

Characterization of the Vinegar Making Industry and Vinegar Producers in Dilasag and Dinalungan, Aurora

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Abstract. The vinegar industry in Dilasag and Dinalungan, Aurora, represents a vital, yet under-documented, traditional livelihood. This study sought to characterize the local vinegar-making industry and its producers to provide a comprehensive baseline of their socio-economic profiles, production practices, and barriers to commercialization. A descriptive research design was employed, utilizing a mixed-method approach. Data were collected from ten (10) purposively selected vinegar producers through survey questionnaires, structured interviews, and on-site observations. The findings reveal that vinegar production is a localized, family-based, supplementary livelihood predominantly managed by an aging population, with most producers in the 51-60+ age group. Production is overwhelmingly traditional, relying on locally available raw materials such as coconut sap (30-40%) and nipa palm (10-20%) and utilizing "natural" spontaneous fermentation (80%). A significant finding is the near-total absence of formal training; producers rely entirely on traditional sensory cues (color, aroma, taste) for quality control rather than scientific tools. While this practice provides a modest supplementary income (₱5,000-₱15,000 monthly) with local prices at ₱50-₱60 per liter, the industry faces significant structural barriers. The study concludes that producers are constrained by four critical, interrelated challenges that prevent commercial expansion: (1) limited production capacity (1-20 liters weekly), (2) a complete absence of product labeling and branding, (3) a lack of capital for investment, and (4) minimal technical training exposure. These barriers trap producers in a low-volume, low-income cycle, highlighting the urgent need for targeted interventions in training, standardization, and marketing to enhance this traditional enterprise.

Keywords: Aurora; Barriers to commercialization; Socio-demographic profile; Traditional practices; Vinegar production

1. Introduction

Vinegar production is one of the oldest and most valuable food-fermentation processes known to humankind. It has been widely used not only as a condiment and preservative but also as a source of livelihood for small-scale producers in rural areas. Vinegar, which is derived from the acetic acid fermentation of ethanol, plays a vital role in the food-processing and culinary industries across the globe. In the Philippines, locally produced vinegar often referred to as “sukang natural” remains an important household commodity and a significant part of Filipino gastronomy. Traditionally made from raw materials such as coconut water, nipa sap, sugarcane juice, and various fruits, vinegar production is an indigenous industry that reflects local resource utilization and cultural identity.

The province of Aurora, particularly the municipalities of Dilasag and Dinalungan, possess rich agricultural and coastal resources that provide potential raw materials for vinegar production. According to tourism and cultural listings, Dilasag’s coastline remains “undeveloped and natural,” providing an environment of rich biological and agricultural resource potential. Despite this, the vinegar making industry in these areas remains largely informal and under-documented. Local vinegar producers rely on traditional knowledge and inherited practices, often without standardized methods of production, quality control, or market expansion strategies. The absence of characterization studies limits the development of appropriate interventions to enhance product quality, promote competitiveness, and ensure food-safety compliance.

Previous studies on the vinegar industry in the Philippines have begun to document the rich, traditional practices and their socio-economic impact. For instance, research has explored the cultural and economic dimensions of traditional nipa vinegar production in Pangasinan (Quinto, 2024) and the production practices and challenges such as an aging workforce and limited technical training for coconut sap producers in Oriental Mindoro (Manalor, 2025). Others have assessed the quality management practices and socio-demographic profiles of fruit vinegar processors (Laurian, 2013). While these studies confirm the importance of characterizing the human and technical aspects of the industry, a significant gap remains. To date, limited literature explores the socio-economic profile of vinegar producers, their specific production practices, and the overall industry landscape in rural, under-documented municipalities like Dilasag and Dinalungan, Aurora. This gap underscores the need to assess both

the human and technical dimensions of vinegar production in this specific region to provide a holistic understanding of the industry's strengths, challenges, and development prospects.

This study, therefore, seeks to characterize the vinegar producers and the vinegar making industry in Dilasag and Dinalungan, Aurora, focusing on socio-demographic profiles, raw material utilization, production practices, product characteristics, and market distribution. The research also aims to identify constraints and opportunities for local industry improvement. The originality of this work lies in its integrative approach bridging socio-economic characterization with product and process documentation to generate a comprehensive baseline for vinegar industry development in Aurora Province. Unlike existing studies centred only on product chemistry, this research combines both human and production aspects, contributing a region-specific understanding that can serve as a foundation for future training, policy formulation, and technology intervention. By documenting indigenous vinegar-making knowledge and aligning it with modern quality standards, this study provides an innovative framework for sustaining and strengthening local vinegar production as a viable agro-based enterprise.

