A/B/n Test Report (Food Drink Variations)

1.0   Introduction

Our R&D team conducted an A/B/n test to evaluate three product variations (coded A, B, and C) of the new food drink. The objective was to measure consumer response across **purchase intent, taste, sweetness, and texture**, and identify which formulation has the strongest potential for market success. Each product was presented in a blinded format across three locations to ensure unbiased evaluation.

1.1   Executive Summary

A total of **45 respondents** (15 per product variation) participated in this study. Ratings were collected on a **1–5 scale** for taste, sweetness, and texture, and a **0–10 scale** for purchase intent.

1.1.1   **Purchase Intent:** Variants A (mean ≈ 7.0) and B (mean ≈ 7.47) were well received, while B showed a higher average intent than A, though the difference was not statistically significant. Both significantly outperformed Variant C (mean ≈ 5.20).


1.1.2   **Taste:** Variant B (mean ≈ 4.0) performed better than Variant A (mean ≈ 3.27) and Variant C (mean ≈ 3.47). However, under stricter Bonferroni adjustment, the differences did not reach statistical significance, indicating a trend that requires larger-sample validation.

Average of taste_rating

taste

3.266666667 — A
4 — B
3.466666667 — C

variant_assigned
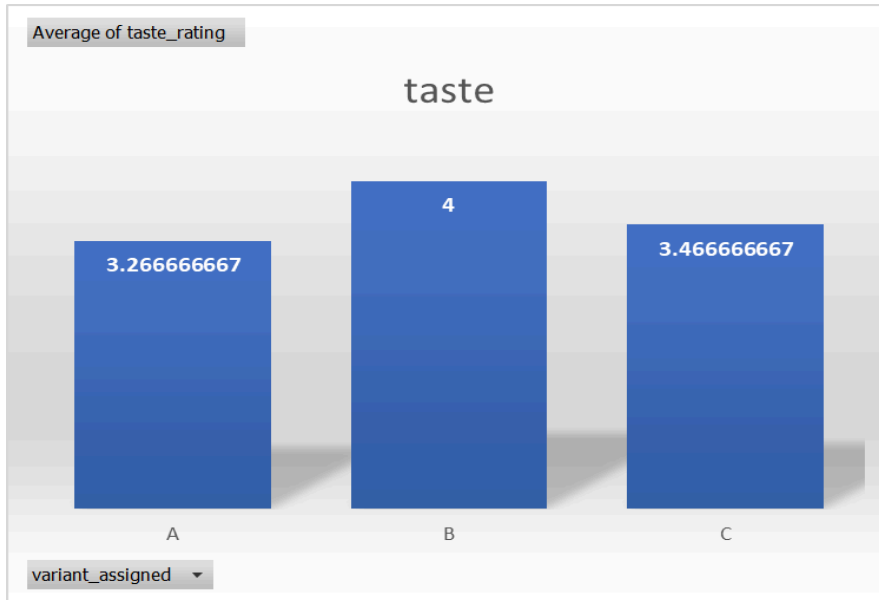
1.1.3 **Sweetness:** Variant B (mean ≈ 3.53) outperformed C (mean ≈ 2.60) with a large and statistically significant effect. Differences between A (mean ≈ 3.33) and the other two variants were smaller and not significant.

Average of sweetness_rating

Sweetness

3.333333333 — A
3.533333333 — B
2.6 — C

variant_assigned
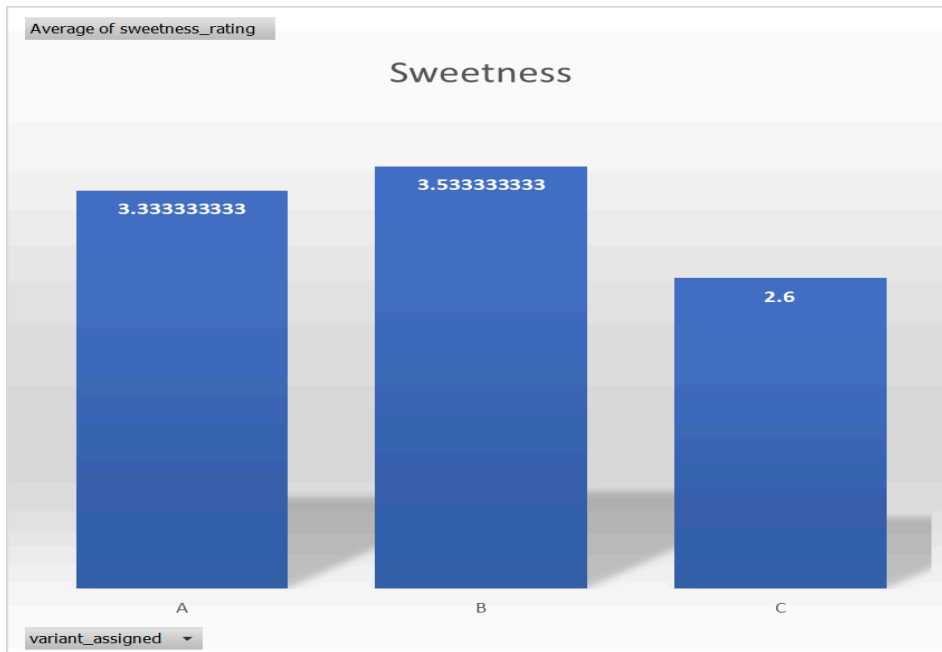
1.1.4 **Texture: Texture:** Variants A (mean ≈ 3.20), B (mean ≈ 3.60), and C (mean ≈ 3.45) showed no statistically significant differences, with all effect sizes small.

