**Background**

Pleurotus sajor-caju (P. sajor-caju) has been extremely useful in the prevention of diabetes mellitus due to its low fat and high soluble fiber content for thousands of years. Insulin resistance is a key component in the development of diabetes mellitus which is caused by inflammation. In this study, we aimed to investigate the in vivo efficacy of glucan-rich polysaccharide of P. sajor-caju (GE) against diabetes mellitus and inflammation in C57BL/6j mice fed a high-fat diet.

**Methods**

Diabetes was induced in C57BL/6j mice by feeding a high-fat diet. The mice were randomly assigned to 7 groups (n=6 per group). The control groups in this study were ND (for normal diet) and HFD (for high-fat diet). The treated groups were NO240 (for normal diet) (240 mg/kg b.w) and HFD0, HFD20 and HFD240 (for high fat), where the mice were administrated with three dosages of GE (60, 120, 240 mg GE/kg b.w respectively). Metformin (2 mg/kg b.w) served as positive control. The glucose tolerance test, glucose and insulin levels were measured at the end of 16 weeks. Expressions of genes for inflammatory markers, GLUT-4 and adiponectin in the adipose tissue of the mice were assessed. One-way ANOVA and Duncan’s multiple range tests (DMRT) were used to determine the significant differences between groups.

**Results**

GE treated groups improved the glucose tolerance, attenuated hyperglycemia and hyperinsulinemia in the mice by up-regulating the adiponectin and GLUT-4 gene expressions. The mice in GE treated groups did not develop insulin resistance. GE also down-regulated the expression of inflammatory markers (IL-6, TNF-alpha, SAA2, CRP and MCP-1) via attenuation of nuclear transcription factors (NF-kappaB).

**Conclusion**

Glucan-rich polysaccharide of P. sajor-caju can serve as a potential agent for prevention of glucose intolerance, insulin resistance and inflammation.