

FUNCTIONAL INGREDIENTS WITH MEASURABLE HEALTH BENEFITS

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Consumers today demand functional food products that provide an additional health benefit above and beyond their pure enjoyment value. For them, it is essential to see a close connection between the products they consume and a balanced and healthy diet. To point out this connection, food and beverage concepts from WILD that offer traceable and measurable health benefits for the consumer are referred to as "measurable health" concepts.

Measurable health benefits may take the form of a lower cholesterol level, through the consumption of phytosterols, or long-term prevention of eye damage, with regular consumption of products containing lutein, or the immune-booster effect of combined fruit and plant extracts. Consumers expect food products they can rely on, and the food industry faces the challenge of meeting this expectation. Credibility is a key factor in this business, and scientific evidence is crucial.

SCIENTIFIC STUDIES

Since a multitude of discussions arose in Europe concerning the scientific basis of functional food [1], scientific evidence has been considered of utmost importance. In the PASSCLAIM project [2], the scientific basis for this was compiled. In order to assess scientific literature on a topic, other studies have focused on rating the scientific value of study findings [3]. The hurdles for scientifically sound evidence are high. With the publication of the EU Health Claims Directive (EG 1924/2006), standardized scientific evaluation and evidence of product-related health claims became a legal requirement across Europe. Although it is not yet entirely clear as to how authorities will assess health claims, a high scientific standard must be applied. Using scientific studies in order to provide evidence of health benefits or carrying out independent studies is unavoidable when developing innovative concepts. In 2002, WILD was one of the first companies in the food industry to develop products with measurable

health benefits. In its "Measurable Health" program, the company scientifically tested products for effectiveness.

GLYCEMIC INDEX

One example of a method for proving positive health effects is to measure the glycemic index (GI) of foods. The index provides a new way of depicting the quality of carbohydrates in food and replaces the trend towards merely counting calories.

The **glycemic index (GI)** relates to the effects of the carbohydrates within the food on the human blood sugar level. A low glycemic index results in only moderate increases and decreases in blood sugar levels, keeping them at a constant level longer. A diet with a low GI helps avoid drastic variations in blood sugar levels.

The World Health Organization (WHO) and the Food and Agriculture Organization (FAO) recommended that populations in industrial nations base their diet more on foods with a low glycemic index to prevent the diseases of modern civilization.

The glycemic index is a ratio that compares the blood sugar curve following the consumption of a set quantity of carbohydrates from a test food (25 or 50g) with the curve from a reference food, formerly white bread and now glucose. The measurement technique was developed by the FAO and WHO. A food's glycemic index is ranked as follows [4]:

GI > 70	High glycemic index
GI < 70 and GI > 55	Medium glycemic index
GI < 55 and GI > 40	Low glycemic index
GI < 40	Very low glycemic index

Regarding health benefits, there is discussion as to whether low-GI foods offer long-term benefits concerning the prevention of coronary illness or diabetes [6]. However, the glycemic index can also be used specifically to develop products that quickly alter the blood sugar level, which can prove necessary in athletics, for instance.

For food manufacturers, it is also important when formulating products to have access to various qualities of carbohydrates, which vary in terms of their glycemic index, among other things. To illustrate this, table 1 provides an overview of some well-known types of sugar, compared to glucose as a reference [5]:

TAB. 1: THE GLYCEMIC INDEX OF VARIOUS TYPES OF SUGAR	
Glucose	99 +/- 3
Fructose	19 +/- 2
Sucrose	68 +/- 5
Maltose	105 +/- 12
Lactose	46 +/- 2

GLYCEMIC LOAD

When referring to the concept of the glycemic index, another important measurement should be taken into account – the glycemic load (GL). The glycemic load multiplies the quantity of carbohydrates per portion of a food by its glycemic index. For example:

- $GL = \text{carbohydrates per portion} \times GI$
- A 500ml portion of apple juice spritzer contains 27.5g of carbohydrate. Therefore, for a GI of 40, the GL is 11.
- A 380ml portion of cola also contains 27.5g of carbohydrate. However, as the GI is 68, the GL is 18 19.

