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NESTLÉ PROFESSIONAL NUTRITION MAGAZINE

The Risks of
Excess Sugar

Sweet
Alternatives

Tips from
the Pros



The Sweet Side of Sugar Reduction

Sugar

Love It or Leave It?

It's on every table, and seemingly everybody's mind. From a spoonful in coffee to baked goods, desserts, and even some condiments, sugar is an important ingredient or addition to many recipes. However, while most customers like to indulge their sweet tooth when they dine out, sugar consumption is on the rise,¹ and public health authorities and governments are pressuring people and the industry to consume less.

Controlling Sugar Intake

The World Health Organization has recommended limits on the amount of sugar people consume² and multiple governments around the world have enacted new regulations or taxes to help reduce added sugar consumption.³

Finding a Balance

Today, the foodservice industry is facing a challenge. Is it possible to meet the new health guidelines, follow government regulations, and deliver enough flavour to keep your customers satisfied?

Equipping Yourself to Succeed

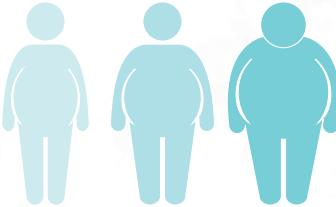
This issue is designed to help you learn more about sugar—where it's found in food and beverages, how it affects people's health, and what you can do to reduce sugar in your recipes. You can use this information to help educate your staff and your customers about these concerns, new guidelines, and the positive steps you're taking in your own kitchens and cafés.

Let's get to work.



The High Costs of Excess Sugar

The costs of obesity—in terms of both human health and money spent on medical care—are too big to ignore.

1.9 
BILLION OVERWEIGHT

- The number of overweight or obese people around the world has reached epidemic proportions, more than doubling since 1980. In 2014, more than 1.9 billion adults, 18 years and older, were overweight, and 600 million of them were classified as obese.⁴
- Excess energy consumption (calories) from excess free sugars has been identified as one of the contributors to being overweight or obese, particularly in relation to sugar-sweetened beverages.³

RISING 
MEDICAL COST

- Annual health care costs of obesity-related illness in the US: \$190.2 billion.⁵
- Annual cost of treating each patient with diabetes in Mexico: > 12,600 pesos (708 USD).⁶
- By 2025, it is estimated that Asia will see the greatest increase in number of people with diabetes.⁷
- Obesity in the UK costs the National Health Service £5 billion every year, with additional indirect social costs estimated at £22 billion.⁸

Worldwide Regulations

With increasing sugar consumption and its associated health risks, at least 49 governments around the world are developing or implementing some regulations on sugar, including soda taxes, advertising restrictions, and labelling guidelines.³



What is SUGAR?

Sugar is a carbohydrate, a natural source of energy found in many types of food. There are six types of simple sugars.

Know Your Limits

In 2015, WHO issued recommendations to reduce free sugar consumption to less than 10% of energy intake for both adults and children.

Further reducing free sugar intake to less than 5% of energy intake would provide additional benefits?

In Practical Terms

5% of daily energy intake corresponds with:

Adults

Less than 6 teaspoons of free sugars per day

Children

Less than 5 teaspoons of free sugars per day

SUGAR:

1 gram = 4 kcals

4 grams = 1 teaspoon

		Simple Sugar	Common Food Source
Monosaccharides		Fructose	High fructose corn syrup, fruits, vegetables, honey
		Glucose	Grains, pasta
		Galactose	Dairy products
Disaccharides		Glucose + Galactose Lactose	Dairy products
		Glucose + Fructose Sucrose	Sugar beets, sugar cane
		Glucose + Glucose Maltose	Molasses, beer



What about juices? Experts say:

- Compared to whole raw fruit, fruit juices lose most of their fibre and mineral content.
- Drinking juice can delay satiety, perhaps promoting excess calorie consumption.⁹
- Choose 100% juices, which retain some of the fibre and vitamins of the fruit.
- Limit children's consumption of sugar-sweetened beverages. Habitual intake vs. water may lead to them finding healthful, less sweet foods unpalatable, having a negative impact on diet quality.¹⁰

TOO MUCH OF A *Good* THING

Although many foods like fruits, vegetables, and milk contain their own natural sugars, when people start adding excess free sugars to their diet, there are increased health risks.



