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Laser-induced autofluorescence assisted by multivariate techniques discriminates a cataractous lens from healthy lens tissues of Sprague–Dawley rats

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Laser-induced autofluorescence (LIAF), combined with multivariate techniques, has been used to discriminate a cataractous lens from healthy lens tissues. In this study, 405 nm and 445 nm were used as excitation sources to induce the autofluorescence. Results show higher autofluorescence intensity in cataractous lens tissues than in healthy ones. Cataractous lens tissues show a red shift of 0.9 nm and 1.2 nm at 405 nm and 445 nm excitations, respectively. Using principal component analysis (PCA), three principal components (PCs) gave more than 99% variability for both 405 nm and 445 nm excitation sources. Based on the three PCs, Fisher's linear discriminant model was developed. An accuracy of 100% was obtained in classifying the lens tissues using Fisher's linear discriminant analysis (FLDA). The LIAF technique assisted by PCA and FLDA may be used for objective discrimination of cataractous lens from healthy lens tissues of Sprague–Dawley rats