

Analysis of Individual Protein Bodies *in situ* in Wheat Endosperm with Synchrotron Infrared Microspectroscopy

D.L. Wetzel, (Microbeam Molecular Spectroscopy Laboratory, Kansas State U.)

Abstract No. Wetz8556

Beamline(s): **U10B**

The protein secondary structure found in wheat endosperm is of interest in the plant breeding community. Infrared microspectroscopy with a conventional (thermal) source produces the spectrum of large starch granules along with small interstitial protein bodies. Because the wheat endosperm is approximately 70% starch the spectrum of the composite does not allow for good protein analysis by comparison of the shoulder to peak ratio for Amide I and II bands. The purpose of the current synchrotron activity was to establish the potential of the U10B beamline equipped with the infinity corrected confocal Continuum infrared microscope to obtain the spectrum of individual protein bodies within individual pixels from high density mapping procedures. Using $5\ \mu\text{m} \times 5\ \mu\text{m}$ masking this was accomplished to allow accurate determination of the frequencies of Amide I α -helix maxima as well as the frequencies of the shoulder representing the β form. From rectangular map only pixels whose spectra had high Amide I and II absorption were analyzed in this study. Self deconvolution was used. Determining ratio of α -helix to all other form in the ultimate goal. From this brief attempt with a limited number of wheat sections the results were encouraging because pixel selection in effect enhanced the prominence of the small protein bodies relative to the large starch granule matrix. This experimentation paves the way for future systematized comparisons of different experimental wheat cultivars at early stages of the breeding process.