For centuries, sugar and sugar based sweetness such as honey have been giving sweetness to human food. However, in the last decades the global sugar and nutritious sweetener consumption has been rising steadily and the per capita use has grown dramatically (1), particularly in the industrialised countries. The risk of a high sugar and consequently high calorie diet combined with a lack of physical exercise is scientifically proven and underlined by obesity and overweight statistics. Eating large amounts of sugar has not only been linked to health problems such as obesity but also to metabolic syndrome, diabetes and caries. Obesity must be understood as both, an individual risk factor as it shortens significantly the life expectancy of every individual, but also as an economic problem as the costs involved are distributed over the whole population of a country. Working on the risk factors of this epidemic is therefore an important task for both the individual and the health authorities in every affected country. A reduction of sugar intake in the diet is a valuable and necessary approach to tackle this threat to human health.

Sugar’s tasks in food > Traditionally the term “sugar” is used for sucrose, the white table sugar, which is used in uncountable ways at home or industrially in foods and beverages. Sugar serves numerous functions: it adds sweetness to a product but it also has and adds its own taste profile. Being a bulk ingredient sweetener it additionally contributes to the texture and consequently to the mouthfeel of a beverage or food. Consumers are used to the sugar taste profile since their childhood and any change like e.g. a lingering sweetness or metallic off-taste of a sugar replacer is recognised very quickly and efficiently. Sugar is more than just a sweetening...
agent and any ingredient which is intended to be used in the place of sugar should ideally be able to act as sugar with regards to taste profile and mouthfeel.

With people looking for ways to decrease caloric intake and with an increase in the number of diabetics, low-calorie sweeteners began to gain market share in the middle of the past century. Be it for home use, in restaurants or industrially, alternative sweeteners became more and more en vogue. Today, Aspartame, Acesulfame K or Sucralose are the most popular high intensity sweeteners. Especially in North America and Asia Pacific they have built high market shares. Their success was built on their zero calorie sweetness. But their limitations are obvious: aftertaste problem, no texture or body and thus limitation on use in liquid or semi-liquid food products. It turned out that high intensity sweeteners can take over sugar’s task in food only partially and never completely. They could not create technological effects like colour upon baking, prolonged shelf life due to reduction of water activity or a freezing point depression. Discussions about the safety of artificial high intensity sweeteners additionally limited the success due to the customer’s fear of possible yet unknown health risks of those “new” and chemically produced sweeteners.

High intensity sweeteners were increasingly used as table top sweeteners and large beverage companies introduced “light” product lines to the market which contained high intensity sweeteners such as Cyclamate and Aspartame. High intensity sweeteners are produced by chemical synthesis (2). Although they have the advantage to be zero caloric and tooth-friendly, consumers increasingly search for alternatives. They prefer to keep their food natural and want the original genuine taste in the foods and beverages they consume.

The search for natural zero calorie sweetness has finally put the Stevia plant into the spotlight. Extracts of the Stevia Rebaudiana plant are one of the very few natural high intensity sweeteners available. The natural status in addition to its attractive properties such as zero calories, a zero glycaemic index and tooth-friendliness made it very popular not only to the food industry but also to end consumers in Europe even before it was finally approved in November 2011. Steviol glycosides which are the sweetness giving compounds in the stevia plants’ leaves can be up to 300 times as sweet as sugar. It consequently acts as a powerful sweetener but again shows the same technological limitations: namely the lack of bulk. Originally, the taste profile of the stevia extracts was not comparable to sugar: it has a bitter, liquorice-like off-taste and a lingering sweetness. With the emergence of the highly purified type of the steviol glycoside Rebaudioside A, the taste has improved but still aftertaste profile and a shifted sweetness onset pose significant problems to food developers.

Besides high intensity sweeteners, sugar alcohols (polyols) are the most important alternatives to sugar. Polyols have fewer calories than sugar, are tooth-friendly but are not as sweet as sugar. Their sweetness ranges between 30 and 95% of the sweetness of sugar. Additionally, polyols are known to cause laxative problems in case of overconsumption. Therefore, in Europe the well known laxative warning must be on the label of a product if it contains more than 10% polyols. Though polyols are less sweet than sugar, their strength is that they do add mouth feel which is sugar-like. Calorie-wise, polyols like sorbitol, maltitol, etc. must be labelled with a caloric value of 2.4 kcal/g in the European Union.

