

Indigenous Knowledge of “Bir Pletok” From the Betawi Tribe As Content In Making an Educational Video On the Biodiversity Topic

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Abstract. Indonesia is rich in biodiversity, but some studies indicate that students' understanding of biodiversity topics remains limited. Biodiversity is closely related to the utilization of plants in indigenous knowledge, such as bir pletok from the Betawi Tribe. Therefore, this research examined the indigenous knowledge of bir pletok, including the tools and materials used and the process of making it. Additionally, this research produced educational videos as a learning medium to support students' understanding. The method used was field exploration through interviews, direct observation, and documentation of the bir pletok-making process. Bir pletok is a traditional drink that has been passed down through generations and is prepared using traditional tools. Nine plant species are used in making bir pletok, including Ginger (*Zingiber officinale* Rosc.), Lemongrass (*Cymbopogon ciratus* (DC.)), Cinnamon (*Cinnamomum burmannii*), Nutmeg (*Myristica fragrans* Hault.), Cardamom (*Elettaria cardamomum* (L.)), Pandan (*Pandanus amaryllifolius* Roxb.), Sappan wood (*Caesalpinia sappan* L.), Sugarcane (*Saccharum officinarum*), Cloves (*Syzygium aromaticum*). The making process involves six stages, from grinding the ingredients to serving the drink. The 11-minute 59-second educational video, published on YouTube, aims to enhance students' understanding of biodiversity and foster an appreciation for cultural diversity and indigenous knowledge.

1 Introduction

Indonesia's rich biodiversity can serve as a valuable learning resource for students. Biodiversity can be found everywhere and encompasses all forms of life on Earth, ranging from the genetic to the ecosystem level. The term refers to the variety of all types of life, including plants, animals, microorganisms, genes, and the ecosystems they form [1]. Biodiversity is one of the topics studied by students in Indonesia, particularly in grade X as part of the *Kurikulum Merdeka*. However, several studies have revealed that students tend to

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have limited knowledge of this topic due to its perceived difficulty. Research by [2] indicated that the most incredible learning difficulty was in plant classification (62.63%). Similarly, [3] reported that students struggle with classifying and identifying the general characteristics of plants. Research by [4] also found that students struggle to understand the characteristics of the Kingdom Animalia.

One of the current challenges in biology education is effectively teaching the concept of biodiversity. This topic is closely linked to indigenous knowledge. Indigenous knowledge refers to the distinct understanding developed by a specific culture, gained through the lived experiences of local communities and passed down from one generation to the following [5]. The Betawi tribe also owns this indigenous knowledge. The Betawi tribe inhabits the city of Jakarta and is being pushed to the brink of extinction by the influx of migrants. The development of Jakarta as a metropolitan city has led to the dispersion and marginalization of the Betawi people, whose indigenous knowledge includes the traditional drink *bir pletok*.

Bir pletok was created by the Betawi people during the Dutch colonial period as an alternative non-alcoholic drink that resembles wine out of curiosity, but refuses to consume alcohol according to Islamic teachings [6]. *Bir pletok* is usually served warm with a warm and refreshing taste from ginger, cloves, and lemongrass, a fragrant aroma from pandan leaves, cinnamon, and cardamom, a reddish-purple color from secang and cinnamon, and a sweet taste from granulated sugar, coconut sugar, and cinnamon [7]. Several researchers have conducted previous research on *bir pletok*. Research from [8] on the characteristics of carbonated pletok beer drinks with different compositions of rhizome types. Research from [6] promotes *bir pletok* as a typical Betawi welcome drink.

Previous research has not examined *bir pletok* from a biodiversity perspective through an ethnobiological approach. Ethnobiology plays a crucial role in uncovering local expertise by documenting the complexity of indigenous knowledge outside the traditional academic framework [9]. In addition, there has been no effort to educate on *bir pletok* in the form of a video defense. Video is an electronic medium combining audio and visual technology simultaneously [10]. Therefore, this research aims (1) to examine the indigenous knowledge of *bir pletok* from the Betawi Tribe, including the history of making it; (2) the materials used, and the process of making it. In addition, this research also aims to describe an educational video about *bir pletok* that supports students' understanding of biodiversity.

2 Materials and methods

2.1 Methods

This study employed a field exploration approach involving direct observation of behaviors in their natural settings. This method also incorporates ethnobiological principles—an interdisciplinary field that examines the intricate relationships between biodiversity and culture [11]. The research procedure is illustrated in Figure 1.

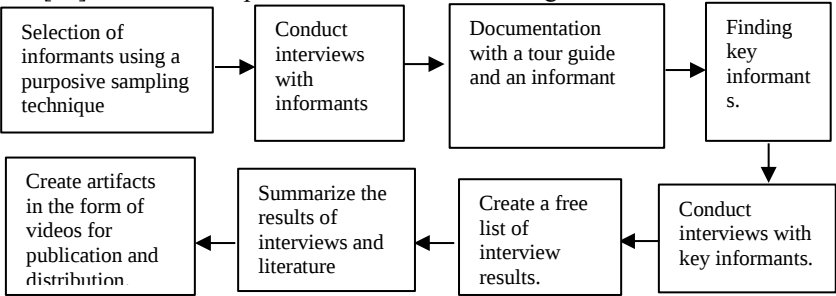


Fig. 1. Research Procedure [12].

