

Sensory Evaluation of Bitter Eggplant Varieties Trialed at the Evergreen State College Organic Farm

Profile Analysis of Bitter Eggplant

As a component of the 2024 student capstone project, "Replicated Variety Trials of *Solanum aethiopicum* at the Evergreen State College Organic Farm, student researchers held a tasting of raw samples of the four varieties being trialed ('Simeon's White', 'Zebra', 'Morro Redondo', and 'Comprido Verde Claro'), as well as the control variety of *Solanum melongena*, 'Orient Express'.

Methodology

A group of 34 students were asked to evaluate raw samples of bitter eggplant and Asian eggplant and to evaluate each sample in 5 categories. Tasting sheets were developed to record respondent answers. Data was evaluated and compiled into charts reflecting the responses of the group.

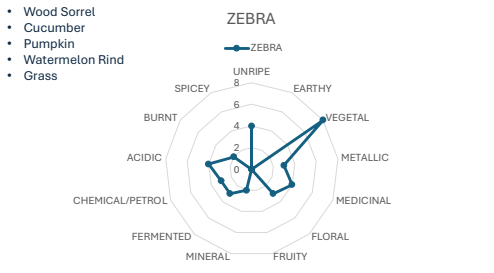
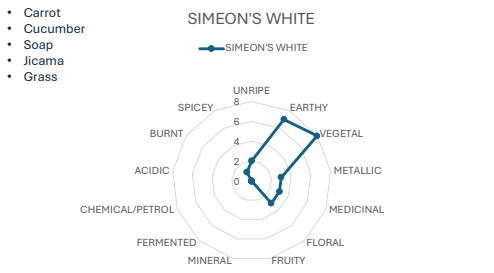
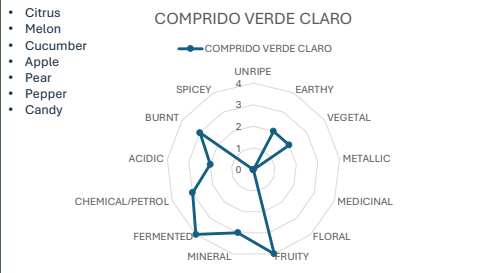
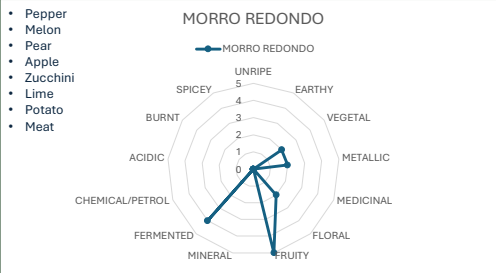
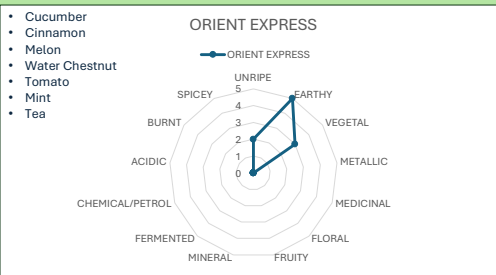
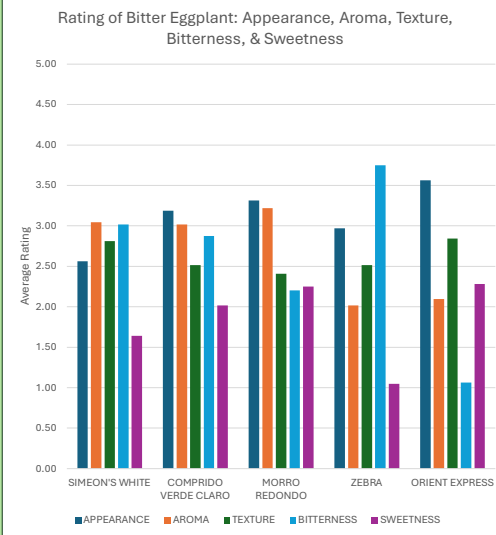
Samples were characterized in the categories of appearance, aroma, texture, bitterness, and sweetness utilizing an intensity scale of 0-5. Samples were coded to avoid influencing participants.

Utilizing individual evaluation results, average ratings for appearance, aroma, texture, bitterness, and sweetness.

Results

'Orient Express' was found to have the best appearance and 'Morro Redondo' was found to have the best aroma. 'Simeon's White' and 'Orient Express' were found to have the best texture. 'Zebra' was found to be the bitterest and 'Morro Redondo' as well as 'Orient Express' were found to be the sweetest of the samples.

