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Developing and Improving the Production Technology of Canned Cold Smoked Rainbow Trout Fillet

A.M. Aghababyan
Armenian National Agrarian University
aghababyan-87@mail.ru

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ABSTRACT

Fish and fish products are foods of high nutritional value. The current research aimed at improving the technology of manufacturing canned products from cold-smoked rainbow trout fillets has a certain scientific-practical significance.

Physicochemical indicators of the mentioned product were studied in the experimental and control samples. It has been revealed that energy value of the product is higher in the experimental sample than in control one, due to the content of proteins and fats.

HACCP system research has indicated that safety and biological indicators of the finished product meet the accepted standards. Therefore, the product is safe and can be offered to consumers.

Introduction

Nowadays, there are a lot of piscicultural farms, which provide the required raw materials in processing industry. Fish processing is of great importance as an alternative to irreplaceable food. It is necessary to consider natural, resource, market, economic and social factors of the environment for the sustainable development and reproduction of fish processing industry.

In-depth knowledge of fish processing technology enables to produce functional foods for different age groups of population and supply a range of high-quality food.

In the Republic of Armenia, a great number of rainbow trout is bred and it is expedient to use pond rainbow trout in the production of canned food (Beglaryan and Aghababyan, 2021). Cold smoking is one of the canning methods.

Thus, conducting scientific research on the improvement of canning technology from cold smoked rainbow trout fillet has a certain scientific-practical significance, which confirms the relevance of the current work.

Materials and methods

Analytical methods (physicochemical, biochemical, safety, microbiological), accepted standards, technical conditions

and instructions approved by the relevant organizations were used in the work (Levanidov, 1987).

Experimental and theoretical research was carried out at the ANAU Chair of Animal-Based Food Products Processing Technology throughout 2019-2020 and the rainbow trout fillet served as a study subject.

The moisture content in the product was determined according to Gost 31448-98, fat content – through acid method with oil meter (Gost 23042-2015), the amount of minerals – through ashing method according to Gost 31727-2012, while the content of protein (water-soluble and salt-soluble) was determined via calculation method, and the presence of toxic elements was identified in accordance with Gost 26932 – 86.

One of the main quality indicators of the discussed food is its salt content, since the food is lightly brined. The amount of sodium salt was determined through Mohr's method per GOST 27207-87. The method is based on the precipitation of chlorine ions by means of silver ions in the presence of potassium chromate in the neutral medium. Metrological studies of food quality management were performed according to the method of A. Malkhasyan.

When implementing HACCP (hazard analysis and critical control points) system, the documentation content of the performed work should be reflected for each implementation stage. In the development and implementation of HACCP system, it is necessary to distinguish two main stages: the initial stage and basic stage.