Key informants were selected using purposive sampling, targeting those who met the required key informant criteria. The criteria included original Betawi people (parents of Betawi people), individuals aged 40 years or older, sellers and makers of *bir pletok* with a minimum of 5 years of experience, and those residing in the areas around Jakarta and Tangerang. Based on this selection, three key informants encompass the required criteria. Informants were coded A1-A3.

2.2 Research Location

This research was conducted in Jakarta from March to April 2024, spanning a two-month period. This research includes observation, interviews, and field documentation. The study's location and distribution of key informants are presented in Figure 2.

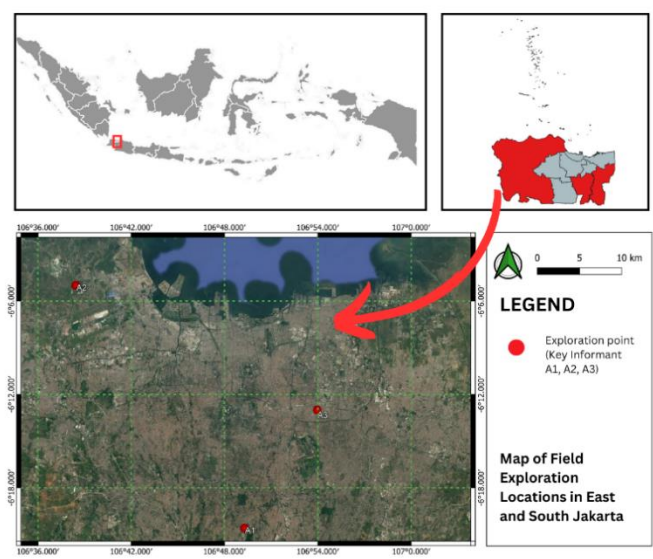


Fig. 2. Research Location.

2.3 Data collection techniques

Data was collected using three primary techniques: interviews, observation, and documentation. Semi-structured interviews allowed informants to share information openly while remaining aligned with the research objectives. Observations focused on the tools, ingredients, and the *bir pletok*-making process. To support the findings from interviews and observations, researchers documented visual elements through photos, videos, and field notes, which will later serve as material for creating educational videos.

2.4 Data analysis techniques

The collected data were analyzed qualitatively through three key stages: data reduction, data presentation, and conclusion drawing. Information gathered from observations, interviews, and documentation was filtered, simplified, and categorized based on relevant themes, such as tools, ingredients, and the *bir pletok*-making process. The reduced data were then organized into descriptive narratives, tables, or visuals to help illustrate the connections between various aspects of *bir pletok*.

3 **Results and discussion**

As a country rich in biodiversity and indigenous knowledge, Indonesia has a wealth of healthy traditional drinks. *Bir pletok* is a traditional Betawi drink known to have various health benefits, one of which is to provide a warm effect on the body. *Bir pletok* drinks do not contain alcohol, so when consumed, it does not cause the effect of being drunk or dizzy. *Bir pletok* is a drink that combines several spices in a concoction from the Betawi Tribe [8]. These spices are rich in health benefits. Observations and interviews (A1-A3) revealed that the ingredients required to make *bir pletok* comprise nine species, which are classified into seven orders: *Zingiberales*, *Poales*, *Laurales*, *Magnoliales*, *Pandanales*, *Fabales*, and *Myrtales*. The species used for making *bir pletok* are presented in Table 1.

Ginger, also known as *Jahe*, is beneficial as an antioxidant, analgesic, antibacterial, antiviral, and anti-inflammatory agent due to its phytochemical compounds, including alkaloids, flavonoids, phenolics, triterpenoids, and saponins [13]. In the coloring process, sappan wood is the main ingredient that produces the distinctive red color of *bir pletok*. These pieces of information were obtained from informant A2, a *bir pletok* seller and maker in Teluk Naga, Tangerang. A2's knowledge of *bir pletok* came from his adoptive parents, who are Betawi natives. A2 explained that *bir pletok* is a rare drink in high demand due to its spicy content, which refreshes the body when it feels unwell. It also has a complex flavor that distinguishes it from other traditional drinks, such as *wedang jahe*.

Additional information was obtained from A3, a seller and brewer of *bir pletok* in the Klender area, who is a ninth-generation Betawi descendant. A3 said that *bir pletok* is a cultural heritage dating back to the Dutch colonial period, created as an alternative warming drink that does not contain alcohol. The name “*bir pletok*” comes from the distinctive sound produced when the drink is served in a closed glass and shaken. According to A3, *bir pletok* is made from various spices that offer health benefits, such as relieving menstrual pain, improving blood circulation, and enhancing endurance. In its composition, sappan wood is a natural colorant that gives it a distinctive look, while ginger is the main element that provides a spicy and warm sensation.

