

HAIR AND URINE SPECIMENS FOR BIOMONITORING SHORT AND LONG TERM TERBUTYLAZINE EXPOSURE IN AGRICULTURE WORKERS AND RURAL RESIDENTS

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Background and Aims: Terbutylazine (TBA) is a herbicide widely used in maize cultivation, one of major crop in Northern Italy. Aim of this work was to evaluate short-term and long-term exposure to TBA in agriculture workers and in rural residents.

Methods: Ten farmers, 13 rural residents, and 17 urban residents entered the study. Urine samples were collected before starting the application season for all subjects (March, T0) and after the application of TBA in farmers only, in two moments: at bed time the day of the application (April, T1), and the next day in the morning (T2). Hair samples were collected for all subjects at T0, and at the end of the application season (July, ES). TBA and its metabolite desethylterbutylazine (DET) in urine and hair were measured by LC/MS/MS in the presence of deuterated internal standards.

Results: At T0 median urinary TBA and DET was $<0.25 \mu\text{g/L}$ in all subjects; in farmers urinary DET significantly increased to 1.81 and $2.95 \mu\text{g/L}$ at T1 and T2, respectively ($p < 0.001$), urinary TBA was always $<0.25 \mu\text{g/L}$.

Hair DET was always $<0.010 \text{ ng/mg}$. At T0 median TBA in urban residents was $<0.010 \text{ ng/mg}$ hair, such level was lower than 0.010 ng/mg measured in both farmers and in rural residents ($p = 0.004$). At ES median TBA was $0.073 > 0.011 > 0.010 \text{ ng/mg}$ hair in farmers, rural residents and urban residents, respectively ($p < 0.001$).

No correlation was observed between urinary DET and hair TBA, while significant or borderline significant correlations were found between hair TBA and age or application time ($p = 0.021$ and $p = 0.081$).

Conclusions. Urinary DET and hair TBA seem to be promising candidates for biomonitoring short- and long-term exposure to TBA. The use of this herbicide in agriculture impacts the exposure of rural residents.