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Glycemic Index of FiberPasta: Scientific Report

INTRODUCTION:

Many studies have affirmed that a diet rich in simple sugars is associated with the insorgence of diabetes, cardiovascular disease and metabolic syndrome (1-5). Among the hypothesized molecular mechanisms there is an effect on glucose metabolism and insulin secretion (2-5). In the recent years In order to prevent these diseases, the glycemic index has been proposed as a useful parameter of nutritional quality The glycemic index (GI) is used to classify foods containing carbohydrates based on the increase of blood glucose and is calculated by comparing the increase in blood glucose levels after ingesting a predetermined quantity of meal and the increase observed after the ingestion of a reference food (glucose or white bread). The GI is expressed as a percentage of the reference food value, giving it a glycemic index value of 100.

Scientific studies conducted on different types of foods proved that different types of carbohydrate produce varying glycemic and insulinemic responses. Glycemic index even depends on the amount of fibre and further factors that can influence the digestion and absorption of carbohydrates and consequently the insulin response (7, 8). Generally, foods containing refined sugars have a high glycemic index, while vegetables and legumes and foods rich in fibre tend to have a lower glycemic index (7). Once known the GI of a food, it's possible to calculate another parameter, the glycemic load. The glycemic load is easily calculated by multiplying a food's Glycemic Index (as a percentage) by the number of net carbohydrates in a given serving.

The concepts of glycemic index and glycemic load are particularly important in those situations where it is necessary to control postprandial blood glucose and insulin, such as diabetes and obesity (9.10) The interest in the determination of G.I. value is also confirmed by the fact that many countries like Sweden, Germany, UK and Australia show that value in the nutrition labeling of foodstuffs.

METHODS:

The glycemic index of the FibePasta was evaluated following the experimental indications described by Wolever et al. 2008. (6)

We have included n.20 healthy volunteers (without diabetes or other disorders of glucose metabolism). The age, sex and the median BMI of patients included in the study are reported in Table 1

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We evaluated the variation of blood glucose after 50g glucose intake, as standard reference food, and FiberPasta intake (50g available carbohydrate).

The scientific experiment was were carried out to a maximum 120 minutes. As shown in Image 1, you get an increase in postprandial glycemia, and the area under the curve can be used to calculate AUC (the incremental areas under the curve). We assigned a value of 100 to the area under the curve (obtained after glucose intake). The Glycemic Index of foods has been calculated as the ratio between AUC of the blood glucose response of pasta and AUC of the reference food (glucose).

Glycemic Index (GI) = (AUC pasta / AUC glucose) * 100

Table 1: Characteristic of patients included in the study.	
Male / Female (n)	8/12
Age	34±12
Weight (Kg)	65±9
BMI (Kg/m^2)	23,8±3,1
Fasting blood glucose (mmol/L)	4,4±0,4
AUC ref (mmol*min/L)	185,4±67,7
AUC pasta (mmol*min/L)	43,7±17,1
Glycemic Index pasta (%)	23,5±9,1
Glycemic load pasta (80g)	10,8±4,3

RESULTS:

The average level of fasting blood glucose is 4.4 ± 0.4 mmol / L and increases after intake of standard food (glucose), reaching the maximum peak after about 30 minutes (7.2 ± 1.0 mmol / L) (Figure 1). AUC values obtained after intake of standard food changes in the examined patients with values between 84.5 and 350 mmol * min / L. The average value is 185.4 ± 67.7 mmol * min / L. These data agree with those reported by other authors (6).

In **Image 1** we showed the average value of blood glucose after FiberPasta ingestion, compared to the reference food (glucose). The average AUC after pasta ingestion (43,7±17,1mmol*min/L) is lower than after standard food (185,4±67,7 mmol*min/L). The Glycemic Index individual values of FiberPasta are included between 11% and 37% and the average value is 23,5±9,1%.