2. Methodology

This study employed a descriptive research design to characterize the vinegar producers and the local vinegar-making industry in the municipalities of Dilasag and Dinalungan, Aurora. This approach is consistent with other Philippine-based characterization studies that have documented traditional producers and their practices (e.g., Laurian, 2013; Quinto, 2024). Due to the limited number of active producers in the area, respondents were purposively selected. Participants were identified through coordination with the Municipal Agriculture Offices, the Department of Trade and Industry (DTI), and local Barangay Captains. Data were collected using a mixed-method approach, which parallels studies like Quinto (2024), by combining: (1) a survey questionnaire to gather socio-demographic profiles, production scales, and marketing activities, a component also used by Laurian (2013); and (2) structured interviews to understand motivations and traditional practices. Collected data were analyzed using descriptive statistics, including frequency counts, percentages, and means, to summarize the characteristics of the vinegar producers and their production systems. All ethical

protocols were followed, including obtaining informed consent from participants and ensuring the confidentiality of their responses.

2.1. Sampling Procedure

The study employed a purposive sampling technique to identify specific individuals who possess characteristics relevant to the study's objectives, focusing on individuals and households engaged in vinegar production within Dilasag and Dinalungan, Aurora. Coordination was made with the Municipal Agriculture Offices (MAO), the Department of Trade and Industry (DTI), and the Barangay Captains to obtain a list of known vinegar producers. From this list, participants were selected based on three criteria: they were actively producing vinegar at the time of the study, were residents of Dilasag or Dinalungan, and were engaged in production for either household use or small-scale commercial purposes. A total of 20 vinegar producers (10 from each municipality) participated, a number considered sufficient to represent the local industry since vinegar production in these areas is limited to a small group of individuals and families.

2.2. Respondents

The respondents of the study were local vinegar producers from Dilasag and Dinalungan, Aurora. They were purposively selected because they are the only individuals in their respective communities actively engaged in vinegar fermentation and production.

The respondents provided information on their socio-demographic profile (age, sex, educational attainment, occupation, and years of experience), production practices (raw materials used, fermentation duration, and equipment), and marketing activities (pricing, volume of production, and market outlets).

The researcher personally administered the questionnaire, conducted structured interviews, and carried out on-site observations. Immersion in the respondents' production areas allowed for direct documentation of their vinegar-making practices and ensured the authenticity of the gathered data.

2.3. Research Site

The study was conducted in the municipalities of Dilasag and Dinalungan, located in the northern part of Aurora Province, Philippines. These areas were chosen because they represent communities where vinegar production is a traditional household industry, utilizing locally available raw materials such as coconut water, nipa sap, sugarcane juice, and various fruits.

Both municipalities have agricultural and coastal settings that provide the necessary natural resources for vinegar fermentation. The geographical and cultural characteristics of these areas make them suitable sites for studying local vinegar-making practices and industry conditions.

Field visits, data gathering, and observations were conducted at the actual production sites of the respondents in both municipalities to ensure the accuracy and reliability of the information collected.

3. Results and Discussion

3.1. Socio-Demographic Profile of Vinegar Makers

The socio-demographic data from the ten (10) producers reveal that small-scale vinegar making in Dilasag and Dinalungan is a localized, family-based livelihood predominantly managed by an aging population.

Distribution and Demographics the producers are dispersed across several barangays, with Diniog in Dilasag having the highest concentration (20%). This indicates that vinegar making is not a centralized industry but rather a dispersed household activity. The demographic profile reveals that vinegar production is primarily a livelihood for middle-aged to older individuals. Producers in Dilasag are mostly in the 51–60 age group (30%), while Dinalungan has a notable concentration of producers aged 60 and above (20%). This finding suggests that the traditional knowledge of fermentation is being stewarded by experienced, older community members. This aligns with studies on other traditional fermented products in the Philippines, such as rice wine, where producers are typically middle-aged (41–50 years old) and operations are family-run (Gado et al., 2023).

Gender, Family, and Ethnicity, A clear gendered distinction was observed: male producers dominate in Dinalungan (30%), whereas female producers are the

majority in Dilasag (50%). This finding is consistent with broader observations on food processing in the Philippines. Abdon et al. (2021) note that women play a significant role in plant-based traditional food processing, particularly in home-based operations, which aligns with the production scale observed in Dilasag. The majority of producers are married (40–50%) with 4–6 children, reinforcing the family-based nature of the enterprise. Ethnically, the producers are diverse, with Ilocanos leading in Dilasag (30%) and Tagalogs in Dinalungan (20%), indicating the practice is culturally integrated across different groups.

Education, Occupation, and Livelihood, Educational attainment is primarily at the high school level. This profile is common in studies of rural enterprises, where experiential knowledge and inherited skills are valued over formal training.

