

EASTERN MICHIGAN UNIVERSITY
Chemistry Department

M. S. Thesis Seminar

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(Tim Brewer, advisor)

Tues., July 8th, 4:00 pm, Science Complex Rm 156

**Determination of thiamine in solution by UV-
visible spectrophotometry: the effect of
interactions with gold nanoparticles**

The use of gold nanoparticles as a means of detection for organic and biological substances in a system is a growing area in chemistry and biochemistry. The nanoparticles allow for an enhancement in the spectrophotometric signal and are useful for determining the presence or absence of certain substances in a solution. This is due to the interaction that occurs between the gold nanoparticles and the analyte, which results in a size and shape change within the nanoparticle structure, which in turn can be observed using UV-Vis spectrophotometry. In this thesis project, gold nanoparticles were synthesized and characterized using a citrate reduction method. The nanoparticles were then mixed with three amino acid solutions and a thiamine solution to determine the level of interaction for each substance through measurement with UV-Vis. After this, an in depth look into the interactions with thiamine was undertaken. The limit of detection for thiamine as well as an estimation of the method's selectivity was estimated. During this project, an absorbance decrease over time was observed and this phenomenon was measured in some detail. The goal of this project was to provide the foundation for using gold nanoparticles as a means of measuring thiamine in solution.