

Latino Youth Development in an Agricultural Context

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The goal of the Latino Youth Development in an Agricultural Context study (Michael Merten, PI) was to determine the developmental consequences of exposure to agricultural work for Latino adolescents between the ages of 13-17 in Tahlequah and Muskogee, Oklahoma. One component of this project was a nested biomarker study wherein first-morning void urine specimens from a targeted subsample of 60 youth in the rural area. These adolescents self-reported having worked in agriculture during the one-month period prior to the survey will be collected across seven consecutive days. Regarding urine samples, we exceeded our collection numbers as we received urine samples from 61 adolescents. We asked youth to provide urine samples for 7 consecutive days and approximately 90% of youth returned all 7 samples. Daily urine samples were pooled prior to lab analyses yielded the following:

- 49 of 61 adolescents were found to have varying levels of pesticide metabolites in their bodies.
- 22 adolescents had varying levels of organophosphorus pesticides in their urine
- 24 adolescents had samples that detected chlorpyrifos
- 43 adolescents had samples that contained 10 of 18 commercially available pyrethroids.
- Compared to NHANES data (Barr et al., 2010), the youth in our study had elevated concentrations of 3PBA – our geometric mean is 1.544 ng/mL, which lies roughly in the 90th percentile for 12-19 year olds in the nation.
- Our chlorpyrifos levels are lower than those of young children (aged 2-8) but comparable to the 75th percentile for adults aged 18-57 (Trunnelle et al., 2014b).
- The study strongly supports that adolescents working in agricultural settings are: 1) exposed to pesticides and 2) their exposure appears to be at elevated levels.

Pesticide Exposure Biomonitoring Using Sweat Patches: A Pilot Study

This study builds off the work of PI Merten's previously discussed "Latino Youth Development in an Agricultural Context" study. In this study, PI Merten and Co-I Grzywacz executed a study in which sweat samples were collected from a subsample (n=22) of participants in the nested biomarker study described above. Sweat samples were obtained concurrently with urine samples so that the temporal period for both sets of samples will be identical. This study hopes to introduce a more efficient way to assess pesticide metabolites among adolescent farm workers.

- Recovery from patches during a drip test lasting for 48 hours yielded good results suggesting that stability on the patches was good.
- Pesticide metabolites were only detectable on a single sweat patch, the single exception was the detection of 3PBA on a patch that correlated with the highest urine value.
- These results suggest that the deposition of metabolites to the patch were lower than expected.
- Deposition based on the equivalency of 20 ml of urine was required to have the same quantitation limits as urine. Thus if the patches were exposed to less than 20 ml of sweat or distribution of the metabolites to sweat occur at a much lower rate than urine, then detection would occur at lower levels than urine.
- The sweat patches may have utility for pesticide metabolites based on recovery and stability results; however, more trace analytical techniques are likely required.
- Adolescents reported very high adherence to wearing the patch for the duration they were instructed and changing the patch when appropriate.
- Adolescents reported high satisfaction with wearing the patch and very few individuals reported any discomfort or problems with wearing the sweat patches.