Abstract

The blood fluke *Schistosoma mansoni* and the hard tick *Ixodes ricinus* produce an aspartic protease cathepsin D which initiates degradation of hemoglobin, their key nutrient. First, in the presented work, the protocol for refolding and activation of the zymogen of cathepsin D from *I. ricinus* (IrCatD) was developed and optimized. In acidic pH the propeptide of IrCatD zymogen was removed by an auto-activation mechanism. Further, a kinetic assay with fluorogenic substrates was employed to study functional properties of IrCatD including pH optimum, substrate and inhibition specificities. Second, two isoforms of cathepsin D from *S. mansoni* (SmCatD) were produced using recombinant expression in *E. coli*. These recombinant proteases were isolated from inclusion bodies using affinity chromatography under denaturating conditions, and protocol for their refolding was developed and optimized. The studied aspartic proteases are pharmacological targets: inhibitors of SmCatD represent potential chemotherapeutics for the treatment of schistosomiasis, and IrCatD is a candidate antigen for the development of novel anti-tick vaccines.