OMICS International
conferenceseries.com

Pharm Anal Acta 2016, 7:2(Suppl)
http://dx.doi.org/10.4172/2153-2435.C1.031

International Conference and Exhibition on

Advances in HPLC & Chromatography Techniques

March 14-15, 2016 London, UK

CenC, a multi-domain thermo-stable GH9 processive endoglucanase from Clostridium thermocellum: Cloning, characterization and saccharification studies

Ikram-Ul-Haq
GC University, Pakistan

The growing demands of bioenergy have led to the emphasis on novel cellulases to improve efficiency of biodegradation process of plant biomass. Therefore, a thermostable cellulolytic gene (CenC) with 3,675 Bp was cloned from *Clostridium thermocellum* and over-expressed in Escherichia coli strain BL21 CodonPlus. It was attested that CenC belongs to glycoside hydrolase family 9 (GH9) with four binding domains, a processive endoglucanase. CenC was purified to homogeneity, producing a single band on SDS-PAGE corresponding to 137.11 kDa, by purification steps of heat treatment combined with ion-exchange chromatography. Purified enzyme displayed optimal activity at pH 6.0 and 70°C. CenC had a half-life of 24 min at 74°C, was stable up to 2 h at 60°C and over a pH range of 5.5-7.5. Enzyme showed high affinity towards various substrates and processively released cellobiose from cellulosic substrates confirmed by using HPLC technique. It efficiently hydrolyzed carboxymethyl cellulose (30 U/mg), β-glucan Barley (94 U/mg); also showed activity towards p-nitrophenyl-β-D-cellobioside (18 U/mg), birchwood xylan (19 U/mg), beech wood xylan (17.5 U/mg), avicel (9 U/mg), whatman filter paper (11 U/mg) and laminarin (3.3 U/mg). CenC exhibited K_m, V_{max}, K_{cat}, $V_{max}K_m^{-1}$ and $K_{cat}K_m^{-1}$ of 7.14mM, 52.4 µmol mg-1min-1, 632.85 s-1, 7.34 min-1 and 88.63, respectively used CMC as substrate. Recombinant CenC saccharified pretreated wheat straw and bagasse to 5.12% and 7.31%, respectively at pH 7.0 and 45°C after 2 h incubation. Its thermostability, high catalytic efficiency and independence of inhibitors make CenC enzyme an appropriate candidate for industrial applications and cost-effective saccharification process.

ikmhaq@yahoo.com

Bioavailability and antihyperglycemic effect of metformin transfersome vesicles in transdermal patch delivery system

Meah G Pacheco
University of Santo Tomas, Philippines

Metformin, a prominently prescribed antihyperglycemic agent has been proven to increase life span of both diabetic and non-diabetic individuals. It decreases glucose production and absorption and increases body's response to insulin. However, it is slowly and incompletely absorbed in the gastrointestinal tract and it has a low permeability. It is available in oral tablet and it takes 6 hours for the drug to be completely absorbed. It is taken 2 to 3 times a day as a maintenance drug, depending on patient's condition. Gastrointestinal side effects have also been reported in nearly 30% of patients. With these impediments, different drug delivery systems have been developed. The use of transfersomes in transdermal patch offers the potential advantage of improving the bioavailability of the drug. Metformin Transfersome Vesicles were prepared using sodium cholate and phosphatidylcholine 50% and its particle size was 168 nm. Drug entrapment efficiency was determined using HPLC and it was found to be 94.96%. Plasma concentration of metformin in hyperglycaemic induced rabbits treated with metformin transfersome patch was significantly higher than controls (p=0.001). The post treatment glucose level of hyperglycemia induced rabbits applied with metformin transfersome patch (p=0.002) showed significant decrease in glucose level relative to untreated alloxan induced hyperglycemic rabbits. The study showed that metformin transfersome vesicles in transdermal patch delivery provide enhanced antihyperglycemic effect and bioavailability over metformin transdermal patch.

meah.pacheco@yahoo.com.ph