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THE USE OF OM MEAT FROM CARP FOR THE PRODUCTION OF SHAPED PRODUCTS IN FISH PROCESSING®

Wykorzystanie mięsa OM z karpia do produkcji wyrobów formowanych w przetwórstwie rybnym®

Key words: carp processing, meat recovery, fish burgers.

The purpose of the research carried out as part of a several-year project “Development of a program for the use of modern, comprehensive carp processing technologies in aquaculture farms and fish processing plants”, was to determine the technological suitability of meat recovered from carp backbones, and from sorter, mechanically damaged carp fillets. The manufacturing processes and recipe composition of burger-type molded products were designed with the addition of meat separated from the carp’s backbones (50%). Selected chemical indicators in the raw material were determined and in the proposed molded articles.

Słowa kluczowe: przetwórstwo karpia, odzysk mięsa, burgery rybne.

Celem przeprowadzonych badań w ramach kilkuletniego projektu „Opracowanie programu wykorzystywania nowoczesnych, kompleksowych technologii przetwarzania karpia w gospodarstwach akwakultury i w zakładach przetwórstwa ryb”, było określenie przydatności technologicznej mięsa odzyskanego z kręgosłupów karpia (MOM), a także z wysortowanych, czyli uszkodzonych mechanicznie filetów z karpia. Zaprojektowano procesy wytwarzania i skład recepturowy wyrobów formowanych typu burgera z dodatkiem mięsa OM z karpia (50%). Przeprowadzono oznaczenia wybranych wskaźników chemicznych w surowcu i w proponowanych wyrobach formowanych.

INTRODUCTION

Mechanically separated meat (MOM) from carp backbones, obtained after filleting or flaking, is classified as a product with altered internal structure of the muscle tissue that can be obtained by mechanically or manually separating meat from bone parts, bones and skin [4].

Research carried out at the Sea Fisheries Institute – National Research Institute in Gdynia has shown that the most effective method of recovering meat from carp backbones after filleting or flaking is mechanical separation using drum separators [2].

The use of OM meat is a highly rational and efficient way to use the by-products from filleting or flaking whole fish. Mechanical separation ensures a high recovery of the edible meat. Depending on the type and treatment of the spine, the efficiency of OM meat recovery from the spine after filleting or flaking carp using the Baader 603 drum separator is [2]:

- 50% (raw backbones after filleting),
- 40% (raw spines after flattening),
- 69% (steamed backbones after filleting),
- 58% (steamed spines after flattening).

The yields shown refer to the weight of the raw or steamed meat recovered from the backbones to the weight of the raw or steamed backbones prior to separation.

MATERIALS AND METHODS

The research material used for technological trials was meat from sorted, mechanically damaged, skinless carp fillets and OM meat obtained from the spine after filleting carp. Due to the laboratory nature of the work, OM meat was obtained for testing by manual method. It does not change the fact that the presented technology for the production of molded products based on OM meat can be used in fish processing plants, with the use of mechanical separation of meat from bone parts.

As part of the research, manufacturing processes and the recipe composition of molded products such as fish burgers were designed, and laboratory tests were carried out to produce the proposed product.

In the recovered OM meat from carp and in meat from sorted skinless fillets, as well as in the produced samples of molded products, the following was marked dry matter (weight method), protein content (Kjeldahl method in the Kjeltec

System apparatus), the total fat content (Soxhlet method) and the content of mineral compounds in the form of ash (weight method after sample mineralization) and table salt (NaCl). All determinations were made in triplicate.

RESULTS AND DISCUSSION

The quality and subsequent technological suitability of OM meat from carp are influenced primarily by the freshness of pre-treated fish. In order to ensure the highest sensory quality of the manufactured molded products, OM meat obtained from the backbones directly from the filleting of whole fish should be used. In the case of later use of OM meat, in order to extend its technological usefulness, it is recommended to store it at a temperature below -18°C for no longer than six months.

Table 1 shows the basic chemical composition of the recovered OM meat from carp and meat from sorted carp fillets without skin. Chemical composition tests were also carried out on raw OM meat immediately after it was recovered from the spine.

Table 1. Basic chemical composition [%] of carp OM meat and skinless carp fillet meat

Tabela 1. Podstawowy skład chemiczny [%] mięsa OM z karpia oraz mięsa z filetów karpia bez skóry

Component [%]	OM meat from carps	Carp meat without skin
Dry weigh	21,17±1,39	25,01±0,43
Fat	2,79±0,12	7,67±0,40
Protein	16,62±0,27	16,96±0,45
Total ash	0,97±0,01	0,90±0,05
NaCl	0,20±0,00	0,20±0,00

Source: The own study

Źródło: Badania własne

The obtained results of the basic chemical composition (Table 1) classify the OM meat from carp at a level similar to the meat from sorted fillets of carp without skin. One should only pay attention to the lower fat content of OM meat from carp compared to meat from sorted carp fillets without skin. This difference is classified as approximately 5%. In conclusion, it can be stated that the composition of OM meat from carp and meat recovered from sorted skinless fillets in the form of molded products creates a product that is a source of valuable and essential for the human body polyunsaturated fatty acids (PUFA), including fatty acids from the n-3 family.

