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Editorial

Artificial sweeteners: A sweet deception with bitter consequences

Anuj Maheshwari[1]*

[1]Dept. of Internal Medicine, Hind Institute of Medical Sciences, Ataria, Lucknow, Uttar Pradesh, India

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Artificial sweeteners (AS), once celebrated for their zero-calorie promise and hailed as saviours for people battling obesity and diabetes, are now at the center of growing scientific scrutiny. Introduced over a century ago with saccharin, the AS family has expanded to include compounds such as aspartame, sucralose, acesulfame potassium, neotame, and natural derivatives like stevia. Although these compounds have received regulatory approval, mounting evidence suggests potential health risks that warrant reconsideration of their widespread use.

The World Health Organization (WHO) delivered a decisive statement in May 2023 discouraging the use of non-sugar sweeteners (NSS) for weight control. “Replacing free sugars with NSS doesn’t aid long-term weight control,” stated Dr. Francesco Branca, Director of WHO’s Department of Nutrition and Food Safety. He emphasized that NSS provide no nutritional value and should not be seen as essential dietary components. Instead, public health strategies should promote the reduction in dietary sweetness from an early age, favouring natural sources like fruits and unsweetened foods (WHO, 2023).[1]

Several mechanisms have been proposed to explain the adverse health effects of AS, particularly their impact on gut micro biota. Dysbiosis, or the imbalance of gut microbial communities, has been associated with the development of metabolic disorders, including insulin resistance, type 2 diabetes, and cardiovascular diseases (Singh et al., 2023).[2] Sucralose, for instance, has been shown to reduce beneficial gut bacteria and alter glucose metabolism pathways (Ruiz-Ojeda et al., 2016).[3]

Animal studies and human observational data further suggest that AS consumption may contribute to glucose intolerance and insulin resistance, particularly when consumed chronically (Azad et al., 2017).[4] These effects could be due to the dissociation between sweet taste and caloric content, which disrupts normal metabolic signalling and promotes energy overcompensation, as highlighted by Sylvetsky and Rother (2016).[5] Moreover, aspartame and other NSS have been implicated in accelerating atherosclerosis and cellular aging, contributing to atrial fibrillation and other cardiovascular risks. Singh et al. (2023) argued that these sweeteners, through their influence on vascular inflammation and oxidative stress, may directly contribute to endothelial dysfunction.[2]

Although initially developed to combat obesity, long-term consumption of AS has not consistently led to sustainable weight loss. In fact, many studies suggest the opposite. Evidence from the Women’s Health Initiative shows an association between artificially sweetened beverage intake and increased risk of stroke, coronary heart disease, and all-cause mortality, particularly among postmenopausal women (Mossavar-Rahmani et al., 2019).[9] This paradox is supported by findings that NSS may heighten appetite and sugar cravings, reinforcing the consumption of other high-calorie foods (Brown et al., 2010).[9]

*Corresponding author: Anuj Maheshwari
Email: dranujm@gmail.com

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India presents a unique and concerning case. As urban populations grow and dietary habits shift toward processed foods, the use of AS has surged. According to a report in The Economic Times, 38% of urban Indians consume artificial sweeteners monthly. However, a study by Shetty and Kumar found that although awareness of AS is high among Indian diabetics, understanding of their health risks is low. An Indian study published in the Journal of Family Medicine and Primary Care linked AS intake with increased insulin resistance, a key precursor to type 2 diabetes (Mathur et al., 2020).[8] This gap between usage and understanding is problematic in a country facing a dual burden of under nutrition and an increasing prevalence of non-communicable diseases (NCDs). Public education and clinical guidance must keep pace with this trend.

Recent systematic reviews and meta-analyses have further elucidated the potential risks associated with AS. Brown et al.[9] concluded that artificial sweeteners might not be metabolically inert, as previously thought. They can influence energy balance, glucose metabolism, and even hormone secretion. Another recent publication in Nutrients reported that frequent use of NSS was associated with alterations in satiety signals and microbiome diversity (Kossiva, 2024).[6] A comprehensive review in Biotech Asia also highlighted that while AS were originally promoted for their safety and sweetness intensity, their chronic intake might affect appetite regulation, gut health, and cognitive function (Ali et al., 2021).[7] These insights challenge the long-standing assumption that AS is a benign substitute for sugar.

The accumulating data underscore a pressing need for revised dietary recommendations. Reducing the overall sweetness of the diet—not merely swapping sugars with NSS—should be the new public health goal. This approach aligns with the WHO's latest guidance and shifts focus toward promoting whole foods and naturally sweet options. From a regulatory standpoint, governments must ensure clear labelling, restrict AS in children's products, and fund further research into their long-term effects. As Branca noted, "NSS are not essential and should be minimized." A culture shift—away from hyper-palatable, sweetness-enhanced foods—is both urgent and necessary.

While causality remains difficult to establish due to reliance on observational data and confounding dietary variables, the biological plausibility and consistency of emerging findings are difficult to ignore. What's needed now is robust longitudinal research that disaggregates the effects of individual AS and explores dose-dependent relationships. Special attention should also be paid to vulnerable populations such as children, pregnant women, and those with pre-existing metabolic conditions. Moreover, health professionals must evolve their guidance. Recommending artificial sweeteners as a blanket solution for sugar reduction may no longer be tenable. Instead, patient education should emphasize the quality of dietary intake, whole foods, and natural sources of sweetness.

Conflict of Interest

None.

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