

The Electron Spin Resonance Study of Hair Melanin

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Melanin is an ubiquitous natural pigment found in most organisms. In humans, melanin is the primary determinant of skin color. It is also found in hair, the pigmented tissue underlying the iris of the eye, and the stria vascularis of the inner ear. There are two types of melanin in hair: eumelanin, which gives a brown or black hue, and pheomelanin, which gives a yellow, orange-red hue. Melanin in hair serves to protect the body against ultraviolet (UV) and visible radiation by absorbing them.

The ESR spectra of melanin's free radicals in natural black and red hair have been investigated. It is shown that the ESR spectrum of black hair is slightly asymmetric singlet with $g = 2.0037$ and $\Delta H = 0.5$ mTl. The ESR spectrum of red hair with $g = 2.0053$ differs from the spectrum of black hair. Using the method of saturation was shown that ESR spectrum of red hair represents a superposition of two signals: a singlet, relating to the black hair, and a triplet from red hair's pheomelanin. Under the influence of visible light in both types of hair (black and red), the photoinduced free radicals appear, which indicates an increase in the intensity of already existing ESR spectrum of hair. It should be noted that the ESR spectra of red hair from various donors are different.

Under the influence of visible light the intensity of ESR spectrum increases, in the darkness it decreases. The dependence of the change in the intensity of spectrum on irradiation time was recorded. It should be noted that under the irradiation by the changes in the ESR spectra of induced free radicals the antioxidant activity of variety of antioxidants can be determined.