



Acceptance of sugar reduction in flavored yogurt

M. Chollet,¹ D. Gille, A. Schmid, B. Walther, and P. Piccinali

Agroscope Liebefeld-Posieux, Research Station ALP-Haras, CH-3003 Berne, Switzerland

ABSTRACT

To investigate what level of sugar reduction is accepted in flavored yogurt, we conducted a hedonic test focusing on the degree of liking of the products and on optimal sweetness and aroma levels. For both flavorings (strawberry and coffee), consumers preferred yogurt containing 10% added sugar. However, yogurt containing 7% added sugar was also acceptable. On the just-about-right scale, yogurt containing 10% sugar was more often described as too sweet compared with yogurt containing 7% sugar. On the other hand, the sweetness and aroma intensity for yogurt containing 5% sugar was judged as too low. A second test was conducted to determine the effect of flavoring concentration on the acceptance of yogurt containing 7% sugar. Yogurts containing the highest concentrations of flavoring (11% strawberry, 0.75% coffee) were less appreciated. Additionally, the largest percentage of consumers perceived these yogurts as “not sweet enough.” These results indicate that consumers would accept flavored yogurts with 7% added sugar instead of 10%, but 5% sugar would be too low. Additionally, an increase in flavor concentration is undesirable for yogurt containing 7% added sugar.

Key words: yogurt, sugar reduction, acceptance, flavoring

INTRODUCTION

Many studies have shown that consumers prefer high concentrations of sucrose in food. This trend can be observed for children as well as for adults and the elderly (Barnes et al., 1991; Kälviäinen et al., 2003; Thompson et al., 2007). However, preferences vary according to age and food type (Kälviäinen et al., 2003; Liem and de Graaf, 2004). Still, regardless of age, the human body requires sugar because it is a good energy source that is used for the maintenance of human metabolism (Barclay et al., 2008). Although a moderate intake of sugar keeps us alive, a constant oversupply

can lead to disease. Several diseases are associated with a high level of sugar consumption, including obesity, insulin resistance, and diabetes mellitus type 2, as well as caries and fatty liver. Therefore, low sugar intake is strongly recommended (FAO/WHO, 2003). This recommendation is addressed not only to the consumer—the food industry must also address the reduction of sugar content in processed food (Barclay et al., 2008). This task poses a major challenge as products have to be reformulated with less sugar while maintaining their popularity and appealing character.

Yogurt is perceived as a healthy food because of the presence of live and active cultures (Popa and Ustunol, 2011), and this positive image should not be harmed by high levels of added sugar or by the use of artificial ingredients such as sweeteners. Because of the growing health consciousness of the consumer, there is a demand for sugar reduction in yogurt. This fact was confirmed by a survey conducted by Agroscope (Berne, Switzerland) in 2009 with Swiss participants over the age of 50 yr, where 51% of the participants (n = 253) stated that flavored yogurts available in the market are too sweet (Gille et al., 2012).

Not only is sugar essential for the sweet taste of yogurt products, but it also contributes to the total solids of the product and provides texture, body, viscosity, and moisture retention (Popa and Ustunol, 2011). As preferences for yogurt products are principally influenced by texture, aroma, and taste (Kälviäinen et al., 2003; Bayarri et al., 2011; Routray and Mishra, 2011; Grygorczyk et al., 2013), the concentration of sugar in yogurt products is crucial. Indeed, the health benefits of a dairy product cannot outweigh its sensory properties, and its acceptance depends on the degree of satisfaction given to the consumers (Bayarri et al., 2011). Therefore, the objective of the first study was to investigate which concentration of added sugar in flavored yogurt was favored by the Swiss population and whether consumer preferences differed.

Adding fruity flavorings generally increases the sensory acceptance of yogurt by consumers (Routray and Mishra, 2011). In several studies, the addition of various flavor compounds (strawberry aroma, vanilla aroma, benzaldehyde, furaneol) in sweet matrices was found to enhance consumers' perception of sweet-

Received January 22, 2013.

Accepted June 8, 2013.

¹Corresponding author: magali.chollet@agroscope.admin.ch

ness (Tournier et al., 2007, 2009; Labbe et al., 2010). However, these studies mainly dealt with a model food matrix and with either a small number of consumers or only trained panelists. Hence, it is still unknown if adding more flavoring could improve the acceptability of sugar-reduced yogurt.

