S2. Mix reaction for proline biosynthetic assay

Final volumes were adjusted to 1 ml with PBS and prepared as follows:

* (L-Glu) 20 mM sodium glutamate, 10 mM MgCl2, 0.5 mM NADPH, 5 mM phospho(enol)pyruvic acid cyclohexylammonium (PEP) as an ATP-regeneration system;
* (DL-P5C/GS) 1.5 mM DL-P5C (freshly prepared), 0.5 mM NADPH;
* (L-Gln) 5 mM L-glutamine, 10 mM MgCl2, 0.5 mM NADPH, 5 mM phospho(enol)pyruvic acid cyclohexylammonium (PEP) as an ATP-regeneration system;
* (L-Ala) 5 mM L-alanine, 10 mM MgCl2, 0.5 mM NADPH and 5 mM PEP;
* (L-Arg) 5 mM L-arginine, 1 mM MnCl2 and 50 µM pyridoxal.