CHEMICAL COMPOSITION OF THE SECRETION OF THE INTERDIGITAL GLAND OF Rangifer tarandus

V. E. Sokolov, A. Brundin, B. S. Chikil'din, and É. P. Zinkevich

UDC 547.915+547.922.5

The chemical composition of the secretion of the interdigital gland of the reindeer, which affects its behavior, has not been studied previously [1]. The present paper gives the results of an investigation of the main components of the secretion by the methods of TLC, GLC, and IR spectrometry.

The secretion was obtained by extracting the surface of the gland area with ether using 30 fully grown males in the period of the autumn slaughter in Sweden (20-25 mg from each individual). Preliminary information on the chemical composition of the mixture was obtained by the methods of TLC on "Silufol" silica gel in n-hexane–ether systems (95:5, 90:10, 85:15, 80:20, and 70:30) the spots being revealed by nonspecific agents, and also with iron hydroxamate, potassium dichromate–nitric acid, 2,4-dinitrophenylhydrazine and other agents, by comparing the chromatographic mobilities with standard substances of the class of lipids, and by the application of the method of chemical subtraction (reduction of the initial mixture with lithium tetrahydroaluminate, catalytic hydrogenation, hydrolysis, etc.). It was found that the secretion consists of a mixture of groups of substances I-VII, numbered in order of increasing polarity, of which I-III consisted of esters (I – monoesters; II – triesters), IV – acids, V and VI – alcohols, and VII – carbonyl compounds. According to quantitative preparative chromatography with the gravimetric estimation of the amounts of the substances after exhaustive elution of the zones, the monoesters I amounted to 61%, the triesters II to 13%, the esters III to less than 4%, the acids V to 8%, the alcohols V and VI to 14%, and the carbonyl compound VII to 4% (relative error ± 4%). The volatile compounds distilling at 100°C under a pressure of $2 \cdot 10^{-2}$ mm Hg amounted to 0.5% of the secretion.

Further identification was performed separately for each group of compounds I-VI after their preparative separation in a thin layer. The esters I (IR spectra: 1730 and 1170 cm^{-1}, semi-micro cell, solution in CCl_4), after alkaline hydrolysis were found to contain two alcohol components identified as lanosterol and cholesterol by comparison with markers by the methods of TLC [silica gel, n-hexane–ether (7:3)], GLC (silanized samples; Tsvet-101; 2-m glass column; 3% of XE-60 on Chromosorb W AW, 120-140 mesh: FID 225°C; He 30 ml/min) and IR spectrometry (Perkin Elmer 325, micro cell, solution in CCl_4). The acid components of I were identified as acetic, propionic (traces), isobutyric, butyric (traces), α-methylbutyric, and, probably, an unsaturated C_4 acid, and also higher fatty acids of the C_{12}-C_{20} series (GLC, comparison of the retention times of the acids under investigation and the products of their reduction by lithium tetrahydroaluminate: 10% of behenic acid on Chromosorb W AW, 120°C, for the C_2-C_5 acids, and 10% of FFAP on Chromosorb W AW, 220 and 275°C, for the C_{12}-C_{20} acids and the alcohols from them).

On hydrolysis, the esters II (IR spectrum 1745, 1175 cm^{-1}) gave glycerol [TLC, silica gel, chloroform–methanol–water (61:32:7)] and C_{14}-C_{18} higher fatty acids, among which palmitic and oleic were identified (GLC, conditions similar). The esters III (IR spectrum 1735 cm^{-1}) were not identified.

According to GLC (conditions similar) the acids IV (IR spectrum 1710 cm^{-1}) consist of a mixture of C_{12}-C_{20} higher fatty acids, among which lauric (traces), myristic (traces), palmitic, and oleic were identified. The C_2-C_5 acids were detected only in the form of traces.

The alcoholic components of the secretion, V and VI, were identified similarly by IR spectrometry, TLC, and GLC as lanosterol and cholesterol, respectively.

A. N. Severtsova Institute of the Evolutionary Morphology and Ecology of Animals, Academy of Sciences of the USSR. Umea University, Sweden. Translated from Khimiya Prirodnykh Soedinenii, No. 5, pp. 654-655, September-October, 1974. Original article submitted April 3, 1974.

Thus, the main components of the secretion are sterols and their esters, triglycerides, and free higher fatty acids.

LITERATURE CITED

1. M. B. Quay, J. Mamal., 36, 187 (1955); L. M. Baskin, The Reindeer. Ecology and Behavior [in Russian], Nauka, Moscow (1970).