Radial charts evaluating specific bitter characteristics mentioned in participant tasting notes were created for each sample, and specific flavor profiles were categorized for each sample to both describe the types of bitterness and the particularities of flavor for each sample variety. Overarching flavor descriptors include apple, cucumber, grass, and melon.



Exploring the Evolution of Flavor Preference and Bitter-Sweet Balance Through Sensory Evaluation

Exploring the Interplay Between Sweet and Bitter

Aristotle's interpretation of taste distinguishes between two primary flavors: sweet and bitter. These contrasting tastes elicit instinctive reactions in individuals, which appear hardwired rather than learned, highlighting a key aspect of human evolution. Sweet flavors typically evoke positive responses, such as preference and enjoyment, rooted in our evolutionary past where sweetness indicated energy-rich resources essential for survival.

In contrast, bitter flavors provoke negative responses, leading to avoidance. This aversion is vital for survival, as many natural bitter substances, particularly found in plants, are potential toxins. This instinctual rejection is evident not only in humans but also in nonhuman primates, indicating that the aversion to bitter tastes is an evolutionary trait shared across various species. The relationship between bitterness and food intake underscores that substances perceived as bitter are often deemed harmful, reinforcing the survival mechanism that enabled early humans to differentiate between safe and toxic foods based on taste.

While bitterness often serves as a warning signal for potential toxins, it is also important to recognize that many bitter foods have substantial nutritional benefits. This understanding emphasizes the necessity of not entirely dismissing bitter tastes; instead, it calls for a recognition of their dual role in both cautioning against poisons and providing valuable nutrition.

Beyond their distinct reactions, sweet and bitter flavors interact in complex ways, leading to mutual suppression. The presence of sweetness can diminish the intensity of bitterness, while bitterness can temper the perception of sweetness. This interaction creates a nuanced flavor balance that significantly influences food preferences. Exploring the interplay between sweet and bitter is important for understanding food palatability and dietary preferences. In fact

According to Beauchamp (2016) in *Why do we like sweet taste: A bitter tale?*, the ability of sweet stimuli to influence behavior coincides with the awareness of toxic bitter stimuli often found in the plant kingdom. This duality suggests that balancing sweet and bitter tastes has been crucial throughout human evolution. In modern diets, sweetness is frequently isolated from its natural bitter counterpart, leading to a tendency for individuals to indulge in sweet flavors without the moderating effects of bitterness. This disconnect may result in overconsumption of sweet foods, detracting from the evolutionary advantages of a balanced palate.

Evolutionary Advantages of a Balanced Palate: From Bittersweet to Cravability

Hypothesis

By coating bitter eggplant chips with chocolate and long pepper, we hypothesized that tasters' negative reaction to bitterness will be tempered by the sweetness and oleogustus of the chocolate, as well as the spiciness and umami of the long pepper.

Methodology

A group of 34 students were asked to evaluate plain bitter eggplant chips as well as eggplant chips that had been dipped in chocolate and seasoned with long pepper. Evaluators were asked to rate the overall flavor of each sample on a scale of 0-5, as well as to fill out radial charts evaluating the individual basic flavor profiles in each sample. Tasting sheets were developed to record respondent answers. Data was evaluated and compiled into charts reflecting the responses of the group.

Results

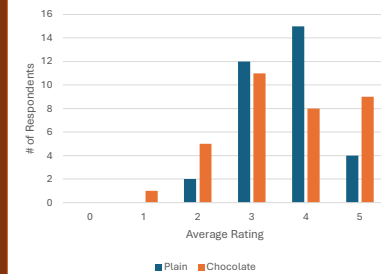
Evaluators preferred plain eggplant chips (3.64/5) slightly over the chocolate and long pepper dipped chips (3.53/5). While it was confirmed that the chocolate dipped chips led to a more balanced flavor profile, that balance did not function as a pathway to higher attraction or craving of the sample.

Conclusions

Outlying factors influenced the data. The texture of the chips greatly influenced the overall rating. Some tasters rated the chocolate sample very low because they disliked the pepper, which also skewed the data significantly.

To deepen our understanding of food's beneficial value, it is vital to develop a comprehensive metric that considers not only the sweet-to-bitter ratio but also how these tastes interact with other flavors. Understanding taste in this multifaceted manner allows for an appreciation of how various taste components affect our eating experiences and choices.

Overall Average Rating of Eggplant Chips Served Both Plain As Well As Chocolate Dipped with Crushed Long Pepper



Flavor Profiles of Bitter Eggplant Chips Served Both Plain as well as Chocolate Dipped with Crushed Long Pepper

