

## Non-Nutritive Sweeteners: Consumer Depth of Knowledge and Why It Matters

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### Abstract

Depth of consumer knowledge regarding non-nutritive, artificial, or high-intensity sweeteners (NNS) is incompletely understood. NNS can be identified by their chemical name (CN), trade name (TN), or by the GRAS plant that is responsible for the sweet taste. Consumers appear to be unable to effectively identify NNS, especially with respect to CN. Food ingredient labelling identifies NNS by CN or GRAS ingredient. Because consumers lack adequate NNS knowledge, they may not understand whether they consume NNS and the importance of NNS to dietary health may be difficult to determine.

**Keywords:** Non-nutritive sweeteners; Artificial sweeteners; Nutritional health; Consumer knowledge

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### Introduction

Non-nutritive sweeteners (NNS) offer little or no calories, have little or no nutritional value, and are sometimes referred to as low calorie sweeteners, artificial sweeteners, high-intensity sweeteners, or reduced calorie sweeteners. Organizations providing recommendations for NNS use to reduce dietary carbohydrate intake include the Academy of Nutrition and Dietetics, American Diabetes Association and American Heart Association [1,2]. The name of an NNS may refer to a specific chemical that is synthetic or plant derived, a trade name for the NNS or the plant with sweet taste that is FDA approved for human consumption under Generally Recognized as Safe (GRAS) status.

### Literature Review

#### NNS identification on ingredient labels and packaging is complicated

Specific NNS can be identified by their chemical name (CN) for example acesulfame potassium, registered trade mark or "trade" name (TN). For example, Sweet-n-Low® contains the NNS chemical saccharin. CN describes the chemical structure of a NNS and is required on the food or beverage ingredient list. Stevia leaf provides a sweet taste that is GRAS by FDA, although the leaf taste is due to the chemical rebaudioside. If a GRAS raw plant is included as an ingredient providing NNS, the plant may appear on the ingredients label. TN are often associated with a registered trade mark and are typically used for marketing,

promotion of consumer product loyalty, and generally appear on the product label itself or in media advertising, but TN generally do not appear in the ingredient label.

NNS use within FDA guidelines is assumed to be safe for human consumption, although their usefulness for improved weight management has been questioned by some investigators [3-6]. NNS market value in 2012 was \$1.2 billion globally and the market continues to experience growth [7]. NNS consumption in the US diet can be estimated by matching product purchase UPC scan data to product ingredient lists [8,9]. Growth in NNS consumption suggests changes in marketing and consumer preferences for NNS containing foods and beverages, however growth could also be indicative of changes in product formulation independent of consumer demand.

Ingredient and package labelling is intended to help consumers make informed decisions about their diet, but this may be counterproductive if the information is not correctly interpreted [10]. Food label changes have been mandated by the FDA, so it is important to understand the success of current food nutrition label information before the effect of proposed label changes can be interpreted. Understanding consumer ability to identify NNS based on their CN or plant of origin on the ingredients list, as well as by the TN identified on package labelling, is important for understanding changes in NNS use and the reason for any changes [11]. For example, are changes in NNS use measured by UPC labels driven by consumer preference or manufacturing decision.

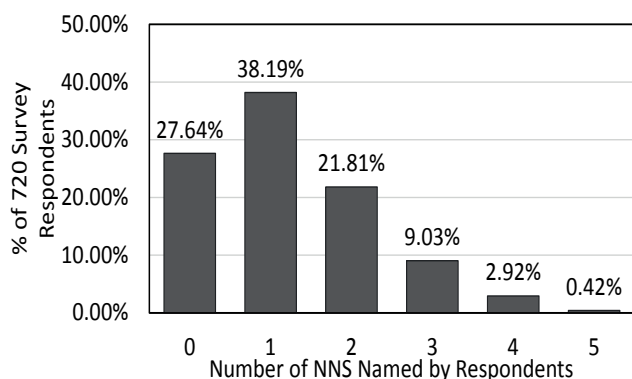
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**Figure 1** Ability of 720 university students in health and basic sciences to provide the names of as many non-nutritive (artificial) sweeteners as possible in a 2013 survey.

### Are consumers able to identify NNS?

Consumer preferences for NNS may be a function of consumer knowledge about NNS. It is reasonable to believe that the general consumer has very little knowledge about NNS. In a 2012 survey, consumers were asked “Which of the following statements, if any, do you agree with regarding low-calorie sweeteners?” 31% of respondents answered, “I do not know enough about low-calorie sweeteners to provide an answer” and 9% answered “None of the above” [12]. In the 2016 IFIC survey, 29% answered “I do not know enough about low-calorie sweeteners to provide an answer” and an additional 21% answered “None of the above” [13]. These surveys suggest an insufficiency of knowledge about NNS that also appear to be observed in university students. In a 2013 online survey of 720 university students majoring in health and science, respondents able to name 0, 1, 2, 3, and 4 examples of an NNS was 28%, 38%, 22%, 9%, and 3%, respectively (**Figure 1**), presumably the average non-science consumer might know even less. A history of attempted prior weight maintenance may be

associated with the use of reduced calorie foods and beverages which could suggest improved NNS knowledge [14,15]. The 2015 American College Health Association survey showed that 51.1% of the 19,714 respondents indicated they are trying to lose weight [16].

### Discussion and Conclusion

The term “Diet Soda” implies usefulness for control of calorie intake and weight management. Do NNS help with weight regulation? However, without special training in NNS identification consumers may not know if they even consume NNS in the products they ingest. We as researchers and clinicians want to confirm that NNS are useful for the promotion of weight loss, that NNS are safe for consumption, better characterize NNS use, and NNS demand. Before this, we should first look for transparent data that characterizes if consumers know whether they consume NNS.

If the consumer is unaware of whether they consume NNS, the clinician will be unable to interpret the outcomes of NNS consumption by the consumer or whether the effect is just a function of manufacturing product ingredient use preferences. In this regard, one can hypothesize that the basic ingredients label gives the average consumer little or no chance to determine whether NNS are a part of their diet. Peer-reviewed manuscripts that characterize consumer NNS knowledge are needed to fill this void in our understanding of NNS effects on nutritional health.

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### Conflicts of Interest

The author has no conflicts of interest in relation to the content of the present study

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