IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, October 2026
Impact Factor: 8.2

# Development and Acceptability of Sani (Nypa fruticans) Sap All-Purpose Concentrated Dressing

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**Abstract**: *This developmental study prepared three formulations of an all-purpose concentrated dressing using sani (Nypa fruticans) sap and evaluated descriptive sensory qualities, consumer acceptability, and nutritional composition. At Surigao del Norte State University, 120 purposively selected evaluators (20 food technology faculty/experts and 100 students) assessed coded formulations using descriptive scores and a nine-point hedonic scale. All formulations were characterized by warm-brown color, distinct sour aroma and flavor, and moderate sourness. Composite appeal means were 7.98, 8.03, and 8.08 for Formulations A, B, and C, respectively. No across-formulation acceptability differences were significant (all $p > 0.05$). For Formulation C, composite appeal differed by age ($F = 3.98$, $p = 0.048$) but not by sex. A 10-mL serving of Formulation C provided 15 kcal and 4 g carbohydrate, with no reported fat or protein. Formulation C was selected for further development on the basis of lower sani sap use, not statistically superior acceptance. The results support pilot product development, with shelf-life, safety, and market studies still needed.*

**Keywords**: Nypa fruticans; nipa sap; concentrated dressing; sensory evaluation; consumer acceptability

## I. INTRODUCTION

Interest in locally sourced condiments is closely related to food-product diversification, resource utilization, and demand for products with recognizable ingredients. Nipa palm (Nypa fruticans), locally called sani, is used in coastal communities, but its sap remains relatively unexplored as the main ingredient of a concentrated all-purpose dressing. Work on the phytochemical composition and traditional uses of the nipa palm provides background on the raw material [4]; the present study, however, investigates food acceptability rather than medicinal effects or antimicrobial performance.

A dressing must provide a coherent sensory profile while remaining suitable for practical preparation and use. Salt, acid, sweeteners, colorants, and thickening agents can be combined to create an acidulated condiment, but good sensory ratings do not by themselves prove microbial stability. Research on seaweed-derived food antimicrobials [1], brine-treated marine ingredients [2], and emerging preservation techniques [3] provides relevant context for food preservation without establishing that the present dressing has a validated shelf life. Similarly, research on hydrocolloid functionality explains why starch can influence sauce texture and handling [5].

Novel food acceptance requires systematic consumer-based evaluation. Reviews of sensory characterization and factors affecting acceptance of unfamiliar foods emphasize testing both individual sensory attributes and the overall impression [6], [7]. Consumer views about preservation practices [8] and reports on plant-based food formulation [9] further motivate the study. Research on starch-gel systems also illustrates the technical relevance of the cassava starch in a concentrated dressing [10].

The study therefore developed three sani sap dressing formulations; characterized their color, aroma, flavor, and sourness; compared sensory acceptability across formulations and respondent groups; and reported the nutrient composition of the selected formulation. The principal question was whether reducing the amount of sani sap altered acceptance sufficiently to affect selection of a practicable formulation.

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DOI: 10.48175/IJARSCT-38841

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## II. METHODOLOGY

**Design, setting, and formulation**

A developmental-descriptive design was implemented at the Food Technology Innovation Center of Surigao del Norte State University, Surigao City, Philippines. Three trial formulations were prepared with nominal proportions of 100%, 50%, and 25% of the sani sap base, while the source describes the other ingredients as held constant. The ingredient list comprised concentrated sani sap, brown sugar syrup, calamansi juice, annatto, black pepper, cassava starch, and salt. The source gives one formula with respective ingredient shares of 11.63%, 23.26%, 23.26%, 13.95%, 9.30%, 9.30%, and 9.30%, but does not provide complete formulation-specific mass balances; therefore, these percentages should not be interpreted as fully documented recipes for all three treatments.

Sap was collected in clean containers, strained or filtered, and gently heated. The dressing ingredients were measured, combined, and stirred under heat; cassava starch was dispersed before thickening, with annatto and pepper incorporated for color and flavor. The mixture was cooled and packaged. Expert critiquing preceded respondent sensory assessment, after which Formulation C was submitted for laboratory nutrient analysis.

**Participants, instruments, and analysis**

The 120 purposively selected raters consisted of 20 university food technology faculty members/experts and 100 students. Descriptive ratings were collected for color, aroma, flavor, and sourness; liking scores were collected for color, aroma, flavor, sourness, texture, and composite appeal using a nine-point hedonic scale (1 = dislike extremely; 9 = like extremely). The instrument collected age and sex for subgroup comparisons. Participants were oriented to the procedures and provided informed consent; the source reports university permission, confidentiality measures, and food-allergy screening.

Means and standard deviations summarized descriptive and hedonic scores. The thesis identifies repeated-measures analysis of variance for formulation comparisons and one-way ANOVA for respondent-profile comparisons, using a 0.05 significance level. Descriptive differences were not interpreted as statistically established unless the reported p-value met this threshold.