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Image 1: Variation of blood glucose after 50g glucose intake and after the consumption of 50g FiberPasta Spaghetti (time 0-120 minutes)
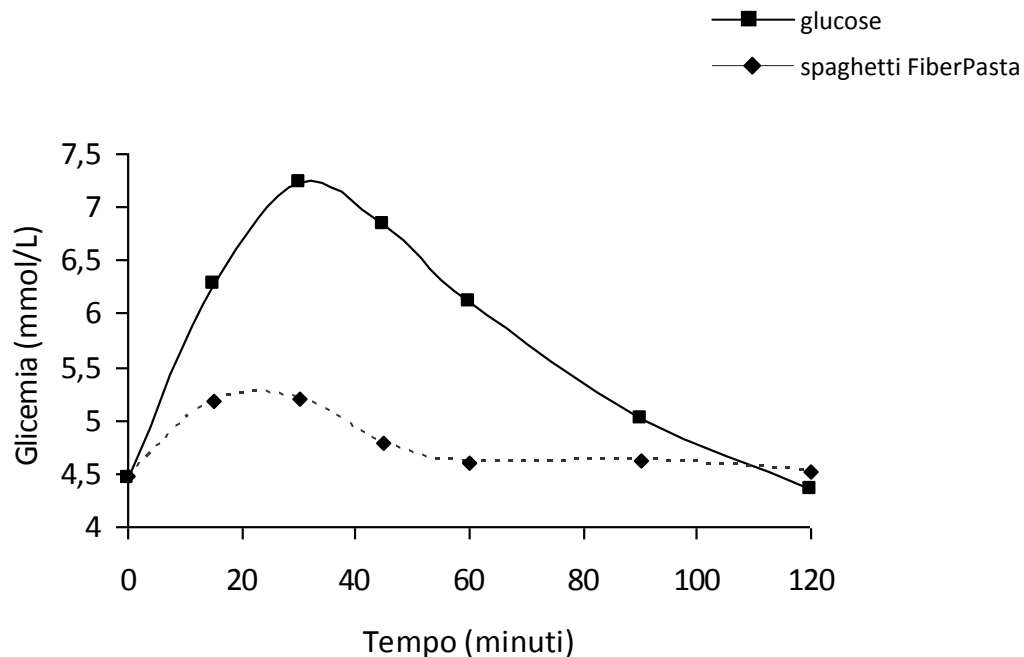
CONCLUSIONS:

The glycemic index is a parameter that allows to classify foods according to their effect on blood glucose.

Foods are classified as follow:

Low glycemic index food GI <55

Medium glycemic index food 56 <IG> 69

High glycemic index GI> 70

The results obtained showed that **FiberPasta has an average glycemic index of 23 % and so it can be considered a low glycemic food.**

So the low-glycemic index of FiberPasta depends on its composition. In fact **FiberPasta is characterized by a high content of fibre (15g/100g).** Dietary fibre is a group of complex carbohydrates (polysaccharides,

cellulose, hemicellulose, lignin, silica, inulin, oligosaccharides) and other non-digestible elements, therefore not immediately assimilated by human body. Even if dietary fibre is not considered a nutrient, it produces important

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functional and metabolic effects and is considered a relevant component of human diet. It helps slowing down the absorption of sugars, plays an important role in increasing the feeling of satiety and improve bowel function and gastrointestinal disorders associated with it (constipation, diverticulosis) (12).

In recent years the concept of prebiotic fibre has gained much attention. Prebiotic fibres are non digestible food ingredients benefiting the body thanks to selective stimulation of the growth and/or activation of health intestinal bacteria, allowing to rebalance the intestinal flora by supporting good colon health.

The pasta FiberPasta contains significant amounts of prebiotic fibres such as inulin (2 g/100g).

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Glycemic Index
and Glycemic Load of FiberPasta

Glycemic index evaluation

The glycemic index of pasta Fiberpasta (spaghetti) has been studied in healthy volunteers (n =20), using 50g anhydrous glucose as reference food. The increase of glycemic levels has been evaluated for different times (0-120min). As shown in **Figure 1**, an increase in postprandial glycemia has been observed after intake of reference food and pasta. The incremental area under the glucose response curve (AUC) has been calculated by using the trapezoid role. The Glycemic Index of pasta has been expressed as the ratio between AUC of pasta and AUC of the reference food (glucose).