Sugar-sweetened beverages are the main source of sugars even in high income countries.¹

*1 serving = 240-350 ml and contains 4-10 teaspoons of sugars

Dental Cavities

Dental disease is the most prevalent non-communicable disease globally

Pain

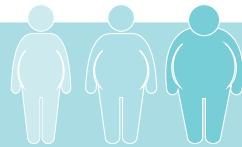
Anxiety

Functional Limitation

Social Handicap

- Accounts for 5-10% of healthcare spend in industrialized countries
- Exceeds financial healthcare resources of children in lower income countries¹¹

Excess Calories



Increased Risk of Obesity

Obesity is a risk factor for many non-communicable diseases (NCDs).

Type 2 Diabetes

Metabolic Syndrome

Heart Disease

Cancer

Sugar consumption in excess of energy requirements can alter glucose and fat metabolism, as well as triggering inflammation. This could lead to developing non-communicable diseases¹² such as type 2 diabetes, metabolic syndrome, heart disease, and possibly some cancers.

LEADS TO *Bad* OUTCOMES



Impact on quality and duration of life



Financial burden on healthcare



The Function of Sugar

Taste is the most obvious quality that sugar brings to food and beverages, but it's not the only one. From browning to baking to preservation, sugars contribute some important functional qualities, as well. When reducing sugar in a recipe, it's important to consider those functionalities and when possible, take steps to compensate so you can achieve similar results.

1 Sugar increases the volume of baked goods. As yeast consumes the sugar in a dough, it releases bubbles of carbon dioxide. These bubbles expand the dough, creating a more porous structure and a softer crumb.¹³

2 Sugar helps preserve jams and jellies. At the right concentrations, sugar binds the water in food. With no water available to micro-organisms, they starve, keeping the food fresh longer.¹³ To get similar results when reducing sugar, reduce pectin at a 1:1 ratio.

3 Sugar lowers the freezing point of foods. When you reduce sugar in frozen desserts, ice crystal formation will be larger. To help maintain a smooth texture, try adding pectins, gelatins, or gums.¹³

4 Sugar increases the setting temperature for baked egg custards. Reducing or omitting sugar won't impact the firmness or texture of the custard, but it will change the way it sets while baking. When reducing sugar, instead of changing the cooking temperature, just reduce cooking time by 2-5 minutes.

5 Sugar affects whipping time in meringues and sponges. Because sugar increases the time it takes to whip food, it's best to whip to soft-peak stage, then add sugar. If reducing sugar by 50%, you can decrease whipping time by 25%.

6 Sugar helps foods brown and crackle. The Maillard reaction between sugar and amino acids helps food brown, creating the perfect finish for everything from golden bread crust to the toasty baked meringue. Sugar can also help water evaporate on the surface of foods to produce crackle-top cookies.¹⁴

7 Sugar enhances the mouthfeel of beverages. When dissolved in a liquid, sugar adds thickness and body, creating a pleasing texture and helping the flavour linger in the mouth.¹⁵ Reducing sugar in beverages may need to be implemented incrementally over time.

8 Sugar retains moisture. Sugar enhances the flavour, moisture retention, and tenderness of baked goods. To maintain these qualities, balance reduced sugar with reduced amounts of fat, egg, and liquid, or substitute honey for some of the sugar.¹⁶



7



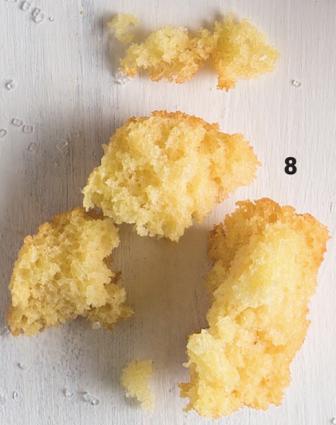
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4



3



8



6

It's not Sugar

Sugar's not the only source of sweetness. In fact, there are several other options that have few—or even no—calories.

