

EFFECT OF HERBAL EXTRACT ON REPRODUCTION FUNCTIONS OF BOARS

Rozkot M.¹, Opletal L.², Lustyková A.¹, Frydrychová S.¹, Daněk P.¹, Václavková E.¹

¹*Institute of Animal Science Prague Uhřetěves, Division of Pig Breeding, Kostelec nad Orlicí, Czech Republic*

²*Charles University in Prague, Faculty of Pharmacy in Hradec Králové, Department of Pharmaceutical Botany and Ecology, Czech Republic*

Abstract

Restricted sexual functions are very weighty problem between boars in insemination stations. Producers of additives and researches are searching new additives for repression of stress factors, which are main reasons of these sexual dysfunctions. Aim of our study was searching suitable extracts from herbs with positive effect to reproductive ability of boars.

For our experiment, we prepared extract from *Eurycoma longifolia*, *Tribulus terrestris* and *Leuzea carthamoides*, containing specific effective substances. Dry mixture of these extracts with lauric acid was used in our two experiments in the insemination station. 10 boars in the experimental (E) and 10 boars in the control (C) group were observed in each experiment 60 days. For experiment group was daily feeding ration supplemented by tested product, for control group by carrier only. In the experimental period was registered libido sexualis and samples of ejaculate was tested for motility and morphology of sperms and biochemical examine of ejaculate was made.

We registered significant improving of libido sexualis (C = 3.84, E = 3.58, P<0.05). The quality of ejaculate of experimental boars was no altered, contents of free amino acids was improved.

Anticipated positive effect of extract from *Eurycoma longifolia*, *Tribulus terrestris* and *Leuzea carthamoides* on reproduction functions of boars was in our experiment certified.

Restricted sexual functions are very weighty problem in boars in insemination stations. Producers of additives and researches are searching new additives for repression of stress factors, which are main reasons of these sexual dysfunctions. Aim of our study was searching suitable extracts from herbs with positive effect to reproductive ability of boars. For our experiment, we prepared extract from *Eurycoma longifolia*, *Tribulus terrestris* and *Leuzea carthamoides*, containing specific effective substances anticipated positive effect of extract from *Eurycoma longifolia*, *Tribulus terrestris* and *Leuzea carthamoides* on reproduction functions of boars was in our experiment certified.

Material and methods

For our experiment, we prepared extract from *Eurycoma longifolia*, *Tribulus terrestris* and *Leuzea carthamoides*, containing specific effective substances. Dry mixture of these extracts with lauric acid was used in our two experiments in the insemination station. 10 boars in the experimental (H) and 10 boars in the control (C) group were observed in each experiment for 60 days. For experiment group was daily feeding ration supplemented by tested product, for control group by carrier only. In the experimental period was registered libido sexualis and samples of ejaculate was tested for motility and morphology of sperms and biochemical examine of ejaculate was made. The statistical program QCExpert was used for statistical evaluation of the results from the experiment. Basic statistical characteristics (mean, standard deviation) were calculated. Mean values were compared by the unpaired t-test. Significance was declared at P<0.05 and P<0.01 level.

Results and discussion

There were not found significant differences between control (C) and trial group (H) in semen volume, sperm concentration, sperm motility, abnormal sperm percentage, percentage of live sperms. The semen volume was found higher in C group in comparison to H group (334.00 ± 135.02 g vs. 296.00 ± 81.42 g, P>0.05). There was not difference in sperm motility between C and H group (69.00 ± 12.94 % vs. 66.00 ± 10.84%, P>0.05) in the samples of ejaculate from the first collection. The percentage of abnormal sperms was higher in H group (33.90 ± 24.02% vs. 16.50 ± 8.80%) but without significant difference between both groups. The estimation of libido sexualis was better in H group (3.60 ± 0.55) than in C group (3.20 ± 0.84).

There were not found out significant differences between C and H group ejaculate collection at the end of the experiment in monitored parameters although there was higher percentage of abnormal sperms (36.00 ± 20.40% vs. 22.50 ± 8.28%) and lower motility (57.50 ± 5.00% vs. 74.00 ± 6.52%) in H group.

Positive effect of herbal extract added into feeding mixture on libido sexualis in H group was detected. Valuation of libido sexualis was higher in H group in compared to C group (3.84 ± 0.57 vs. 3.58 ± 0.62, P<0.05). In addition, [2] and [6] described positive effect of herbal extracts from *Tribulus terrestris* and *Eurycoma longifolia* on libido sexualis in male rats. The semen volume, sperm motility, sperm concentration and percentage of abnormal sperms were very similar in both

groups. The percentage of abnormal sperms was significantly higher in H group ($P < 0.05$).

