Abstract: Two new stable isotope dilution assays were developed for the quantification of ochratoxin A in human blood samples for exposure studies. The methods based on two different sample extraction and cleanup procedures including liquid-liquid extraction with following immunoaffinity chromatography (IA) as well as a dispersive solid-phase extraction (DSPE) method. For detection, LC-MS/MS was applied. For the first time, exact quantitation of the reference compound ochratoxin A was performed by quantitative NMR spectroscopy (qNMR). Additionally, a comparison of different blood-drawing procedures revealed no differences for heparin plasma and serum whereas citrate plasma gave significantly lower results for the mycotoxin. Limits of detection (LOD: 0.02 ng/g (IA) vs 0.03 ng/g (DSPE)), limits of quantification (LOQ: 0.07 ng/g (IA) vs 0.08 ng/g (DSPE)), relative recovery (\textgreater 94\%), precision, and linearity indicated excellent performance of the developed methods.