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## MODELING OF LIGHT SCATTERING IN THICK BIOLOGICAL SAMPLES

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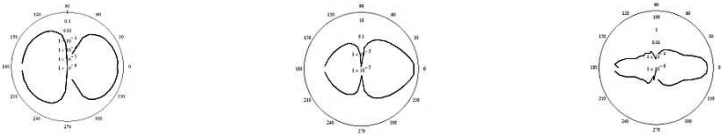
The study of light propagation in biological media (BM) today is an actual topic. Especially, it concerns finding out the character of spatial distribution of scattered light, which the scattering indicatrix is responsible. The modern methods of optical tomography, mammography and biopsy are based on light scattering principles. The experimental indicatrix of scattering in thickness samples lies at the basis of determining the anisotropy factor of single scattering. Since the influence of scattering anisotropy factor to determine the optical parameters of scattered BM radiation is significant enough [1], then for research appropriate to use the spatial photometry [2], which provides for use of the sections method and modified Henyey-Greenstein function [1]. In this paper scattering indicatrix of thickness BM samples were simulated and the influence of thickness on spatial distribution of light scattering was showed. The simulations were obtained by Monte Carlo method. They consisted of 10 numerical experiments on chicken and porcine muscles tissue. Optical properties [1] and thickness of the samples were by the input data for simulation. The modeling was performed for the thickness from 0.0001 to 2 mm. For accuracy of the results for each simulation, 20 million photons were launched. As example the indecatrixes of scattering by porcine muscles of different thickness showed on Figure.



*a* *b* *c*

Normalized light scattering indicatrix by pig muscle thickness 1 mm (*a*), 0.1 mm (*b*) and 0.001 mm (*c*)

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## INFLUENCE THE ANISOTROPY FACTOR OF BIOLOGICAL MEDIA ON SCATTERING INDICATRIX

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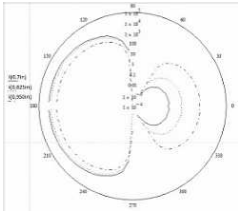
Spatial photometry of thickness biological media (BM) is based on goniometric method [1] and includes defining the indicatrix of scattering on different cross sections. The anisotropy factor of single scattering, which used for modeling the light propagation in BM, is determined from these spatial data. In this paper, the character of scattering indicatrix depending on value of anisotropy factor was researched. For simulation of light propagation in BM for samples of porcine muscle tissue by 1.5 mm thickness with optical properties approximate to experimental was used Monte Carlo method. [2]. Values of scattering anisotropy factor varied from 0.025 to 0.95. During simulation, 20 million photons were launched. The incident beam had two types' configurations: infinitely thin and finite diameter with evenly distribution of intensity. As a result, the values of coordinates and weight of photons, which transmitted and reflected from BM in 24 different cross sections, were received. Graphs of dependence the scattering indicatrix on anisotropy factor were obtained by averaging data. In case of increasing of anisotropy factor, the scattering indicatrix was stretched in forward direction and almost did not change in back direction.



Dependence the scattering indicatrix on anisotropy factor