Influence of various carbohydrate sources on postprandial glucose, insulin and NEFA concentrations in obese cats

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Abstract

Carbohydrate is an important source of energy, which can significantly affect postprandial blood glucose and insulin levels in cats. In healthy animals, this is not a big concern; however, in obese and diabetic animals, this is an important detail. In the present study, the impact of four different carbohydrate sources (glucose, maltose, corn starch, and trehalose) on short-term post-prandial serum glucose, insulin, and non-esterified fatty acid (NEFA) concentrations was investigated with four obese cats. Each of the carbohydrate sources was added to a commercial wet food diet for feeding the animals. A significant difference was observed in postprandial glucose, insulin, and NEFA area under the curve (AUC) values between each carbohydrate source in obese cats. Furthermore, glucose and maltose induced the highest postprandial glucose and insulin AUC values, whereas trehalose induced the lowest postprandial glucose and insulin AUC value amongst all carbohydrate sources, respectively, in obese cats. However, trehalose has a higher risk of inducing side effects, such as diarrhea, as compared to other carbohydrate sources. As such, different carbohydrate sources appear to have a very significant impact on post-prandial glycemia and subsequent insulin requirement levels in obese cats. These results might be useful when selecting a prescription diet for obese or diabetic cats. In addition, maltose appears to be capable of inducing experimentally evoked postprandial hyperglycemia in obese cats, which may serve as a good tool for use to check the impact and effectiveness of newly developed oral hypoglycemic drugs or supplements for cats in future experiments.

Key words: cat, carbohydrate, diet, glucose, insulin

Introduction

Obesity is common amongst privately owned cats. Since the cat is carnivorous by nature and would normally consume prey high in protein, with moderate amounts of fat, and a minimal amount of carbohydrate, in a natural environment, cats are metabolically adapted for greater metabolism of proteins and lower utilization of carbohydrates, as compared to omnivores. As such, carbohydrate amounts and sources can...