

Environmental Variation in Taste Perception: An Evaluation of Basic Tastes at Sea Level and 2200 m Altitude Using a Trained Sensory Panel

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Abstract

Taste perception is not determined solely by the chemical composition of food; it may also be shaped by environmental conditions. Previous research has suggested that hypobaric atmosphere, ambient noise, and temperature can influence gustatory perception. Rahne et al. (2018), for example, showed that hypobaric conditions may reduce gustatory sensitivity, while white noise may selectively impair sensitivity to sweet and sour tastes. Likewise, Green and Andrew (2017) demonstrated that temperature exerts stimulus-dependent effects on bitter taste perception. In addition, research on aircraft cabin environments has highlighted that reduced air pressure, low humidity, and background noise can weaken the overall tasting experience (Spence, 2017). Despite these findings, environmental influences on taste have largely been examined separately, and comparative field-based studies remain limited.

This paper proposes a research design to examine whether basic taste perception varies across two distinct environmental settings: sea level and 2200 m altitude. The study will focus on the five basic tastes, namely sweet, salty, sour, bitter, and umami, and will be conducted using a trained sensory panel. The research is structured in three stages. In the first stage, panelists will be selected and trained to recognize, discriminate, and rate the intensity of basic tastes. In the second stage, reference sensory evaluations will be carried out at sea level under standardized conditions. In the third stage, the same panelists will repeat the evaluations at 2200 m altitude, allowing for a direct comparison between the two environments.

The proposed study is expected to contribute to the gastronomy literature by addressing taste perception within a real environmental context. By moving beyond laboratory-based or single-factor approaches, it offers a comparative sensory framework for understanding how altitude may influence taste perception under field conditions. The findings may provide useful implications for destination gastronomy, sensory product development, and the design of food and beverage experiences in high-altitude settings.

Keywords

Taste perception, basic tastes, altitude, trained panel, sensory evaluation, destination gastronomy.