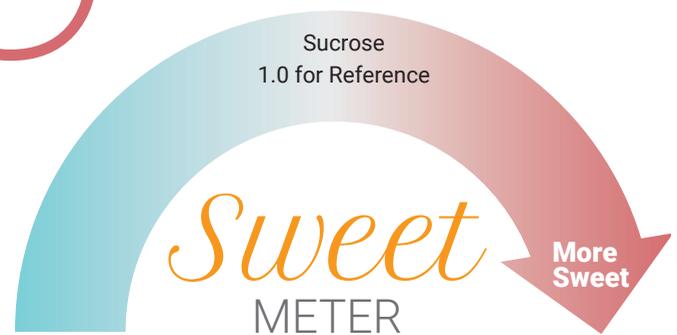
Sugar Replacements

Aspartame, saccharin, and other synthetically formulated ingredients are often used to sweeten diet or sugar-free foods and drinks like cookies and soda. While these artificial sweeteners have been rigorously tested by health authorities and deemed safe, some consumers prefer to avoid them. This preference and the desire to reduce added sugars are driving a trend toward natural, non-sugar sweetening options, including stevia extract and monk fruit.¹⁷

How do they work?

Sugar replacements are sometimes called non-nutritive sweeteners or intense sweeteners, due to their composition and relative sweetness compared to common sugars like table sugar, honey, or fructose.

These substitutes typically yield no or low calories. In addition, since they may be many times sweeter than sugar, they can be added in very small amounts—they have much more sweetening power per calorie.



Sweetener	Times Sweeter than Sugar
☞ Lactose	0.16
☞ Maltose	0.38
☞ Maple Syrup	0.60
☞ Galactose	0.60
☞ Molasses	0.70
☞ Glucose	0.75
☞ Brown Sugar	0.97
☞ Honey	0.97
☞ Sucrose (Table Sugar)	1.0
☞ Fructose	1.4
☞ Agave Nectar	1.5
Sodium Cyclamate	26
☞ Stevia Leaves	40
Acesulfame Potassium	200
Aspartame	220
☞ Stevia Extract	250
☞ Monk Fruit	300
Saccharin	300
Sucralose	600

☞ = Natural Source

Monk Fruit



Monk fruit comes from the Luo han guo plant, which is native to Southeast Asia. It has no calories, is approximately 300 times sweeter than sugar, and like stevia, is generally recognized as safe to consume.

Whole monk fruit is not widely available. However, you can find powdered extract which is made by peeling, seeding, and squeezing the fruit. It's also used as an ingredient in low-calorie versions of tabletop sweeteners, beverages, baked goods, yoghurts, sauces, and desserts.

As with stevia extract, a little monk fruit goes a long way. Take time to experiment and find the right amount to provide the ideal level of sweetness.

Stevia Extract



Stevia extract comes from the leaves of a South American plant. The extract is virtually calorie-free, approximately 200 times sweeter than sugar, and generally recognized as safe to consume.

Powdered stevia is widely available, and you can find many products sweetened with stevia extract, including soft drinks, sports drinks, yoghurts, and desserts.

However, it's also easy to prepare your own. Just keep a plant in the kitchen, and snip a leaf to use as a garnish in drinks or on desserts. Or, dry the leaves, steep them in hot water, and strain to create a calorie-free syrup that you can add to foods and drinks. Remember, since stevia is so much sweeter than sugar, you only need a little to get the flavour you want.

Sweet *Natured*



When you're thinking about replacing sugars with other sweeteners, remember that taste is not the only consideration. Sugars play an important functional role in some foods.

In foods and beverages where sugars don't play a critical functional role, it's easier to reduce or replace them. You may need to make some adjustments to whipping time or cooking times or temperatures, but the lack of sugar won't affect the structural integrity of the food.

For example, in egg-based desserts, like custards, or in whipping applications like creams and meringues, you can reduce sugars or completely replace them with other sweeteners.

However, sugars play an important structural role in baked goods. Alternative sweeteners won't feed the yeast fermentation that's critical for the crumb structure of cakes and breads, so you can't completely remove or replace the sugar. Instead, start with a 10% reduction, and adjust until you're happy with the results.

What's Hot

IN COFFEE SWEETENERS

Not every customer wants to drink coffee black. Thankfully, there are many creative ways to add flavour and sweetness without overloading on sugar, syrups, and whipped cream.

