

Effect of dietary fiber in lowering serum glucose and body weight in sprague dawley rats

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Abstract

Introduction:

The present study evaluated the hypoglycemic perspectives and weight loss significance of dietary fiber. Dietary fiber was supplemented in commercial wheat flour (atta) for the preparation of chapatis, a staple diet of South Asia. Male Sprague Dawley rats (n = 100) were randomly divided into 4 diet groups (n = 25 per group). The control group was fed basal diet that included commercial wheat flour chapati, cornstarch, corn oil, salt and vitamin mixture in such a way that 10% of the protein was available from the final diet. To the basal diet of other 3 groups, chapatis supplemented with 2% guar gum (GG 2%), 3% guar gum (GG 3%) and 5% chickpea + 1% guar gum (CP5%+GG1%) were added, respectively. All diets were fed to the rats for a period of 8 weeks to perceive the impact of respective compositions. Rats fed on CP 5% + GG 1%, showed maximum glucose reduction (14.57%) followed by GG 3% (11.64%) and GG 2% (9.60%) as compared to control diet. Likewise, rats fed on 3% GG showed maximum decline (7.90%) in body weight. It was concluded that chapatis prepared from selected treatments provide an additional dietary fiber that could be supportive for diabetic and obese individuals.

Results:

The results indicated that addition of dietary fiber influenced the physical characteristics of chapati non-significantly. Maximum glucose concentration was found to be 112.50 mg/dL in control group followed by 101.70 and 99.41 mg/dL in groups fed on guar gum 2% and guar gum 3%, respectively. Lowest glucose concentration (96.11 mg/dL) was observed in rats fed on the combination of chickpea 5% + guar gum 1%. Maximum serum protein concentration was found to be 6.39 g/dL in rats fed on combination of chickpea 5% + guar gum 1% whilst the remaining three groups showed non significant variations with respect to each other. Means for serum

protein were 6.33, 6.30 and 6.32 g/dL for control, guar gum 3%, and guar gum 2%, respectively. Maximum serum albumin concentration was found to be 3.63 g/dL in rats fed on combination of chickpea 5%+ guar gum 1% showing non-significant differences than that of control (3.60 g/dL).

Conclusion

Soaring cost of medication and their side effects demand new ways against the existing malady of diabetes. Diet based strategy is a right approach as it is economical and assessable to avoid the health risks. The present research explored that diet diversification is an effective tool for the management of serum glucose and body weight. Role of legumes is indispensable to enhance the dietary fiber. Ingestion of chapaties prepared from selected compositions of composite flours providing an additional dietary fiber would be supportive to reduce hyperglycemia and obesity.

Keywords: Sprague Dawley rats, Dietary fiber, Composite flour, Chapati, Serum glucose, Insulin glucose indices.