

Human Journals

Review Article

May 2023 Vol.:24, Issue:3

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Difference between Low-Sugar and Sugar-Free Canned Coffees



IJSRM
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY
An Official Publication of Human Journals



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Submitted: 27 April 2023
Accepted: 03 May 2023
Published: 30 May 2023

Keywords: Canned Coffee, Liquid Coffee, Trace Sugar, Low Sugar, Sugar-Free

ABSTRACT

Coffee is consumed worldwide because of its unique aroma and bitterness. In Japan, coffee is consumed in various places, such as homes, restaurants, and workplaces. Conventionally, several types of solid coffees exist. Solid coffee can be roughly divided into regular coffee, which refers to roasted and ground coffee beans, and water-soluble instant coffee, which is a dried extract of regular coffee. In recent years, canned and liquid coffees, which have already been put into a container in a ready-to-drink state, have been produced as a convenient way to drink coffee involving little time and effort. Liquid coffee already contains sweeteners and milk and can be consumed immediately without adding hot water or undergoing an extraction process. Numerous coffee lovers exist worldwide; however, excessive drinking can cause health concerns. In particular, canned and liquid coffees are associated with an increased risk of obesity and diabetes due to an excessive intake of lipids and sugars. This study primarily focuses on the quantity of sugar, describes the types of canned and liquid coffees, and considers how to drink such coffee.



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INTRODUCTION

Coffee is a liquid beverage obtained by extracting components with hot or cold water from the powder obtained after roasting and crushing seeds of the coffee tree, termed coffee beans. Owing to its unique aroma and bitterness, coffee is consumed worldwide. In Japan, it is consumed in various places, such as homes, restaurants, and workplaces. As an old classification, solid coffee can be broadly classified into regular coffee, which refers to both roasted and ground coffee beans, and water-soluble instant coffee, which is the dried extract of regular coffee. For regular coffee, it is necessary to separate the bean extraction residue using a filter, such as filter paper, whereas instant coffee is already an extract and dissolves in hot or cold water; therefore, it can be easily made into a liquid.

In recent years, canned and liquid coffees, which are already in ready-to-drink containers, have been produced to ease drinking coffee with little effort. Canned coffee is made from extracted and seasoned coffee. Created in Japan, it was launched in 1969 and attracted considerable attention the following year at the Osaka Expo. Containers, such as plastic bottles and paper packs, which have appeared more recently, are filled with liquid coffee. Coffee in bottles made of metal or PET resin is known as bottled coffee, and its distribution began with the development of PET bottle containers¹⁾. The latter coffee already contains sweeteners and milk and can be consumed immediately without the addition of hot water or undergoing an extraction process. There are no significant difference between the contents of canned and liquid coffees. Sometimes, the same content is packed into two packages (see Table 1). In Japan, the demand for bottled coffee, which can be divided into several portions after lid closure, is increasing more than the demand for canned coffee, which must be consumed once the lid is opened.

There are innumerable coffee lovers worldwide; however, excessive drinking can cause health concerns. Typical effects that occur minutes to hours after ingestion of coffee, primarily derived from caffeine, include CNS excitatory action (enhancement of mood, prevention of drowsiness, anxiety, and insomnia in excessive cases), skeletal muscle hyperkinetic action (reduced muscle fatigue and tremors in excessive cases), elevated blood pressure, diuretic effects, promotion of gastric juice secretion (promoting digestion and worsening of excessive gastritis), increased blood cholesterol (LDL and Total), and increased colonic peristalsis (laxative effect and

diarrhea). These acute effects disappear within a day at the latest and are generally not considered to cause health concerns. If consumed in excess or depending on the physical condition at the time, consumption may cause transient problems. Depending on the condition of the patient, such as gastrointestinal disease, hypertension, or panic disorder, the condition may worsen with excessive caffeine consumption.

Not only do people enjoy the aroma and taste of coffee as a beverage, but it is also often used to prevent drowsiness due to its CNS excitatory action, which is considered to be inherent to caffeine. Canned and liquid coffees are currently popular in Japan for this purpose. Although they can be easily purchased at stores and vending machines and can be consumed immediately, overdose concerns have become a serious issue. Because milk and sugar are often added beforehand, it is difficult to adjust them by oneself, and there is an increased risk of obesity and diabetes due to excessive intake of lipids and sugars. This study mainly focuses on the amount of sugar, describes the types of canned and liquid coffees, and considers how to drink such coffee.

