DETERMINATION OF THE AGE AND SEX OF CATTLE BY PARAMETERS OF INFRARED ABSORPTION SPECTRUM OF OCCIPITAL BONE IN FORENSIC VETERINARY EXAMINATION

Yatsenko I.V., Abuznaid Karem R.S., Getmanets O.M.

The purpose of research: 1. To establish the regression's relationship between age of cattle and the IR relative absorbance of ashing occipital bone. To analyze the use of infrared spectroscopy method for determination the age and sex of cattle by the spectroscopic characteristics of the occipital bone.

Materials and methods. The object of research was cattle – the females and males from birth to 12 years (144 months). The material of research has been the body of occipital bone. The fragments of bone were selected from known clinically healthy slaughtered animals without evidence of diseases of the skeletal system. By the method of bones preparation were purified from soft tissue. For preparation of the test-samples were taken samples of ashed occipital bone about 1 gram.

The IR spectra of ashed occipital bones were obtained on the infrared spectrometer "Avatar-360" with Fourier converter (firm Nicolet) in the range of wave numbers 550 – 3500 cm1. For further processing and analysis were identified the six most intensive characteristic of absorption bands that were present in each of the obtained IR spectra: $\nu = 567$ cm1, $\nu = 603$ cm1, $\nu = 632$ cm1, $\nu = 1047$ cm1, $\nu = 1091$ cm1 and $\nu = 3433$ cm1. For exclusion of diffuse (background) radiation attenuation was applied the basic line method. The relative optical density on the band of absorption with account of the background correction was calculated on the base of next expression: $D = \log (IB / I)$, where IB – transmittance for the background of the wave number as a percentage; I – measured transmittance for the same wave number as a percentage.

Results. It was found that absorption bands: $\nu = 567$ cm1, $\nu = 603$ cm1, $\nu = 632$ cm1, $\nu = 1047$ cm1, $\nu = 1091$ cm1 and $\nu = 3433$ cm1 were contained in spectra of all samples of bones but their quantitative characteristics depend on the age and on the sex of the animals.

For modeling the dependence on the age of cattle from relative optical density of ashed occipital bones has been applied regression analysis. In regression equation using nonlinear regression

function that was previously reliably tested in many works. It was as follows: , where a, b and c – regression parameters whose values were obtained by least squares method.

Conclusions. The possibility of determination of the cattle age and sex by the IR absorption spectra of the ashed occipital bones in the age range from birth to 10 years with a standard error of determination in the range from 3 to 8 months has been proved. Was shown that the age and sex of the cattle must be performed by determining the relative absorbance digestion of the ashed occipital bones (or fragments thereof) for several (at least two) bands of IR transmittance. Expert studies by determination the age and sex of cattle can be performed as on an anatomically whole, as on a burnt and fragmented materials.

Forensic veterinary examination, infrared spectroscopy, cattle, age, gender