Average of texture_rating
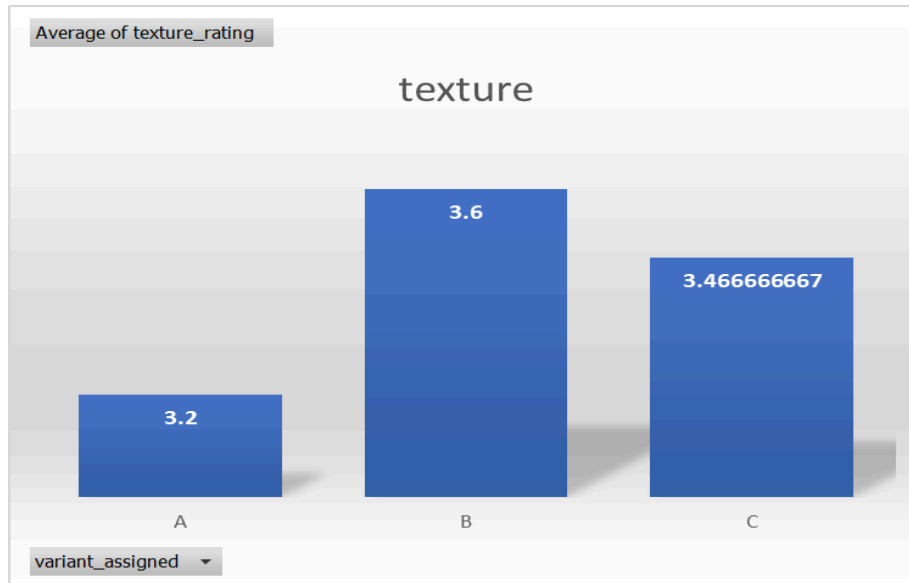
texture

Statistical tests (ANOVA, t-tests, and Chi-square) confirmed that Variant B consistently outperformed C in purchase intent and sweetness, while taste differences trended in favor of B but were inconclusive, and texture showed no clear separation.

1.2   Objective

The test aimed to:

1. Identify which product variant generated the **highest consumer purchase intent**.

2. Determine whether sensory attributes (**taste, sweetness, texture**) differ meaningfully between variants.

3. Provide R&D with data-driven recommendations on which formulation(s) to prioritize for production scale-up.

1.3   Data Preparation

1.3.1   **Sample size:** 45 respondents, evenly distributed across the three coded product variants.

1.3.2   **Metrics measured:**

- Purchase intent (0–10 scale)

- Taste, Sweetness, Texture (1–5 scale)

- Choice over current brand (Yes/No categorical)

1.3.3 **Cleaning:** Responses were validated for completeness. Means, standard deviations, margins of error, and 95% confidence intervals were calculated. Post-hoc comparisons (t-tests) were applied with Bonferroni correction (α=0.0167).

1.4 Analysis

1.4.1.1 Purchase Intent (0–10 scale)

- Variant A: **Mean = 7.0, SD = 1.60, 95% CI [6.11, 7.89]**

- Variant B: **Mean = 7.47, SD = 1.81, 95% CI [6.47, 8.47]**

- Variant C: **Mean = 5.20, SD = 1.74, 95% CI [4.24, 6.13]**

1.4.1.2 Statistical Tests: (under Bonferroni, to reduce the chance of Type 1 error)

- A vs B: p = 0.46 (NS), Cohen's d = 0.27 (small effect).

