ABSTRACT

The in vitro synthesis of proline from glutamate was followed in fat body homogenates from the tsetse fly Glossina morsitans. Rates of synthesis were much higher in freeze-thawed or sonicated homogenate than in untreated homogenate. Synthesis in the presence of added glutamate was significantly stimulated by addition of NADH, NADPH and ATP, the effects of these coenzymes being approximately additive. Isocitrate stimulated proline production in the presence of glutamate. This effect was most marked when no coenzymes were added, but was observed also when all three coenzymes were present. α-Oxoglutarate was without action. α-Oxoglutarate was produced when freeze-thawed fat body homogenate was incubated with isocitrate. Production was enhanced when glutamate was also present, and enhanced further by the combined addition of NADH, NADPH and ATP. The role of isocitrate in proline synthesis is discussed. It is suggested that synthesis from glutamate utilizes NADPH generated by the oxidation of isocitrate through the mitochondrial NADP-isocitrate dehydrogenase reaction.