Types of canned and liquid coffees

Several types of canned and liquid coffees exist. The name is usually displayed on the label along with the ingredients; therefore, by checking, people can avoid the risk of ingredients they do not wish to consume or illnesses derived from such ingredients. One classification method is how much coffee ingredients are contained, and there are three types: coffee, coffee beverages, and soft drinks containing coffee³⁾. For coffee, 5 g or more of green beans are used to produce 100 g of the product. For coffee beverages, ≥ 2.5 g and < 5 g of raw beans are used, and for soft drinks containing coffee, 1–2.5 g of raw beans are used. This content is strictly stipulated in Japan based on fair competition terms regarding indications, such as coffee drinks. It is believed that the quantity of coffee beans used correlates, to some extent, with caffeine intake. There are cases in which the content is indicated on the label, which is helpful.

There are indications for the use of sugars, such as added sugar, low sugar, trace sugar, and sugar-free, but the content regarding the use of coffee beans differs greatly. Definitions exist for convenience; however, details differ among manufacturers. Carbohydrates, saccharides, and their saccharinity are close to that of sugar³⁾. Carbohydrates are compounds represented by chemical formulas in which carbon and hydrogen are combined and include many substances that are not

nutritious. Saccharinities are carbohydrates that serve as energy sources when absorbed by the body. These include macromolecules that do not become energy on their own (for example, starch, which is a polysaccharide, and sucrose, which is a disaccharide) and those that can be used as energy as they are. Saccharides are a part of saccharinity and include monosaccharides, such as glucose and fructose, and disaccharides, such as maltose and sucrose (sugar). They are sweet in taste. Monosaccharides are readily available for energy production⁴⁾. The principal ingredients added to coffee include saccharides, conventionally referred to as sugars. The main purpose of sugar is sweetness, and among natural ingredients, monosaccharides and disaccharides are sweet (high molecular-weight sugars are not sweet). Sugar, a disaccharide also known as sucrose, is the most common sugar worldwide. Numerous people want to prevent obesity and diabetes; therefore, artificial sweeteners (acesulfame K and sucralose) that are not energy sources are sometimes added⁵⁾. Artificial sweeteners taste sweet to the tongue but are not directly related to diabetes.

Examples of these products are listed in Table 1, and an overview of their classification by sugar content is presented in Table 2. If there is no particular description, it is better to consider that sugar should be added to canned and liquid coffees. If the manufacturer wants to emphasize or call attention to it, they use the expression sugar added. It is common to compare the standard additive amount with standard coffee beverages (7.5 g saccharides/100 mL) stipulated by the All Japan Coffee Fair Trade Conference⁶⁾. However, this value is only close to the median value, and the actual amount of saccharides contained differs depending on the manufacturer and product. No specific regulations have been established by countries, associations, or academic societies. When the expressions “trace sugar” and “low sugar” are used, the content of saccharides is slightly low and generally ≥ 0.5 g and < 2.5 g are contained in 100 mL of coffee^{6),7)}. However, it cannot be said that this was always the case. In Japanese terms, there is a perception that the sugar content is trace sugar $<$ low sugar, but as a definition, this does not hold, and it is better to believe that it varies depending on the manufacturer^{8),9)}. Sugar off has the same meaning as trace sugar¹⁰⁾. Some consumers interpret this as no sugar, which is incorrect. The expression “sugar-free” does not mean that it contains no sugar at all. Sugar content of up to 0.5 g/100 mL is generally acceptable. Similarly, some terms are synonymous with sugar-free sugars, such as sugarless and zero sugar. Consumers may interpret this to sugar-free; however, this does not imply that a product is completely sugar-free. Another expression is “no sugar used,” but this

only means that no sugar is added, and naturally the sugar that originally existed in the coffee beans is included, and fructose and glucose other than sugar are also included¹⁰⁾.

CONCLUSION

In this paper, we elucidate the types of canned and liquid coffees, focusing on differences in sugar content. In an academic sense, saccharides and saccharinities differ in the range of types of compounds contained, and although both are saccharines, only the former exhibits direct sweetness. Macromolecular saccharin, such as starch, has no sweetness but can be used as an energy source when digested. In addition, high intake is associated with diabetes and obesity. In recent years, artificial sweeteners that have a sweet taste but do not serve as an energy source have been introduced. Even if a coffee drink is sweet, it is not necessarily related to sugar content or susceptibility to obesity due to ingestion.

In addition, when people taste sweetness, they may feel the sugar content of the coffee beans themselves without added sugars. Even if a product is labelled “sugar-free,” Japanese regulations allow the addition of a small amount of sugar. If people want to choose something that is completely sugar-free, it would be better to choose a product that is labelled as “no sugar used.” Even so, the use of saccharides other than sugar is permitted; therefore, it is necessary to be careful not to consume too much saccharin, which is an energy source.

