Can Carbonated Beverages Trigger Mast Cell Activation or Other Health Symptoms

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Carbonated beverages, such as sparkling water and soda, are a staple in many diets worldwide. While the CO_2 gas used in these drinks is purified to meet food-grade standards, some individuals report experiencing histamine-related symptoms, sore throat, and even mast cell activation syndrome (MCAS)-like reactions after consuming carbonated drinks. This article explores whether trace contaminants in CO_2, acidity, or carbonation itself could contribute to these reactions, particularly in individuals sensitive to histamines, acid reflux, or airway irritation.

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Carbonated Beverages Trace Contaminants in CO2

Introduction
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How Beverage Companies Source CO_2
Beverage manufacturers obtain CO_2 from three primary sources:

1. Natural CO_2 Reservoirs
• Extracted from underground formations, similar to natural gas wells.
• Found in locations such as the Jackson Dome in Mississippi, one of the largest natural CO_2 sources.

2. Industrial CO_2 Capture (Byproduct of Manufacturing)
• Many beverage companies use CO_2 captured from industrial processes, including:
• Ethanol fermentation (breweries, distilleries)
• Ammonia production (fertilizer plants)
• Oil refining & natural gas processing
• Cement and power plants with carbon capture technology
• This CO_2 is filtered and purified before use in food and beverages.

3. CO_2 Pipelines in the U.S.
• The U.S. has over 5,000 miles of high-pressure CO_2 pipelines used mainly for enhanced oil recovery (EOR) and industrial supply.
• Some beverage companies may source CO_2 from suppliers connected to these pipelines, but not all CO_2 in pipelines is food-grade.

Does CO_2 in Carbonated Beverages Contain Toxins?
Food-grade CO_2 must meet purity standards set by:
• FDA (Food and Drug Administration, U.S.)
• EFSA (European Food Safety Authority, EU)
• ISBT (International Society of Beverage Technologists)

To be considered food-grade, CO_2 must be 99.9% pure and undergo purification to remove:
• Sulfur compounds (H_2S, SO_2) – Known airway irritants.
• Volatile hydrocarbons (benzene, toluene, methane) – Linked to inflammation.
• Heavy metals & particulates – Can cause toxicity over time.
• Residual lubricants from industrial processes – Must be fully filtered out.

Although these contaminants are removed to safe regulatory levels, individuals with high chemical sensitivity may still react to trace amounts.