

## **Classification of Gender and Maturity Status in Chinook and Coho Salmon by Short Wavelength Near Infrared Spectroscopy**

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The acquisition of a non-invasive means to qualitatively determine gender and level of maturation in young salmonids is of increasing interest to northwestern U.S. hatcheries and those working to preserve salmon runs. The availability of a technique to determine maturation status (immature or maturing) and gender at the earliest possible date has great implications for the successful maturation and spawning of captive-reared salmonids and for hatchery management. Short-wavelength near-infrared spectroscopy (SW-NIR) has been widely applied in the food industry and shows potential for application in biological systems. Experimental evidence has been obtained that confirms SW-NIR light can penetrate through the skin, scales, and muscle in the ventral area of a fish and reach the gonadal tissue. Also, distinct gonadal signal features were found that distinguish egg tissue from testis tissue. Results of Soft Independent Modeling of Class Analogy (SIMCA) and Principal Component Analysis (PCA) conducted on spectra collected on chinook and coho salmon demonstrate that a sound classification of gender and maturation can be achieved. Practical application of this method will depend on the rigor of the model developed.