The direct recovery of recombinant hepatitis B core antigen from disruptate derived from continuous-flow bead milling.

ABSTRACT

HBcAg (hepatitis B core antigen) is a nanoplex bioproduct that has a great potential in the development of therapeutic drugs and vaccines. In the present study, a continuous-flow bead milling for the disruption of Escherichia coli was optimized and a direct recovery protocol to isolate the recombinant HBcAg from the unclarified E. coli disruptate was developed. The optimal condition for continuous-flow bead milling for the release of HBcAg from E. coli was achieved at a feed flow rate of 15 litres/h, biomass concentration of 10% [ww/v (wet weight/vol.)] and impeller tip speed of 14 m/s. The sucrose-density-gradient analysis showed that the particulate form of the HBcAg released by this optimal condition is still preserved. In the direct purification of HBcAg from the unclarified disruptate, the AE-EBAC (anion-exchange expanded-bed adsorption chromatography) technique was employed. A 54% adsorption and 50.7% recovery of HBcAg were achieved in this direct recovery process. The purity of HBcAg recovered was 49.8%, which corresponds to a purification factor of 2.0. ELISA showed that the HBcAg recovered is functionally active.

Keyword: Anion-exchange expanded-bed adsorption chromatography;(AE-EBAC); Continuous-flow bead milling; Escherichia coli; Hepatitis B core antigen (HBcAg); Hepatitis B virus (HBV); Therapeutic vaccine.