There was observed higher content of all monitored free amino acids in seminal plasma after 8 weeks of herbal extracts feeding in H group. Statistically significant difference was detected for Tau ($P < 0.01$), Ala ($P < 0.01$), Val ($P < 0.001$), Met ($P < 0.001$), Ile ($P < 0.05$), Leu ($P < 0.05$), Tyr ($P < 0.05$), Phe ($P < 0.05$) and Lys ($P < 0.05$).

There are not significant differences between group C and group H in the average value of free amino acid content from the beginning to the end of the experiment. The highest average concentration was measured for glutamic acid ($17.43 \pm 5.14 \mu\text{mol}/100\text{ml}$ in C group, $21.55 \pm 7.59 \mu\text{mol}/100\text{ml}$ in H group). [7,8,10] marked glutamic acid predominant in boar seminal plasma in experiment with Yorkshire boars and serine as the second most prevalent amino acid. Glycine was the second major amino acid in our experiment. Its concentration in seminal plasma in C group was measured $12.81 \pm 7.29 \mu\text{mol}/100\text{ml}$ and $14.65 \pm 13.37 \mu\text{mol}/100\text{ml}$ in H group ($P > 0.05$). The third highest concentration was measured for taurine amino acid ($7.48 \pm 4.26 \mu\text{mol}/100\text{ml}$ in group and $7.87 \pm 5.46 \mu\text{mol}/100\text{ml}$ in H group, $P > 0.05$).

Conclusion

The positive effect of *Eurycoma longifolia*, *Tribulus terrestris* and *Leuzea carthamoides* extract on reproduction functions of boars were detected in the experiment. Significant improving of libido sexualis was registered. The herbal extract had no negative effect on quality of ejaculate, except higher occurrence of morphologically abnormal spermatozoa. The concentration of free amino acids in seminal plasma was improved.

References

- [1] Almeida M.M.B., Arriaga A.M.C., Dos Santos A.K.L., Lemos T.L.G., Braz R., Vieira I.J.C., Occurrence and biological activity of quassinoids in the last decade, *Quim. Nova* (2007) 30:935-951
- [2] Ang H.H., Sim M.K., *Eurycoma longifolia* Jack enhances libido in sexually experienced male rats, *Exp. Anim.* (1997) 46:287-290.
- [3] Ang H.H., Ngai T.H., Tan T.H., Effects of *Eurycoma longifolia* Jack on sexual qualities in middle aged male rats, *Phytomedicine* (2003) 10: 590-593.
- [4] Cerovsky J., Metoda barvení kančích spermii pro morfologické hodnocení, *Živ.Výr.* (1976) 21: 361-366.
- [5] Gauthaman K., Adaikan P.G., Prasad R.N.V., Aphrodisiac properties of *Tribulus terrestris* extract (Protodioscin) in normal and castrated rats, *Life Sci.* (2002) 71:1385-1396.
- [6] Gauthaman K., Ganesan A.P., The hormonal effects of *Tribulus Terrestris* and its role in the management of male erectile dysfunction-an evaluation using primates, rabbit and rat, *Phytomedicine* (2008) 15: 22-54.
- [7] Hood R.D., Witters W.L., Foley C.W., Erb R.E., Free amino acids in porcine spermatozoa, *J. Anim. Sci.* (1967) 26: 1101-1103.
- [8] Johnson L.A., Pursel V.G., Gerrits R.J., Thomas C.H., Free amino acid composition of porcine seminal, epididymal and seminal vesicle fluids, *J. Anim. Sci.* (1972) 34: 430-434.
- [9] Kolečkar V., Opletal L., Brojerova E., Rehakova Z., Cervenka F., Kubikova K., Kuca K., Jun D., Polasek M., Kunes J., Jahodar L., Evaluation of natural antioxidants of *Leuzea carthamoides* as a result of a screening study of 88 plant extracts from the European Asteraceae and Cichoriaceae, *J. Enzym. Inhib. Med. Chem.* (2008) 23:218-224.
- [10] Louis G.F., Levis A.J., Weldon W.C., Miller P.S., Kittok R.J., Stroup W.W., The effect of protein intake on boar libido, semen characteristics and plasma hormone concentrations, *J. Anim. Sci.* (1994) 72:2038-2050.
- [11] Tyagi R.M., Aswar U.M., Mohan V., Bodhankar S.L., Zambare G.N., Thakurdesai P.A., Study of furostenol glycoside fraction of *Tribulus terrestris* on male sexual function in rats, *Pharm. Biol.* (2008) 46:191-198.