be produced with additives to the basic material which will made the film permeable for various components. Erk and Korlatzki suggest to use as such an additive ionomer polymers [2], but these films have low vapor permeability. Therefore, the sausages made in such casings, contain a lot of moisture and their taste differ from habitual to consumers of the traditional fried products, and high cost of ionomer polymers limits the application of such casings.

Hisazumi et.al. found out that the copolymer of polyethylene and vinyl alcohol additive in the basic material also increases permeability of polymeric films [3]. However, casings with such additive react with moisture contained in sausage mince. It results in deterioration of a packaging of products. It also informed, that introduction in polymeric material up to 20 % plasticizer also increases of smoke permeability. Casings with the big contents of plasticizer have one serious disadvantage - low strength. It can result in breaks of a casing at the moment of sausage filling. Besides, migration of plasticizer on an external surface of a casing will result in deterioration of print and migration of plasticizer inside of the sausage can give a product e unusual taste.

Permeable films described above are not absolutely suitable for manufacturing sausage casings. Therefore, we wanted to receive a strong, shrinkable low cost film, permeable for moisture and smoke. Changing conditions of crystallization of extruded polymer and parameters of the subsequent stretch we prepared a film with the changed morphology of submolecular structures. The sample casing were subsequently made from these films.

Results and Discussion

Prepared permeable sausage casings were tested for vapor permeability, oxygen permeability and permeability for a phenolic fraction of smoke. For comparison artificial polyamide and fibrous casings were taken (see tabl. 1). The table shows that vapor and phenolic fraction permeability of our casings is close to that of fibrous casing while oxygen permeability has remained at a level of barrier polyamide casing permeability.

Conclusion

As a result of the change of morphology submolecular structures, the polymeric film, permeable for vapor and smoke is made. But oxygen permeability with the given film has remained at a level of barrier polyamide casings permeability. Now the firm " Atlantis - Pak" on the basis of the films with the changed structure described above begins to produce begins produce permeable sausage casings "Amismok" and "Amilux". Application of these casings has big prospects as it allows to make fried smoked sausages by the traditional technology only in natural animal and fibrous

sausage casings earlier.

Table 1

	The sample casing	The barrier polyamide casing	The fibrous casing
Vapor permeability, g/ sq.m day	960	25	1200
Permeability for a phenolic fraction of smoke, g/ sq.m day	135	-	160
Oxygen permeability, sm3/sq. m atm. day	22	20	800

References

1. M. Mulder «Introduction to membrane technology», Moscow, «Mir», p.89
2. EP 0139888
3. US 4851245