ANALYSIS OF POTENTIALS FOR USE OF OSTRICH MEAT FOR PRODUCTION OF DIETETIC FOODS AND PRODUCTS FOR CHILD NUTRITION

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Introduction

At the present time due to deficiency of supplies of domestic beef and pork there is a trend in Russia of mass raising and processing of such exotic fowl as ostrich. The feeding of this fowl doesn't require incorporation in their diets of stimulants, hormone preparations, antibiotics, etc. The investigations of ostrich meat carried out according to sanitary and hygiene rules, related to foods for children (these are the most stringent requirements) have shown that it is a high quality and ecologically pure raw material. These factors are important in the increase of demand of these raw materials. The increasing distrust in traditional kinds of meat, industrially produced abroad with the use of multiple chemical supplements, and some dangerous diseases of domestic animals, for example bovine spongiform encephalopathy occurring in the last time, also contribute to this.

There are several kinds of ostrich in the nature (African ostrich, Australian emu, Australian cassowary, American nandu). African ostrich is mostly spread in Russia (live weight: males – 120-150 kg, females – 80-120 kg). Nestlings reach market weight 10-14 months after birth. The age optimum for slaughter is 10-16 months. It is found that after slaughter the carcass weight (lean meat, fat, bones) is on the average 58.6% of the live weight.

Materials and methods

The meat, obtained after slaughter of ostrich, raised in the farms in the South of Russia was chosen as the object of investigations. The investigations of chemical and biological value, and safety indices were conducted according to generally accepted methods. Amino-acid and fatty acid balance of ostrich meat was calculated with the help of computer modeling according to academician N.N.Lipatov.

Results and discussion

The ostrich meat by its chemical composition and biological value is a highly nutritional and dietetic product, which is easily assimilated by human's organism. Results of sensory evaluation have shown that ostrich meat has dark red color, and by its taste it resembles lean beef or veal (depending on age). The structure of muscle fibers is similar to that of beef muscle fibers. The broth after meat cooking is transparent, with insignificant amount of fat drops on the surface, by taste and smell it is similar to veal broth.

Safety is the most important factor when choosing meat raw materials for the manufacture of child nutrition products. In connection with this the investigations of the contents of toxic elements, pesticides, antibiotics and radionuclides in the meat of ostrich, raised in the farms of the South of Russia were investigated.

The obtained results are significantly lower than the permitted levels, established by Sanitary rules and norms 2.3.2.1078 for meat raw materials, used in the manufacture of child nutrition products.

The analysis of results of the investigations of food value of ostrich meat suggests about the high content of protein in the samples and low content of fat as compared to other kinds of meat.

Table 1. Chemical composition of ostrich meat

Content	Meat				
	Ostrich*	Turkeys	broilers	rabbits	beef
Moisture, %	76.00	68.0	63.8	66.7	64.4
Protein, %	21.7	18.5	18.7	21.1	18.7
Fat,%	1.2	11.7	16.1	11.0	16.0
Carbohydrates,%	-	0.6	0.5	-	-
Cholesterol, mg/100 g	32	59	73	79	86
* - results of own investigations of the authors					

The data of calculations of amino acid and fatty acid balance of ostrich meat suggest that the fatty acid composition of ostrich meat contains all the essential amino acids. The minimum amino acid score is higher than that of the other kinds of meat, that suggests about high amino acid balance. As is seen from the data the meat of ostrich is not inferior to the traditional kinds of meat used for manufacture of child nutrition products.

Table 2. Amino acid and fatty acid balance of ostrich meat

Index	Ostrich meat*	Broilers meat	Rabbit meat	Turkey meat	Beef	Mature breast milk (reference)
Contents of essential amino acids, g/100 g of protein:						
Isoleucine	4.85	3.90	4.19	4.76	4.20	4.60
Leucine	8.00	7.16	8.42	8.42	7.95	9.80
Lysine	11.00	8.70	10.67	8.94	8.54	7.50
Methionine + cystine	3.20	3.56	3.68	3.18	3.87	4.00
Phenylalanine+ tyrosine	7.50	7.02	7.74	7.23	7.81	8.60
threonine	4.45	4.45	4.43	4.45	4.32	4.60
tryptophane	1.25	1.60	1.59	1.64	1.13	1.50
valine	4.50	4.65	5.16	4.71	5.86	5.20
Minimum score, %	81.0	73.0	55.0	79.0	66.0	100
Coefficient of comparable redundancy, g/100 g of product	9.8	10.42	17.64	6.92	12.42	1.0
Content, % to the sum of fatty acids in meat						
Σ Saturated fatty acids	46.41	32.53	38.72	34.60	44.5	41.78
Σ monounsaturated fatty acids	39.81	50.91	34.88	34.40	46.4	43.03
Σ polyunsaturated fatty acids	13.77	18.39	24.72	31.40	3.5	12.42
Linoleic acid	10.45	16.33	21.52	28.10	2.50	10.85
Linolenic acid	0.48	1.18	2.88	1.40	0.87	0.62
Arachidonic acid	2.34	0.49	0.32	1.90	0.13	0.95
Coefficient of fatty acid balance RL, Share of units						
1 = 1 … 3	0.91	0.79	0.72	0.64	0.63	1.00
1 = 1… 6	0.78	0.73	0.48	0.53	0.53	1.00
* - results of own studies of the authors						

The results of the investigation of fatty acid composition of ostrich meat show, that the ratio of saturated, monounsaturated and polyunsaturated fatty acids approaches the reference. The food value of meat lipids to a large extent depends on the amount of essential polyunsaturated fatty acids – linoleic and arachidonic. The amount of linoleic acid of ostrich meat approaches the reference value, and as far as the level of arachidonic acid, very important for a human being, ostrich meat several times surpasses the reference value.

Conclusions

Comparative evaluation of different kinds of meat raw materials has shown that ostrich meat by its food and biological value is not inferior to the main kinds of meat raw materials and can be recommended for manufacture of the products for feeding children, preventive, dietetic and curative nutrition in case of iron-deficiency anemia, hypotrophy, obesity, protein deficiency and other pathological disorders.