

Phenolics Content and Inhibitory Effect of Sugarcane Molasses on α -Glucosidase and α -Amylase In Vitro

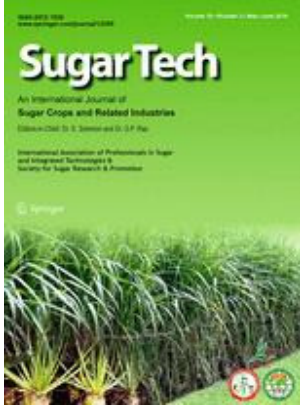
- Fansheng Kong **Affiliated with** College of Light Industry and Food Sciences, South China University of Technology College of Pharmacy, Guangdong Pharmaceutical University Guangdong Province Key Laboratory for Green Processing of Natural Products and Product Safety
- Shujuan Yu **Affiliated with** College of Light Industry and Food Sciences, South China University of Technology Guangdong Province Key Laboratory for Green Processing of Natural Products and Product Safety [Email author](#)
- Feng Zeng **Affiliated with** College of Light Industry and Food Sciences, South China University of Technology
- Xinlan Wu **Affiliated with** College of Light Industry and Food Sciences, South China University of Technology

Abstract

Sugarcane molasses is a wealthy source of health beneficial phenolic compounds and exhibited significant biological properties. Present study was designed to assess the inhibitory effect of sugarcane molasses on α -glucosidase and α -amylase. Hypoglycemic fractions were extracted using macro-porous and ion exchange resins. The total phenolics content was 0.179 ± 0.003 mg GAE per milligram of extract. Four phenolic acids which include caffeic acid (11.64 mg/g), ferulic acid (10.49 mg/g), chlorogenic acid (1.77 mg/g), and gallic acid (0.87 mg/g) were identified and quantified by high-performance liquid chromatography. The inhibitory activities of sugarcane molasses were 4.693 mg/mL ($K_m = 1.099$ mL/mg) and 4.254 mg/mL ($K_m 0.238$ mL/mg) for α -glucosidase and α -amylase, respectively, which revealed that sugarcane molasses could be a useful addition in medicinal preparations as nutraceutical and functional food for diabetic patients.

Keywords

Molasses; Phenolic compounds; α -Glucosidase; α -Amylase; Diabetes



Phenolics Content and Inhibitory Effect of Sugarcane Molasses on α -Glucosidase and α -Amylase In Vitro

Frankling Arag^{1,2}, Siqueira L^{1,3}, Fong Arag⁴, Saldan W⁵

Received: 4 April 2010; Accepted: 4 June 2010
© Frankling Arag, Siqueira L, Fong Arag, Saldan W

Abstract Sugarcane molasses is a waste stream of black treacle, phenolic compounds and cellulose, a natural inhibitor of α -glucosidase and α -amylase. Hypoglycemic factors, such as polyphenols, are present in the molasses. The total phenolic content was 0.179 ± 0.002 mg GAE per milligram of dry molasses, with the highest values (0.179 mg/g) in the molasses with 100% sugarcane molasses. The inhibitory activity of sugarcane molasses was evaluated against α -glucosidase and α -amylase. The results showed that sugarcane molasses could be a natural inhibitor of α -glucosidase and α -amylase, and therefore a good source for diabetic patients.

Keywords Molasses; Phenolic compounds; α -Glucosidase; α -Amylase; Diabetes

Introduction Diabetes mellitus is a metabolic disorder characterized by high blood glucose levels with consequent pathogenesis. Various factors are associated with insulin resistance, such as obesity, hypertension, and hypertriglyceridemia. Several components including carbohydrates, lipids, proteins, and vitamins are present in molasses. The phenolic compounds in molasses are naturally found there, and some of them are known to have antidiabetic and hypoglycemic effects, such as chlorogenic acid, gallic acid, and ferulic acid. These compounds are naturally found in tea leaves, citrus, vegetables, and some fruits. Phenolic compounds, such as flavonoids and phenols, with their antioxidant potential and are natural inhibitors for several kinds of enzymes (Arag et al. 2010; Arag and Saldan 2011; Fan et al. 2010; Fong et al. 2010). These compounds are also naturally found in sugarcane molasses (Arag et al. 2010) and are known to have antidiabetic effects (Arag et al. 2010). The aim of this study was to evaluate the inhibitory effect of sugarcane molasses on α -glucosidase and α -amylase activities in vitro.

¹ Instituto de Alimentos e Nutrição, Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil
² Instituto de Alimentos e Nutrição, Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil
³ Instituto de Alimentos e Nutrição, Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil
⁴ Instituto de Alimentos e Nutrição, Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil
⁵ Instituto de Alimentos e Nutrição, Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil

Published online: 10 March 2010