## III. RESULTS AND DISCUSSION

**Descriptive characteristics and sensory acceptability**

All three products were described as warm brown, with a distinct sour aroma, distinct sour flavor, and moderate sourness. Their descriptive ratings were similar: for example, color means were 4.08 (A), 3.98 (B), and 3.93 (C), and sourness was 3.83 in every treatment. Hedonic acceptability was favorable for all formulations, as summarized in Table I.

TABLE I: SENSORY ACCEPTABILITY OF SANI SAP DRESSING (MEAN ± SD; NINE-POINT SCALE)

| Attribute | A | B | C |
|---|---|---|---|
| Color | 7.79 ± 1.24 | 7.98 ± 1.11 | 7.87 ± 1.26 |
| Aroma | 7.78 ± 1.43 | 7.90 ± 1.33 | 7.88 ± 1.39 |
| Flavor | 7.78 ± 1.23 | 7.77 ± 1.18 | 7.71 ± 1.36 |
| Sourness | 7.58 ± 1.30 | 7.58 ± 1.23 | 7.58 ± 1.42 |
| Texture | 7.83 ± 1.28 | 7.75 ± 1.24 | 7.90 ± 1.25 |
| Composite appeal | 7.98 ± 1.19 | 8.03 ± 1.08 | 8.08 ± 1.05 |

All mean acceptability values ranged from 7.58 to 8.08, corresponding to “like very much” in the scale used by the thesis. Formulation B had the highest color and aroma means, whereas C had the highest texture and composite appeal means. These differences are descriptive rankings only. Sensory research has emphasized the importance of examining multiple attributes rather than assuming that the highest mean on one characteristic establishes superior overall performance [6], [7].

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**Statistical comparisons**

TABLE II: ACROSS-FORMULATION ANOVA RESULTS REPORTED IN THE THESIS

| Attribute | F | p value | Decision (α = .05) |
|---|---|---|---|
| Color | 1.47 | 0.23 | Not significant |
| Aroma | 1.01 | 0.37 | Not significant |
| Flavor | 0.21 | 0.81 | Not significant |
| Sourness | 0.00 | 1.00 | Not significant |
| Texture | 0.73 | 0.48 | Not significant |
| Composite appeal | 0.42 | 0.66 | Not significant |

None of the six outcomes differed significantly among formulations (Table II, p = 0.23–1.00). Thus, the trial did not detect a sensory advantage for any treatment within this sample. Formulation C was selected for further work because it used less of the principal raw material while retaining comparable acceptability; a formal cost analysis was not supplied. The selection represents a practical development choice, not an inferential demonstration of cost-effectiveness.

For Formulation C, age did not significantly affect color (p = 0.437), aroma (p = 0.103), flavor (p = 0.324), sourness (p = 0.166), or texture (p = 0.052). Composite appeal alone differed across age groups (F = 3.98, p = 0.048); respondents aged 20 and below had a mean of 8.25 versus 7.88 among those aged 21 and above. All six sex comparisons were nonsignificant (p = 0.523–0.992). The proximity of texture p = 0.052 to the significance threshold does not justify classifying it as significant. Given the purposive, student-heavy sample, the age finding should be interpreted cautiously rather than generalized to all consumers.

**Nutritional profile and development implications**

TABLE III: NUTRITIONAL FIGURES REPORTED FOR FORMULATION C PER 10-ML SERVING

| Nutrient | Reported amount |
|---|---|
| Energy | 15 kcal |
| Total carbohydrate | 4 g |
| Total fat | 0 g |
| Protein | 0 g |

Formulation C supplied 15 kcal and 4 g carbohydrate per 10-mL serving, with no reported fat or protein (Table III). Consequently, the product is principally a flavoring rather than a meaningful protein or fat source. Although the thesis discusses possible preservation activity and market comparisons, no microbial challenge tests, storage-life series, verified product pricing, or head-to-head commercial sensory trials are reported. Such evidence would be needed before claiming superior safety, shelf stability, or cost savings. The encouraging acceptance results instead support controlled pilot manufacture and subsequent validation of product safety, packaging, pH, stability, and consumer demand.

## IV. CONCLUSION

Sani (Nypa fruticans) sap was formulated into an all-purpose concentrated dressing that 120 evaluators generally liked very much. The three formulations had comparable acceptability, and Formulation C achieved the highest descriptive composite appeal (8.08) without a statistically significant difference from its alternatives. A significant age-related difference emerged for its composite appeal (p = 0.048), while sex-related differences were not detected. Formulation C contained 15 kcal and 4 g carbohydrate per 10 mL and was selected for continued development because of lower sap usage. Before publication of broader preservation or commercialization claims, further work should establish reproducible ingredient ratios, microbiological safety, shelf life, pH, manufacturing cost, and responses from a more diverse consumer sample.

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