ABSTRACT:

Kluyveromyces lactis is an excellent host for a high cell density culture, which allows high expression levels of recombinant enzymes. Nutrient composition and culture conditions affect the secretion, production level and stability of the recombinant host. Therefore, it is technologically important to formulate a medium that stimulates high cell density and enhances the desired enzyme production using K. lactis GG799. In this study, six media were initially compared, and a Plackett-Burman experimental design was employed to screen for important components and trace elements. Nitrogen sources such as ammonium sulfate and free amino acid (casamino acid) as well as compounds like MgSO4·7H2O, Na2SO4, ZnSO4·6H2O, MnSO4·4H2O and KH2PO4 affected biomass concentrations (5.67 g/l) and recombinant endo-ß-1,4-xylanase (Xyn2) production (49.73 U/ml). Optimum productivity was obtained at shorter incubation times (i.e., 6 h), making the medium suitable for use when seeking efficient production. Expression of recombinant Xyn2 by K. lactis GG799 in the designed medium resulted in satisfactory recombinant Xyn2 volumetric productivity (vp) at 8.29 U/ml/h. When compared to the rich, non-selective YPD medium, the designed medium improved biomass output and recombinant Xyn2 production in K. lactis GG799 by approximately 9 and 22%, respectively.