- Steam milk before adding to coffee to enhance its natural sweetness. Pro tip: 60-65 degrees Celsius is the ideal temperature for creating perfect foam and preventing milk "skin" from forming.
- Some common flavours are associated with sweetness. Dust the top of a drink with cocoa, cinnamon, or vanilla powder.
- Try using filtered water to limit minerals, which can taste bitter and minimise sweetness.
- Use cold brew coffee, which tends to have less bitter notes.
- Infuse cold brew coffee with citrus peels or other fruits to intensify sweetness perception.

CARDAMOM MACCHIATO COOLER

Ingredients

1 shot espresso
65 ml cardamom-flavoured milk
Ice cubes
Cardamom powder

Directions

1. Make cardamom-flavoured milk using the instructions on the next page.
2. Place 2-4 ice cubes in a jug, pour the flavoured milk over it, and mix or froth for approximately 45 seconds until the milk has a smooth, silky texture and volume doubles.
3. Place 4-6 ice cubes in a shaker and pour the espresso over it. Shake until the shaker is covered with a frosty mist.
4. Pour the cold espresso into a glass, using a strainer to hold back the ice cubes.
5. Slowly pour the cold and flavoured milk froth over the beverage to create a new layer.
6. Sprinkle cardamom powder on top for decoration.
7. Enjoy!

TROPICAL MACCHIATO

Ingredients

1 shot espresso
50 ml milk
100 ml hot water
1 mandarin orange
½ stalk lemon grass
1 teaspoon honey
Ice cubes

Directions

1. Make a lemon grass infusion using the instructions on the next page.
2. Place 2-4 ice cubes in a measuring jug, pour the milk over them, and mix or froth for approximately 45 seconds until the milk has a smooth, silky texture and volume doubles.
3. Cut two wedges from the orange and put them in a glass. Squeeze the rest of the orange, and keep the juice in a separate jug.
4. Put 4-6 ice cubes in a shaker and pour the espresso, lemon-grass infusion and mandarin juice over it. Shake until the shaker is covered with a frosty mist.
5. Pour the cold coffee mixture into the glass, using a strainer to hold back the ice cubes and lemon-grass pieces.
6. Slowly pour the cold milk froth over the beverage to create a new layer.
7. Mix & enjoy!



Adding Interest Without Extra Sugar

Of course, adding sugar isn't the only way to make beverages attractive to your customers. You can also boost colour (more intense colours are associated with sweetness);¹⁸ add herbs or spices to create intriguing scents and flavours, or create interesting contrasts by accenting with tart and bitter tastes or different textures like crushed ice and soft berries. Cheers!



FLAVOURED MILK

Ingredients

- Milk
- Aromatic spices such as vanilla, cardamom, cloves, tonka beans, cinnamon, or star anise

Directions

1. Place spices in a pan with milk.
2. Slowly heat milk to 65 degrees Celsius for hot beverages, or 75 degrees Celsius for cold beverages.
3. Remove the spices and allow milk to cool.
4. If needed, add a small amount of sugar, brown sugar, or honey to sweeten to taste.

Uses

Substitute for regular milk in any beverage, including hot or cold coffee, tea, cocoa, or smoothies.

FLAVOURED INFUSIONS

Ingredients

- Water
- Muddled fruit, chopped lemon grass, a strip of citrus peel (not pith!), herbs and spices, or a teaspoon of loose tea leaves

Directions

1. Place the flavouring ingredient in a jug.
2. Add hot water.
3. Allow to infuse for a few minutes.
4. Strain the water into another container and add it to your beverage.
5. If needed, add a little honey for taste.

Uses

Substitute for regular water in any beverage, including hot or cold coffee, tea, or lemonade.

Finding your *Sweet Spot*

Here are a few tips from chefs and sensory experts to satisfy customers while lowering the amount of sugar.