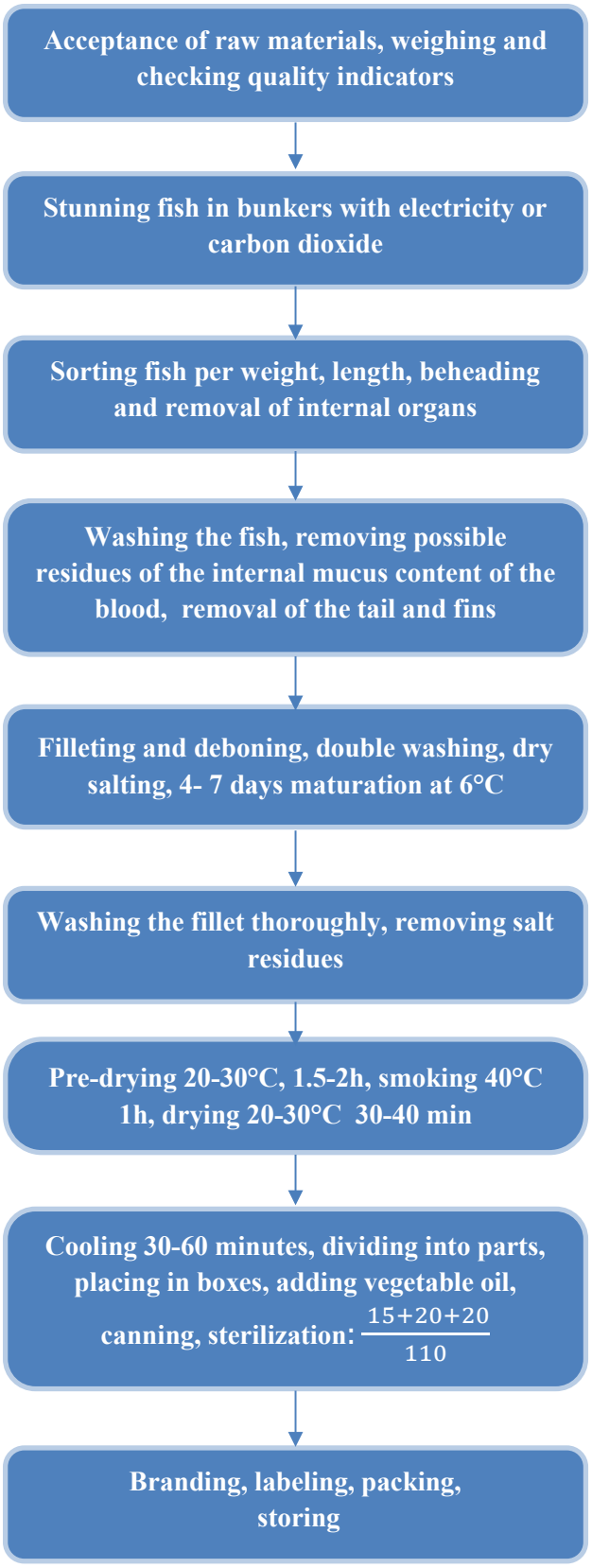
Results and discussions

The production of canned cold smoked rainbow trout fillet was implemented in line with the presented technological scheme.

The canned cold smoked rainbow trout has been produced according to the recipe described in Table 1.

The stored cans of cold smoked rainbow trout fillet were taken as a control variant (Korobeynik, 2002). Physicochemical indicators of control and experimental samples are introduced in Table 2.

The table data indicate that energy value of the product in experimental sample is higher than that of in the control sample (experimental sample – 282.06 kcal, control sample – 268.89 kcal), due to the content of proteins and fats in the product, meanwhile the summary of degustation results testified that the experimental samples had a specific pleasant taste and smell.



Scheme. Technological procedures of canned cold smoked fish production (*composed by the author*).

Table 1. The recipe of finished product per 100 kg raw stuff*

Main raw stuff	Spices and materials	Quantity, g
Trout fillet	Table salt	1200
	Sugar	40
	Seed pepper	400
	Aromatic pepper	400
	Laurel leaf	400
	Coriander seed	400
	Vegetable oil	1900

*Composed by the author.

Table 2. Physicochemical indicators and energy value of finished food product*

Indicators	Experimental (%)	Control (%)
The amount of minerals and salt	5.4±0.06	6.4±0.06
Moisture content	53.6±0.8	54.3±0.8
Oil content	23.0±0.5	22.0±0.5
Protein content	18.0±0.3	17.3±0.3
Energy value /kcal/	282.06	268.89
Energy value /kJ/	1118.3	1167.7

*Guidelines for Laboratory Work, 2000.

Food safety regulation is the key to the prevention of health problems ensuring that the food product is manufactured and used according to sanitary norms. The hazard analysis and critical control points system will guarantee consumers effective health protection measures throughout food production, processing and delivery cycle (Batikyan and Aghababyan, 2016). In our experiments safety indicators were studied according to the normative document and then according to the results of scientific experiments (Table 3). The obtained indicators comply with the standards stated for the given products upon the documents evidencing that they are safe and can be recommended to the consumers.

Conclusion

Based on the afore mentioned statements it can be concluded that technologies for rainbow trout canning production were thoroughly studied. The technology of manufacturing canned product from rainbow trout fillet through cold smoking was justified and improved.

Physicochemical indicators of control and experimental samples were researched. It has been confirmed that in the experimental samples the amount of minerals and salt was higher than in the control samples, while the moisture and oil contents were lower than in the control samples.

In the result of scientific experiments via implementation of HACCP system it has been proved that the recorded safety and bacteriological indicators for canned cold smoked rainbow trout fillet meet the standards of normative document. Thus, the mentioned product is safe and can be recommended to the consumers.

Table 3. Determination of safety indicators*

Indicator	Allowable level, mg/kg, no more /according to N2-III-4.9-o1-2010/	Lightly salted, smoked canned food	Compliance
Dioxins	0.000003	3-8	In compliance
Toxic elements			
Plumbum/lead	0.5	0.01	In compliance
Arsenium	0.1	Not detected	In compliance
Cadmium	0.05	Traces	In compliance
Mercury/quicksilver	0.03	Not detected	In compliance
Pesticides			
HCH (α-, β-, γ-) isomers	0.1	0.05	In compliance
DDT and its metabolites	0.1	0.03	In compliance
Radionuclides, bq/kg			
Cesium-137	160	100	In compliance
Strontium-90	50	20	In compliance

*Composed by the author.

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