Abstract

The present dissertation is based on the results of experiments published in a series of two scientific publications.

The first experiment was conducted on 24 rams of the Berrichon du Cher breed. The animals were divided into four equally sized experimental groups and fed a diet based on silage made from hybrid ryegrass (group RB) or the three most widespread varieties of *Festulolium* in Central Europe - Becva, Felopa, Paulita (groups FB, FF, FP, respectively). Samples of *musculus longissimus lumborum* (MLL) and *musculus gluteus maximus* (MGM) were taken from the half-carcasses of the animals, in which the content of basic chemical nutrients (by standard AOAC methods) and β-carotene, tocopherols and retinol (by HPLC) were determined. Rams fed a ration based on hybrid ryegrass silage (RB) had the highest intake of α-, β-, γ- and δ-tocopherol and total tocopherols ($p<0.01$). Meat from rams fed rations based on *Festulolium* silages (FB, FF, FP) contained more tocopherols ($p<0.01$) and retinol ($p<0.01$ in MGM; $p=0.053$ in MLL) than meat from animals receiving rations based on hybrid ryegrass. The highest total tocopherols ($p<0.01$) and retinol ($p<0.01$ in MGM; $p=0.053$ in MLL) were determined in meat from rams fed rations based on *Festulolium* silage of the Felopa and Paulita cultivars. Statistical analysis showed a positive correlation between the intake of total tocopherols and the content of the form with the highest biological activity, α-tocopherol, in meat (r=0.99), as well as between the intake of β-carotene and the content of retinol in meat (r=0.92 in MLL; r=0.91 in MGM).

In the second experiment, the concentration of β-carotene, tocopherols and retinol, as well as basic chemical nutrients, was assessed in the meat and liver of fallow deer (*Dama dama L.*). The study involved 36 farm-raised bulls divided into three experimental groups: group HO - ration consisting of hay, oat grain, mineral-vitamin premix, group HOP - ration consisting of hay, oat grain, protein concentrate, mineral-vitamin premix, group HG - ration consisting of

hay, pelleted feed mix, mineral-vitamin premix. In the liver samples of fallow deer fed rations with high-protein feeds, more abundant in β-carotene (HOP, HG), the retinol content was about twice as high as in the livers of animals fed a ration consisting of hay and oats (HO) ($p<0.01$). Meat samples from fallow deer fed a ration consisting of hay and oats contained about three times more crude fat (ether extract) than meat from fallow deer of the HOP and HP groups ($p<0.01$). Statistical analysis showed a very strong positive correlation between total tocopherols in the ration and α-tocopherol concentration in liver and MLD (r=0.95) and a moderate positive correlation between total tocopherols in the ration and retinol content in MLD (r=0.58). In the present experiment, the effect of feeding rations with different raw material composition on the variation of tocopherol concentration in liver and meat samples and the basic chemical composition of fallow deer liver samples was not demonstrated.

The results of the first experiment showed that increased intake of tocopherols and β-carotene by sheep did not always lead to higher concentrations of vitamin A and E in meat. Based on the results, it was concluded that *Festulolium* silages are a valuable component in sheep nutrition and that the effects of feeding the rams depend on the variety of *Festulolium* used. In contrast, the use of high-protein concentrate feeds in fallow deer rations did not increase the concentration of vitamin A and E in the meat. Consumption of rations richer in β-carotene (HP, HOP) increased the concentration of vitamin A in fallow deer liver samples.