

# Influence of Spruce Needle Extractives Feeding on Broiler Chicken Meat Composition

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The natural biologically active substances complexes can be extracted by nonpolar organic solvent from spruce needles biomass and it could be utilized in animals diet, to substitute synthetic preparations. The major active ingredients in the biological active substance of pine and spruce needles total extract are – chlorophyll and its derivatives, carotenoids, vitamin E, vitamin K, phytosterols, polyphenols, squalene, sodium salts of resin acids (balsamic compounds) and essential oils (Andersons et.al., 1983; Ievins et.al., 1976). Mentioned before biologically active substances have wide therapeutic and prophylactic influence on poultry and human organism. By including determined biologically active substances contained by spruce needles extracts in the poultry diet it is transferred from feed to poultry meat, including desirable for human organism substances – fatty acids, antioxidants, vitamins.

**The research aim** was to evaluate spruce needles total extractives and separately neutral extract group substances influence on broiler chickens productivity and meat quality.

## Experimental design

Group	Basic diet	Additives of biologically active substances complex
1st group – control	(BD)*	-
2nd group – trial	(BD)*	Total extractive substances from spruce needles biomass
3rd group – trial	(BD)*	Neutral extractives substances from spruce needles biomass

\* the content complies with the standard requirements

## Results

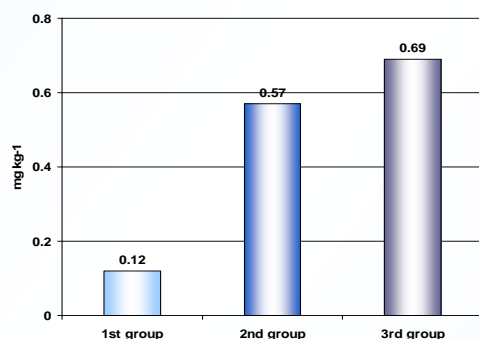
### Productivity of broiler chickens

Parameters	1st group	2nd group	3rd group
Live weight at the age of 42 days, g	3,123.33	3,360.29	3,258.00
% to control	–	7.58*	4.31*
Live weight gain per day, g	73.32	78.97	76.48
% to control	–	7.71	4.31
Feed conversion, kg kg <sup>-1</sup>	1.91	1.79	1.77
% to control	–	6.28	7.33

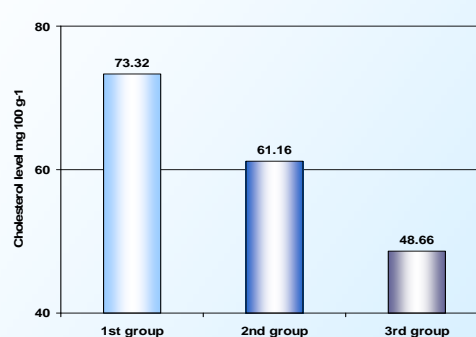
### The quality of broiler chickens meat

Parameters	1st group	2nd group	3rd group
Fatty acids, % of total lipids:			
Saturated (SFA)	24.06	22.60	22.51
Monounsaturated (MUFA)	45.80	48.39	48.90
Polyunsaturated (PUFA)	26.58	27.71	27.73
∑ ω-6 fatty acids	21.27	21.83	21.89
including Linoleic acid	19.27	20.38	20.33
∑ ω-3 fatty acids	5.31	5.88	5.84
± to control	–	+ 0.57	+ 0.53
including Eicosapentaenoic (EPA)	0.45	0.56	0.58
including Docosahexaenoic (DHA)	1.14	1.19	1.36
∑ (ω-6) : ∑ (ω-3)	4.0 : 1	3.71 : 1	3.75 : 1

### Content of carotenoids in broiler chickens' meat



### Content of cholesterol in broiler chickens' meat



**Conclusions:** Applying additives of spruce needles total and neutral extractives substances in broiler chickens' diet in comparison with control group:

- elevates broiler chickens' living weight for sale by 4.31–7.58%, decrease feed conversion by 6.28–7.33%;
- improves meat quality by increasing carotenoids content by 0.45–0.57 mg kg<sup>-1</sup> ω-3 fatty acids total content by 0.53–0.57% including Eicosapentaenoic acid (EPA) by 0.11–0.13% and Docosahexaenoic acid (DHA) by 0.05–0.22% and by decreasing cholesterol level in meat by 11.16–23.66 mg 100 g<sup>-1</sup>.