REDUCE SUGAR

- Limit added sugar wherever possible. In general, the sweeter something is, the more you can remove without having a negative taste impact.
- A simple approach to reducing sugar (and calories) is to offer smaller portions. This can be a good strategy for recipes where reducing sugars is challenging.
- Look for unsweetened ingredients. For example, choose fruit canned in juice or water instead of heavy syrup.
- Add sugar to beverages only upon request, and offer a single packet of sweetener instead of an unlimited supply. By making unsweetened coffee and tea your standard, you can reduce sugars consumed in drinks.

BE STRATEGIC ABOUT FLAVOURS

- Use flavours that are naturally associated with sweetness and enhance it's perception. Try pineapple, strawberry, vanilla, lemon, almond, caramel, and lychee.^{19,20}
- Use contrasting flavours to play up the sweetness. Bitterness and sourness decrease sweetness, while low levels of saltiness or umami play it up. Just be careful not to go overboard on saltiness, which can take the focus away from sweetness (think salted caramel).

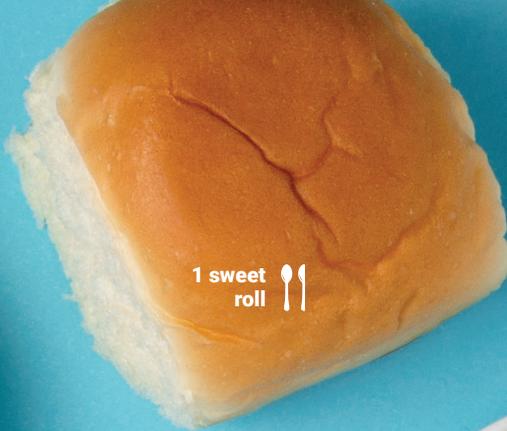
FOCUS ON YOUR OTHER SENSES

- Intensify the colour of red foods and drinks to increase the perception of sweetness. In studies, dark red solutions were rated sweeter than light red solutions even when they contained less sugar.¹⁸
- Play with the texture of foods to take the focus away from flavour. Chopped nuts, toasted coconut, or hot or cool sauces can create an exciting sensory experience without extra sugar.
- Serve foods and beverages warm instead of cold to increase perceived sweetness since temperatures can affect taste perceptions.²¹





125 ml
tomato sauce   



1 sweet
roll  



50 grams
of granola   

Sneaky Sugar

You can control how much sugar you put in your own recipes, but it can also sneak in from other sources. Here's how much added sugar is in common ingredients you might use or offer as condiments on your table. Actual counts may vary depending on serving size and product brand.

 = 1 teaspoon or 4 grams of sugar
WHO Guideline: less than 6 teaspoons/day



125 ml   
mandarin oranges
in fruit juice



30 ml    
hoisin
sauce



30 ml   
sweetened
cream



30 ml  
raspberry
vinaigrette

Making it Light

There are many ways to cut down on sugar without compromising on the delicious look and taste of foods. Experiment with a few of these methods to create a satisfying reduced-sugar dessert.



1 Replace some sugar in cream or fruit fillings and toppings with stevia extract, experimenting to perfect the flavour. Try starting with a 10% reduction, and remember that stevia extract is not a 1:1 replacement – you need much less to get the same taste impact. Garnish the dessert with an edible stevia leaf for a sweet surprise.

2 Consider how sweetness is distributed in your recipe and where it has the biggest impact. For example, you can increase the sweetness of fillings slightly, while decreasing sugar in the batter. The fillings will work harder to boost sweetness perception, but overall total sugars can be lowered.

3 Add fresh, ripe berries (or your other favourite fruits) since ripe fruit notes enhance sweetness perception.

4 Add complexity to the sensory experience to take the focus off of sweetness. For example, choose bourbon vanilla instead of regular vanilla. Or, add nuts or other garnishes for contrasting textures that add a bit of crunch, crackle or snap.

Remember—serving smaller portions is also an important way to reduce sugar (and calories).

Tell Me More

Many consumers are looking to limit sugars in their diet and appreciate transparency.

Why not help them out?

You can help by displaying the sugar content of recipes on menus, cups, wrappers, or other containers. Make sure the information is relevant and easy to understand. Using icons and tangible measures like teaspoons can help customers get the message quicker and even remove language barriers.

Those who are looking for the information will appreciate your support. It may help guide them to the menu choices that are right for them, or reassure them that their old favourites fall within their needs.



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