Glycemic Index (GI) = (AUC pasta / AUC glucose) * 100

Results of the study

In **Figure 1** , the mean plasma glucose values obtained after intake of pasta-Fiberpasta compared with the reference (glucose), have been shown. The mean AUC value obtained after intake of pasta (43.7±17.1 mmol*min/L) is significantly lower than that obtained with reference food (185.4±67.7 mmol*min/L). The Glycemic Index values of FiberPasta range between 11% and 37% and the mean value is 23,5±9,1%.

The glycemic load of a FiberPasta portion (80g) is 10,8±4,3
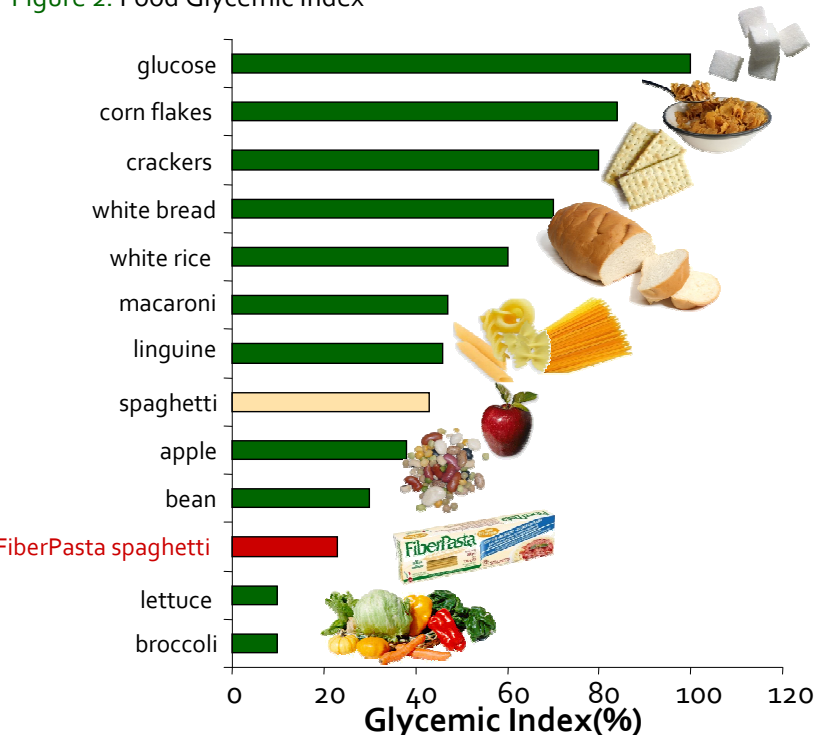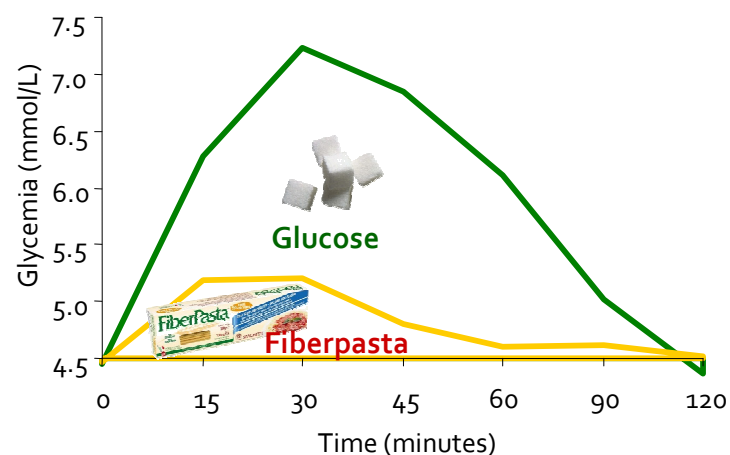
Figure 1: Variation of blood glucose levels after 50g glucose intake and after the consumption of 50g FiberPasta

Figure 2: Food Glycemic Index

Conclusions:

- **FiberPasta (spaghetti) has a glycemic index of 23.5%** and a glycemic load of 10.8; therefore it can be considered **a low glycemic food (Figure 2)**.

- The low glycemic index of FiberPasta is due to its composition rich in dietary fibre and proteins (15% fibre, 15% protein)