Yogurt flavorings can be separated into 2 main categories. The first category includes the fruity and lightly sour flavorings such as strawberry, pineapple, raspberry, and peach. The second one comprises the so-called brown flavorings, such as caramel, vanilla, chocolate, and coffee. The interactions between yogurt's typical aroma, the sugar, and the sensory characteristics of the added flavoring may affect the flavored yogurt's overall acceptability. Subsequently, the aim of the second test was to determine the effect of the amount of flavoring on the acceptance of sugar-reduced yogurt in the Swiss population.

MATERIALS AND METHODS

First Test: Yogurt with Different Concentrations of Added Sugar

Sample Preparation. Coffee and strawberry yogurt samples were manufactured at "Molkerei Wasserfallen," a small dairy factory in Switzerland. Sugar was added to a mild type of plain yogurt along with 2 different flavorings: a strawberry fruit mass (805.10 Erdbeere geschnitten, Schweizer Getränke AG, Obermeilen, Switzerland) and a powdered coffee extract (Mocafin 202-DS, Haco AG, Gümligen, Switzerland). The strawberry flavoring was chosen because strawberry yogurt is the most frequently consumed flavored yogurt in Switzerland and popular around the world (Thompson et al., 2007), and it represents the group of fruity and lightly sour flavorings. The coffee flavoring was chosen to represent the so-called brown flavoring family. Both

flavoring concentrations corresponded to the recommendation of the producer.

Three sucrose concentrations (10, 7, and 5% added sugar) were selected. The concentration of 10% added sugar was chosen because it corresponds to the average sugar concentration for flavored yogurt in Switzerland. The 5% concentration corresponded to that used in a project of the Swiss Federal Office of Public Health aiming to reduce the sugar intake of the Swiss population. Finally, the 7% concentration was chosen as an intermediate level.

For the preparation of the mild yogurt, 2% skim milk powder (Cremo, Freiburg, Switzerland) was mixed with whole milk (3.5% fat), homogenized at 70°C at 8 MPa, and pasteurized for 60 s at 91°C. Yogurt starter cultures (Hansen YC-x1, Chr. Hansen, Hørsholm, Denmark) were added, and the mix was fermented at 43°C to a pH of 4.6. Sugar (Zuckerfabrik Aarberg + Frauenfeld AG, Aarberg, Switzerland), flavoring, and yogurt were blended according to the desired total added sugar content (Table 1). Yogurts were poured into 75-g plastic cups with lids (SwissPrimePack AG, Altstätten, Switzerland) and refrigerated at 5°C for 5 to 7 d until sensory descriptive analysis and the consumer test were conducted.

Sensory Descriptive Analysis. A trained sensory panel (n = 9) with experience in the evaluation of dairy products evaluated the 6 yogurt samples (3 strawberry-flavored and 3 coffee-flavored yogurts). A descriptive analysis focusing on the attributes sweetness, sourness, and strawberry or coffee aroma (i.e., retronasal odor) was performed. The intensity of these attributes was evaluated on 10-cm unstructured line scales, anchored on the left with "not sweet/sour/aromatic" and on the right with "very sweet/sour/aromatic." Water solutions of sucrose and citric acid were given as references to the panel for quality and intensity standardization during

Table 1. Overall liking of yogurt with different concentrations of sugar

Flavoring	Flavoring (%)	Sugar ¹ (%)	Overall liking ²	
			Mean	SD
Strawberry	9	10	7.48 ^a	1.80
	9	7	6.23 ^b	1.76
	9	5	4.79 ^c	2.06
Coffee	0.52	10	6.84 ^x	2.27
	0.52	7	5.84 ^y	1.99
	0.52	5	4.29 ^z	2.05

^{a-c}Means within a column for strawberry flavoring with different superscripts differ significantly ($P < 0.05$) by Fisher least significant difference test.

^{x-z}Means within a column for coffee flavoring with different superscripts differ significantly ($P < 0.05$) by Fisher least significant difference test.

¹Represents sucrose from fruit mass and added sugar, without lactose.

²The degree of liking was rated on a 9-point hedonic scale (1 = dislike extremely, 9 = like extremely).

Download English Version:

<https://daneshyari.com/en/article/10977529>

Download Persian Version:

<https://daneshyari.com/article/10977529>

[Daneshyari.com](https://daneshyari.com)