ERYLITE® Erythritol from Jungbunzlauer is an exception in the polyol landscape. It is zero caloric (3) and it is much better tolerated by the human body. Scientific studies have proven that at typical polyol consumption levels, erythritol has no laxative effect at all. Besides a glycaemic index of zero and tooth-
friendliness which ERYLITE® is sharing with the other polyols, it has another distinct point of differentiation: ERYLITE® has the advantage to be a natural sweetening alternative. Polyols are generally found in certain fruits in nature, but industrially they are all produced chemically by catalytic hydrogenation. ERYLITE® is the exception as it is produced by a natural process, namely yeast fermentation. This natural aspect is one of its main advantages as nowadays consumers are increasingly not only looking for calorie reduction but also for natural alternatives to sucrose. Naturalness is a top claim for foods and beverages. An ideal sugar alternative thus combines naturalness and zero calories with great taste. Currently there is only one product which meets all of these criteria, a blend of the 2 natural sweetening options available and approved for food use in Europe ERYLITE® Erythritol and stevia plant extracts.

ERYLITE® Stevia – the best alternative to sugar > Jungbunzlauer brought together the two natural and zero calorie sweeteners ERYLITE® (erythritol) and Rebaudioside A (steviol glycoside) to create a sweetening system that convinces on all aspects: sugar-like taste profile, naturalness, zero calories and zero glycaemic index. This blend is called ERYLITE® Stevia and offers a 1:1, 2:1 or 4:1 replacement of sugar without sacrificing taste or naturalness.

ERYLITE® is the bulk giving component of this sweetener blend. It occurs in nature in items such as grapes, soy sauce, wine and honey meaning that consumers are physically used to it and that the likelihood of allergies is low. The production of ERYLITE® does not require the use of enzymes or catalysts and there is no chemical modification of the end product. ERYLITE® is approx. 50 % as sweet as sugar and thus lacks sweetness. The missing sweetness is added through Rebaudioside A. The highly purified steviol glycoside is approx. 300x sweeter than sugar but has no bulking functionality itself. Smallest amounts increase the sweetness of the blend significantly.

The blend shows some surprising benefits: The original taste profile of Rebaudioside A is not comparable to the sugar taste profile. Even in highly pure extracts there is still a small amount of bitter tasting substances. ERYLITE® brings taste enhancing and bitterness inhibiting effects into the blend. It improves the overall taste profile by masking the Rebaudioside A off-notes. Besides these qualitative synergies mixtures of ERYLITE® and Rebaudioside A reveal quantitative synergies as well. At a specific ratio, the blends show a sweetness level which is higher than expected (higher than the sum of the individual sweetness provided).

No compromise in taste > The taste profile of a sweetener is the most important criterion. If a sugar replacer does not taste well, consumers will most probably not buy it again. Therefore, the optimal table top sweetener offers a great sugar-like taste, has no calories
and is natural at the same time. Such a table top sweetener does not only enrich the life of those individuals who cannot use sugar but also gives a great alternative to those individuals who are health conscious.

Consumers can choose between three different types: ERYLITE® Stevia 100 which has the same sweetening capacity like sugar, ERYLITE® Stevia 200 which is two times as sweet as sugar and ERYLITE® Stevia 400 which is four times as sweet as sugar. Since ERYLITE® Stevia is all natural and made entirely from natural sweeteners, it also meets the current consumer demands. Sensory tests prove that ERYLITE® Stevia has a winning taste in both, foods and beverages.

The ERYLITE® Stevia table top sweetener is suitable for a large variety of drinks and meals. It sweetens hot drinks like coffee and tea and disperses perfectly in them. Furthermore, it can be drizzled over cornflakes, cereals and yogurt.

ERYLITE® and ERYLITE® Stevia are part of Jungbunzlauer’s “Healthy Choices” range. This range of health promoting ingredients also includes several high purity organic mineral salts as well as the salt substitute sub4salt® and addresses the top health trends: sugar replacement, mineral fortification and salt substitution.


The Authors:
Ferid Haji & Simona Kljaic
Jungbunzlauer International AG
St. Alban-Vorstadt 90,
4052 Basel, Switzerland
Telephone: +41 61 2955 100
Fax: +41 61 2955 255
HealthyChoices@jungbunzlauer.com
www.jungbunzlauer.com