The finished product is fish burgers based on OM meat from carp and meat from sorted carp fillets without skin, mixed in the set proportions (50% / 50%) with additives, breaded, packed in thermoformed multi-layer foil trays and sealed by heat sealing. Then frozen and stored at a temperature below -18°C (Photo 1).

The recipe composition of the product includes: minced meat - 82%, breadcrumbs - 16%, fish seasoning - 1.0%, salt - 0.5%, pepper - 0.5% [1].



Photography 1. Carp burgers.

Fotografia 1. Burgery z karpia.

Source: The own photography

Źródło: Fotografia własne

The process of producing carp meat burgers included:

1. pre-treatment of chilled fish (evisceration, head removal, filleting, skinning),
2. obtaining the appropriate spatial structure of the individual stuffing components in a grinder with a mesh diameter of 3 mm,
3. homogenization of the stuffing mass composition with the least possible damage to the structure of the minced meat OM,
4. giving a specific form, made of multi-ingredient stuffing, fish burgers,
5. breading,
6. hermetic packing,
7. freezing and storage of manufactured products at -18°C .

The proposed range includes fish burgers based on OM meat basic chemical composition was determined from carps and meat from sorted fillets without skin. The obtained results are presented in Table 2.

Table 2. Basic chemical composition [%] of molded products such as fish burgers

Tabela 2. Podstawowy skład chemiczny [%] wyrobów formowanych typu burgery rybne

Component [%]	Molded products with carps
Dry weight	34,35±0,16
Fat	6,93±0,03
Protein	15,62±0,09
NaCl	1,70±0,01

Source: The own study

Źródło: Badania własne

The research results show that carp burgers belong to the group of high-protein, low-fat products. The protein content is around 16%, while the fat content is around 7% in the entire

product. The increase in salt content was due to the addition of this substance as the basic seasoning emphasizing the taste of the product and constituting a preservative.

The produced fish burgers were characterized by an oval shape evenly sized, flat, slightly wavy, battered surface. The color was characteristic of the product, the taste and smell harmonized after frying, typical of the additives used. The texture is firm, juicy, no visible bones. The sensory quality of the product was determined at a high level on the basis of the assessed differentiators and was consistent with the table included in the non-obligatory standard PN-A-86769 [3].

SUMMARY

The assessment of the attractiveness of a product is influenced by the first impression of the consumer, most often caused by the evaluation of the unit packaging. On the other hand, the overall evaluation of the product is influenced by the features of sensory quality, such as taste, smell, color of the product or the texture of the fish. Produced fish burgers based on OM meat from carp and meat from sorted skinless fillets were characterized by a pleasant, essential smell, typical color and intense taste. The texture was defined as juicy, brittle.

In conclusion, it should be said that it was used in the production of burgers from carp, raw materials are a valuable source of nutrients, and their structure is suitable for the production of molded products.

The developed processes for the production of new products based on carp meat are an innovative concept of their use for food purposes. The production of batches of carp burgers in laboratory conditions makes it possible to implement the developed technology in fish processing plants.

PODSUMOWANIE

Na ocenę atrakcyjności produktu wpływ ma pierwsze wrażenie konsumenta, najczęściej spowodowane oceną opakowania jednostkowego. Natomiast na całościową ocenę produktu wpływają wyróżniki jakości sensorycznej, jak np. smak, zapach, barwa produktu czy tekstura ryby. Wyprodukowane burgery rybne na bazie mięsa OM z karpia oraz mięsa z wysortowanych filetów bez skóry charakteryzowały się przyjemnym, esencjonalnym zapachem, typową barwą oraz intensywnym smakiem. Teksturę określono jako soczystą i kruchą.

Podsumowując, należy stwierdzić, że wykorzystane do produkcji burgerów z karpia surowce są w pełni wartościowym źródłem składników odżywczych, a ich struktura nadaje się do wytworzenia produktów formowanych.

Opracowane procesy wytwarzania nowych produktów na bazie mięsa karpia są innowacyjną koncepcją ich wykorzystania na cele żywnościowe. Wyprodukowanie w warunkach laboratoryjnych partii burgerów z karpia daje możliwość wdrożenia opracowanej technologii w zakładach przetwórstwa rybnego.

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