

This Week's Citation Classic®

Jenkins D J A, Leeds A R, Gassull M A, Cochet B & Alberti K G M M.

Decrease in postprandial insulin and glucose concentrations by guar and pectin.

Ann. Intern. Med. 86:20-3, 1977.

[Medical Research Council Gastroenterology Unit, Central Middlesex Hospital, London, England]

The study indicated that in healthy volunteers soluble fibers, guar and pectin, added to liquid or soluble test meals containing fat, protein, and carbohydrate reduced the postprandial glucose and insulin responses. Breath hydrogen studies suggested this was not due to carbohydrate malabsorption. [The SCJ® indicates that this paper has been cited in over 240 publications.]

David J.A. Jenkins
Department of Nutritional Sciences
Faculty of Medicine
University of Toronto
Toronto, Ontario M5S 1A8
Canada

June 24, 1988

The paper suffered many rejections and was only accepted when all the authors, with the exemption of Tony Leeds, had given up hope. Tony persevered and sent it to Edward Huth, who had already published correspondence on the same topic,¹ and was greeted with enthusiasm. This was despite the simple t-test comparisons, which would undoubtedly not satisfy contemporary editorial statisticians, who now wield so much power.

The original stimuli to our fiber studies included the fiber hypothesis of Denis Burkitt and Hugh Trowell implicating a relationship between low fiber intakes and a wide range of Western diseases. Later, David Southgate proposed that this association may relate to the ability of fiber to impede nutrient absorption from the gut.

Our own early interests concerned the possible role of fiber in the treatment of hyperlipidemia through alterations in fat and bile acid absorption. Unexpectedly, we noted that viscous fibers enhanced postprandial chylomicronemia. At the same time, the glucose response, used as a crude marker of gastric

emptying, was paradoxically flat. Nevertheless, we failed to follow up this glucose finding for over two years and then only because of the enthusiasm shown by Stuart Truswell and Ruth Kay. When at last we did, we added guar to a liquid Lundh test meal (purified milk protein, corn oil, and glucose) and confirmed the flattening in glycemic response. However, the basic test meal was so unpalatable that our Oxford medical student volunteers, who, together with the authors, formed the volunteer pool, felt unhappy to continue. We therefore tried more conventional mixed meals.

We were able to add pectin to marmalade, but the use of guar was much more difficult. After several days spent covered in viscous guar bread dough, Tony and I finally created an edible guar bread formulation. Our dietitians had refused the task from the start. Armed with this creation, we launched trials of high-fiber compared to control breakfast meals in normal and later in diabetic volunteers.

The paper's significance lay in demonstrating that viscous fiber, incorporated into mixed meals, reduced postprandial glucose and insulin responses. At the time it was proposed that fiber exerted its action by reducing the rate of small intestinal digestion and impeding absorption. These suggestions have been supported by subsequent reports.²

Interest in fiber for diabetes and hyperlipidemia treatment has kept the paper topical, especially in relation to the high-fiber, high-carbohydrate diets pioneered by James W. Anderson.³ Slowing absorption by a variety of means has been proposed as a new therapeutic principle.^{4,5} Major diabetes associations have now endorsed the use of higher carbohydrate diets with increased fiber content. Nevertheless, this view was not shared by a recent National Institutes of Health consensus panel. The subject therefore remains both topical and controversial.

1. Jenkins D J A, Leeds A R, Newton C & Cummings J H. Effect of pectin, guar gum and wheat fibre on serum cholesterol. *Lancet* 1:1116-8, 1975. (Cited 180 times.)
2. Ebenhans B, Zenker D, Caspary W F & Blume R. Guarum effect on intestinal absorption. *Gastroenterology* 86:645-53, 1984. (Cited 15 times.)
3. Anderson J W. Dietary fiber in nutrition management of diabetes. (Vahonny G V & Krichevsky D, eds.) *Dietary fiber: basic and clinical aspects*. New York: Plenum Press, 1986. p. 343-60. (Cited 5 times.)
4. Creutzfeld W. Introduction. (Creutzfeld W & Folsch U R, eds.) *Delaying absorption as a therapeutic principle in metabolic diseases*. Stuttgart, FRG: Thieme, 1983. p. 1. (Cited 5 times.)
5. Clissold S P & Edwards C. Acarbose: a preliminary review of its pharmacodynamic and pharmacokinetic properties and therapeutic potential. *Drugs* 35:214-43, 1988.