- B vs C: p = 0.002 (significant), Cohen's d = 1.28 (large effect).

- A vs C: p = 0.006 (significant), Cohen's d = 1.08 (large effect).

Interpretation: Variants A and B are both acceptable, but **Variant B clearly outperforms C** with a large effect size, indicating stronger purchase intent.

1.4.2.1 Taste (1–5 scale)

- Variant A: **Mean = 3.27, SD = 0.96, 95% CI [2.73, 3.80]**

- Variant B: **Mean = 4.0, SD = 0.76, 95% CI [3.58, 4.42]**

- Variant C: **Mean = 3.47, SD = 0.83, 95% CI [3.00, 3.93]**

1.4.2.2 Statistical Tests: (under Bonferroni, to reduce the chance of Type 1 error)

- A vs B: p = 0.028 (NS), Cohen's d = 0.85 (Medium).

- B vs C: p = 0.077 (NS), Cohen's d = 0.67 (Medium).

- A vs C: p = 0.055 (NS), Cohen's d = 0.22 (Small)

Interpretation: Variant B looks like the **best bet**, but **further validation** should be carried out **with a larger test** to confirm the trend with stronger statistical power.

1.4.3.1 Sweetness (1–5 scale)

- Variant A: **Mean = 3.33, SD = 0.98, 95% CI [2.79, 3.87]**
- Variant B: **Mean = 3.53, SD = 0.99, 95% CI [2.93, 4.01]**
- Variant C: **Mean = 2.60, SD = 0.83, 95% CI [2.14, 3.06]**

1.4.3.2 Statistical Tests: (under Bonferroni, to reduce the chance of Type 1 error)

- A vs B: p = 0.58 (NS), Cohen's d = 0.20 (Small).
- B vs C: p = 0.009 (Significant), Cohen's d = 1.02 (Large).
- A vs C: p = 0.035 (NS), Cohen's d = 0.81 (Large)

Interpretation: Variants A and B are both viable, but B has stronger proof of outperforming C, making it the safer choice.

1.4.4.1 Texture (1–5 scale)

- Variant A: **Mean = 3.20, SD = 0.68, 95% CI [2.83, 3.57]**
- Variant B: **Mean = 3.60, SD = 0.99, 95% CI [3.05, 4.15]**
- Variant C: **Mean = 3.45, SD = 0.74, 95% CI [3.06, 3.88]**

1.4.4.2 Statistical Tests:

- A vs B: p = 0.21 (NS), Cohen's d = 0.47 (Small).
- B vs C: p = 0.68 (NSt), Cohen's d = 0.15 (Small).

- A vs C: p = 0.31 (NS), Cohen's d = 0.38 (Small).

Interpretation: No statistically significant differences were found between any of the three product variants.

1.4.5.1 **Brand Choice (Chi-square test)**

- χ^2 = 5.29, df = 2, p = 0.071 (not significant at 0.05).

- **Interpretation:** While the overall difference in brand switch rates is not statistically significant, the data suggest **a trend toward higher switching likelihood for B**, warranting further investigation in larger trials.

1.5 Assumptions

1.5.1 Equal variance assumption for ANOVA was met.

1.5.2 Respondents' demographics (age 18–42, balanced male/female) are reflective of target customers.

1.6 Key Insights

1.6.1 **Variant B** consistently performed best in purchase intent, with large and statistically significant advantages over C.

1.6.2 **Taste ratings trend in favor of B**, though further validation is required with a larger sample.

1.6.3 **Sweetness differences were more pronounced**, with B significantly outperforming C.

1.6.4 **Texture showed no meaningful differences**, suggesting it is not a decisive factor in consumer preference for these formulations.

1.6.5 **Brand switching potential favors Variant B**, though not conclusively.

1.7 Recommendations

1.7.1 **Advance Variant B** to the next stage of R&D and pilot production.

1.7.2 **Discontinue Variant C** from further development unless reformulated.

1.7.3 **Retain Variant A** as a fallback candidate but focus resources on B.

1.7.4   Plan a **larger-scale consumer test (n > 200)** to validate taste and brand switching findings.

1.7.5   Position **Variant B's strengths in purchase intent and sweetness balance** as core selling points in marketing.

1.8   Conclusion

The A/B/n test provides a clear direction: **Variant B is the strongest candidate for market success**, with statistically significant advantages in purchase intent and sweetness over C, and favorable trends in taste. Texture showed no differences, suggesting focus should remain on flavor development. Scaling up Variant B while discontinuing Variant C maximizes the likelihood of consumer adoption and successful commercialization.