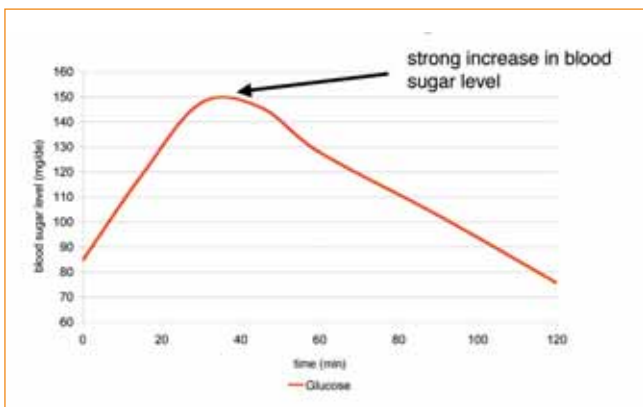


Fig. 1: Blood sugar curve following consumption of high-GI glucose (GI = 99)

In line with the glycemic index concept, the glycemic load per portion of the food should also remain low. For instance, the GLYX Institute in Germany recommends a glycemic load of no more than 10 per portion.

Using the glycemic load measurement, foods containing carbohydrates can be compared using both the glycemic index and consumer-relevant portion sizes.

THE DEVELOPMENT OF FRUIT UP® – THE FRUIT SWEETENER WITH A LOW GLYCEMIC INDEX

Fruit sweeteners are products that contain carbohydrates from one or several fruits, often apple, grape or pear. The glycemic indices of fruit juices vary depending on the combination of carbohydrates [6]:

TAB. 2: THE GLYCEMIC INDEX OF VARIOUS FRUIT JUICES	
Apple juice	40 +/- 1
Orange juice	50 +/- 4
Pineapple juice	46

When manufacturing fruit sweeteners, the purification of the fruit matrix frequently leads to an increase in the glycemic index, as the effects of the matrix that help to reduce absorption (e.g. soluble fiber or polyphenols) are no longer present. Fruit sweeteners are popular ingredients due to their balanced sugar spectrum and positive image.

By carefully selecting specific fruits, WILD has succeeded in producing a natural fruit sweetener that can be used in a variety of applications. The sweetener is a highly concentrated blank product (> 70° Brix). In addition, a GI was achieved that is extremely low for fruit sweeteners.

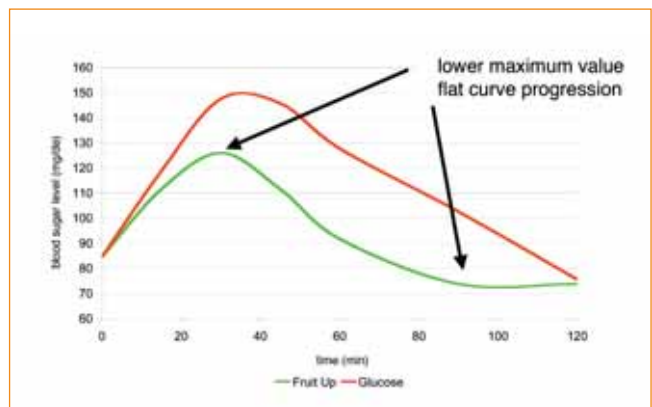


Fig. 2: Fruit Up® from WILD has a GI of less than 35, and has a more balanced effect on blood sugar levels than glucose.

Fruit Up® – the natural fruit sweetener with the lowest glycemic index

Fruit Up® natural fruit sweetener from WILD is a blend of clear fruit concentrates that are entirely derived from fruits. With its broad sugar spectrum of balanced proportions of the carbohydrates in the fruit concentrate – fructose, glucose and sucrose – Fruit Up® has a glycemic index of less than 35, the lowest GI value in comparison to other natural fruit sweeteners.

Fruit Up® is ideal for products that, from a consumer perspective, are natural and contribute to a balanced diet. The natural fruit sweetener is particularly suited for use in sport drinks, near water, herbal or tea drinks containing pure, natural ingredients, or for drinks with a low glycemic index.

WILD produces Fruit Up® from a variety of fruits, using a purely physical process with no enzymes. Sensory tests have shown that compared to single fruit sweeteners, Fruit Up® is also preferred in terms of taste.

In collaboration with Professor C. Jeya K. Henry and Dr. Helen Lightowler from the Nutrition and Food Science Group of the School of Biological and Molecular Science at Oxford Brookes University, WILD has carried out a scientific study on the level and effect of the GI of Fruit Up®. The special composition of Fruit Up® has a proven, low GI of 34 [7]. This means that this fruit sweetener is more suitable than others in foods containing carbohydrates and offers a measurable advantage.

CONCLUSION

The glycemic index and glycemic load of foods are becoming increasingly important as additional quality parameters for the physical effects of carbohydrates. For

this reason, natural sources of carbohydrates are of great importance to product developers. Fruit Up®, the fruit sweetener with the low glycemic index, helps to achieve measurable health benefits for customers by reducing the glycemic index of the end product.

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