Originally, people had to drink coffee to consume something delicious. We believe that coffee is not meant to be used as a substitute for a meal or as an energy source; therefore, it is better to think about taste and choose what is preferred before deciding whether to use sugar (saccharides). In addition, it is necessary to consider whether to use milk and sweeteners along with their amounts. However, the association between sweetness and obesity or diabetes depends on the type of ingredient used. All consumers need to do is check the label to see if there is any added sugar or if artificial sweeteners have been used. To determine whether coffee can be used as an energy source, the type of ingredients should be checked and the appropriate coffee should be selected. If such confirmation is properly performed, we believe that the risk of disease can be avoided and only the benefits of coffee can be relished.

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Table 1 Examples of labeling for canned and liquid coffees

Type	Container	Calorie (kcal/100 mL)	Carbohydrate (g/100 mL)	Saccharinity (g/100 mL)	Sweetener type
Coffee, no sugar	PET bottle	0	0.7*	0.0	
Coffee drink	PET bottle	29	5.6		Sugar
Coffee drink, 60% less saccharide	PET bottle	18	3.5	2.7	Sugar, acesulfame K
Coffee	Can	35	6.9		Sugar
Coffee, trace sugar (60% off saccharide)	Can	22	3.3	2.5	Sugar, acesulfame K, sucralose
Coffee, black	Can	0	0.7*	0.0	
Coffee	Can	18	1.6	0.8	Acesulfame K, sucralose

Coffee, black, no sugar	Can bottle	0	0.7*	0.0	
Coffee	Can bottle	19	3.0	2.1	Sugar, acesulfame K
Coffee drink	Can	34	8.0		Sugar
Coffee drink	PET bottle	46	8.5		Sugar
Coffee drink	PET bottle	47	8.8		Sugar
Coffee drink	PET bottle	46	8.6		Sugar
Coffee	Can	31	7.2		Sugar
Coffee drink	Can	45	8.2		Sugar
Coffee drink	Can, PET bottle	48	9.8		Sugar
Coffee	Can	33	6.4		Sugar
Coffee	PET bottle	0	0.6*		
Coffee	PET bottle	0	0.6		Acesulfame K
Coffee drink	PET bottle	30	6.0*	0.0	
Coffee drink	PET bottle	70	16.0	12.0	Sugar, acesulfame K
Coffee	Can	21	3.2	2.3	Sugar, acesulfame K, sucralose
Coffee drink	PET bottle	56	7.3		Sugar
Coffee	Can	26	4.1		Sugar, acesulfame K
Coffee drink	PET bottle	49	8.9		Sugar, caramel syrup
Coffee	Can	21	3.3	2.4	Sugar, acesulfame K, sucralose
Soft drink with coffee	PET bottle	29	5.2		Sugar, acesulfame K, white chocolate
Coffee drink	PET bottle	12	1.6	Sucrose 0.0	Acesulfame K, sucralose
Coffee drink	PET bottle	19	1.7	Sucrose 0.0	
Coffee	Can	19	2.8		Sugar, acesulfame K, sucralose
Coffee drink	Can	30	4.9		Sugar, acesulfame K
Coffee	Can	19	3.3	2.7	Sugar, acesulfame K
Coffee drink	PET bottle	44	8.1		Sugar, chocolate syrup
Coffee drink	PET bottle	51	7.9		Sugar, acesulfame K, sucralose, caramel sauce

* To the best of our knowledge, carbohydrates are derived from coffee.

Based on the contents of reference 5).

Table 2 Types of canned or bottled coffees (by sugar content)

Type	Explanation	Synonymous term
Added sugar	A small amount or more of added sugar. In the expression below, the content of the expression other than “no sugar” will be included. One of the standards is 7.5 g/100 mL of sugars specified by the All Japan Coffee Fair Trace Conference.	[Included here even if nothing is explained].
Low sugar	Typically, the amount of sugar used is 0.5–2.5 g/100 mL, but the strict regulation varies depending on the manufacturer.	Sugar cut, sugar moderation, sugar off.
Trace sugar	The difference between trace sugar and low sugar depends on the manufacturer, and it is generally interpreted that there is no difference.	
No sugar	Typically, the amount of sugar used is less than 0.5 g/100 mL, but detailed regulations are up to the manufacturer.	Non sugar, sugar free, sugarless, saccharide zero, sugar zero, saccharide free.
No used sugar	It does not imply that saccharide is zero, but that sugar (sucrose) is not used at the stage of processing the product (no mention of other saccharides). The amount of sugar is [no sugar] \cong [no used sugar]. There is a high possibility that sugar from the original coffee bean is included.	Contains ○○ (saccharides other than sugar).

Based on references 6-10).