Crucially, vinegar making is a supplementary livelihood for most. Only 10–30% consider it their primary occupation; the majority identify as farmers, carpenters, or small retailers. The reported monthly income (₱5,000–₱15,000) is modest. This positions vinegar production as a key component of a diversified livelihood strategy, a common practice for smallholder coconut farmers. Research on coconut-based value chains, such as 'tuba' (coconut wine) production, confirms that processing sap is often a secondary, yet vital, income source for farming households (Bermido et al., 2021).

Experience and Training Gaps, While some producers have over two decades of experience, many (20–30%) are relatively new, with 0–10 years in the practice.

A significant finding is the near-total absence of formal training. No respondents in Dinalungan and only a few in Dilasag had attended any training related to vinegar production. This highlights a critical gap between traditional knowledge and modern quality standards. This lack of technical support is a well-documented barrier for micro-enterprises in the Philippines. As Eleria and Eleria (2022) identified, a lack of access to relevant training and new technologies is a primary constraint that limits the scalability, quality consistency, and market competitiveness of micro-scale food processors.

3.2. Vinegar Production Practices

Production practices are overwhelmingly traditional, characterized by the use of local materials, spontaneous fermentation, and sensory-based quality control.

Raw Materials and Fermentation, the predominance of coconut vinegar (30–40%) and Paombong (nipa palm) vinegar (10–20%) underscores the region's reliance on available natural resources. Coconut sap (locally known as tuba) is the most traditional and widely used substrate for vinegar fermentation in the Philippines (Sanchez, 2008). Its abundance and low cost make it the logical primary material for small-scale producers. Production volumes are small, with most producers (40%) processing only 1–10 liters per cycle. The fermentation process is almost exclusively "natural" (80%), relying on spontaneous fermentation from wild yeasts and acetic acid bacteria present in the sap and environment. This process can take anywhere from overnight to two months.

Knowledge and Quality Control this reliance on spontaneous fermentation, while imparting a distinct local character, also introduces significant variability. This is a key challenge in traditional sap-based fermentation. Rollon et al. (2018), in a review of nipa palm fermentation, highlight that this "uncontrolled" process leads to high variability in product quality and alcohol content. This variability is compounded by the producers' methods for quality assessment. Instead of using scientific tools (like pH meters or titration for acidity), producers rely entirely on traditional sensory cues: color, aroma, and taste. This reliance on sensory evaluation is effective for small-batch, personal-use products but becomes a major liability for commercialization. It results in inconsistent acidity and flavor profiles, making standardization impossible and limiting market access (Flores et al., 2019).

3.3. Marketing and Commercialization

The marketing and commercialization of vinegar in Dilasag and Dinalungan are localized and face significant structural barriers that prevent producers from scaling up.

Market Scope, Pricing, and Motivation, the primary products sold are tuba vinegar (30–40%) and Paombong (20%), sold at a modest ₱50–₱60 per liter. This price point provides a steady but small income. The dominant sales channel is direct retailing (10% in Dinalungan), with some producers in Dilasag also engaging in local wholesale (40%). The motivation for production varies slightly: in Dinalungan, it is primarily for extra income (30%), while in Dilasag, it is cited as a main source of livelihood (30%). This suggests that producers in Dilasag may have a more established, albeit small, customer base.

Barriers to Commercialization, despite steady local demand, producers face critical barriers to expansion. The study identified four major challenges: limited production capacity, with small-batch processing (1–20 liters weekly) restricting potential income; an absence of labeling, as products are sold in unbranded, generic containers; and a lack of capital, which prevents producers from investing in better equipment, bottles, or registration. Furthermore, the minimal training exposure noted in Section I exacerbates these issues, as it prevents producers from adopting practices necessary for quality improvement and standardization.

These findings are characteristic of micro-scale food enterprises across the Philippines. Eleria and Eleria (2022) identified "poor product packaging and labeling" and "limited market access" as critical constraints. Similarly, research on other small-scale agricultural processors, such as cacao, found that "lack of capital" and "marketing" are primary obstacles (Shiraishi et al., 2019).

The absence of labeling is arguably the most significant marketing barrier. It immediately disqualifies the producers from accessing formal markets (supermarkets, restaurants, export) that require food safety compliance and branding. This traps them in a low-volume, low-price direct-sales model, reinforcing their status as a supplementary livelihood rather than a scalable enterprise.

4. Conclusions

The commercialization of vinegar in these municipalities is significantly impeded by critical, interrelated barriers, despite steady local demand. The study identified that producers operate with a limited production capacity, typically processing only 1–20 liters weekly, which severely restricts income potential. This operational constraint is directly linked to a lack of capital, which prevents investment in essential equipment, appropriate bottling, and formal business registration. Consequently, a primary marketing deficiency is the absence of labeling, with products sold in unbranded, generic containers, thereby precluding access to formal markets. Underpinning these challenges is the minimal training exposure identified previously, a knowledge gap that hinders the adoption of standardized production techniques and ultimately prevents the quality improvement necessary for commercial expansion.

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