Table 1. Species Used in *Bir Pletok* Making

Local name	Species	Genus	Family	Clade	Parts that used
Jahe	<i>Zingiber officinale</i> Rosc.	<i>Zingiber</i>	<i>Zingiberaceae</i>	Monocots	Rhizome
Serai	<i>Cymbopogon ciratus</i> (DC.)	<i>Cymbopogon</i>	<i>Poaceae</i>	Monocots	Leaf
Kayu Manis	<i>Cinnamomum burmannii</i>	<i>Cinnamomum</i>	<i>Lauraceae</i>	Magnoliids	Bark
Pala	<i>Myristica fragrans</i> Hault.	<i>Myristica</i>	<i>Myristicaceae</i>	Magnoliids	Fruit
Kapulaga	<i>Elettaria cardamomum</i> (L.)	<i>Elettaria</i>	<i>Zingiberaceae</i>	Monocots	Fruit
Pandan	<i>Pandanus amaryllifolius</i> Roxb.	<i>Pandanus</i>	<i>Pandanaseae</i>	Monocots	Leaf
Kayu Secang	<i>Caesalpinia sappan</i> L.	<i>Caesalpinia</i>	<i>Fabaceae</i>	Eudicots	Bark
Tebu	<i>Saccharum officinarum</i>	<i>Saccharum</i> L.	<i>Poaceae</i>	Monocots	Stem
Cengkeh	<i>Syzygium aromaticum</i>	<i>Syzygium</i>	<i>Myrtaceae</i>	Eudicots	Flower

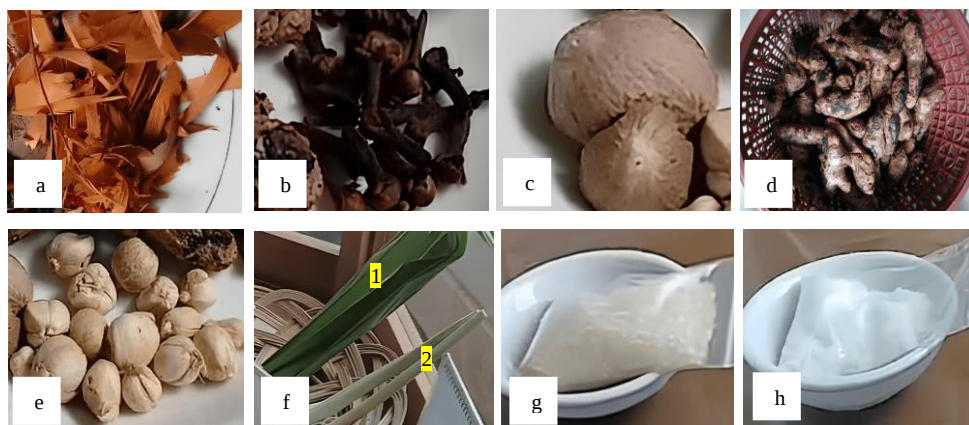


Fig. 3. *Bir pletok* Making Materials. (a) Secang (*Caesalpinia sappan* L.), (b) Cengkeh (*Syzygium aromaticum*), (c) Pala (*Myristica fragrans* Hault.), (d) Jahe (*Zingiber officinale* Rosc.), (e) Kapulaga (*Elettaria cardamomum* (L.), (f) Pandan (*Pandanuse amaryllifolius* Roxb.) (1); Serai (*Cymbopogon ciratus* (DC.) (2), (h) Gula, (i) garam

The bark of *Secang* or *Sappan* (*Caesalpinia sappan* L.) (Figure 3.a) is orange, which turns the water into a purplish red color when cooked. Secang can be used as a diarrhea and antibacterial drug and can be formulated as an anti-acne drug and anticancer activity by reducing viability in some breast cancer cells, colon cancer, and cervical cancer [14]. The flowers of cengkeh or clove (*Syzygium aromaticum*) (Figure 3.b) have small flowers, one clustered. *Pala* or nutmeg (*Myristica fragrans* Hault.) seeds (Figure 3.c) used are round in shape and coated with a seed coat. *Jahe* or ginger (*Zingiber officinale* Rosc.) (Figure 3.d) is part of the rhizome, which has a sharp odor and is warm when consumed. *Kapulaga* or cardamom (*Elettaria cardamomum* (L.) (Figure 3.e) is used in the form of round seeds coated with a seed coat. Pandan (*Pandanuse amaryllifolius* Roxb.) (Figure 3.f.1) are green leaves that flavor and give fragrance to food. *Serai*, or lemongrass (*Cymbopogon ciratus* (DC.)) (Figure 3.f.2), is a plant with slightly rough leaves and a distinctive fragrance. *Gula pasir*, or granulated sugar (Figure 3.g), is made from sugar cane (*Saccharum officinarum*), which is processed from its brushy stems. Another seasoning added is salt (Figure 3.h).

Various simple yet functional tools are used in the traditional *bir pletok* brewing process. The main ingredients are placed in a mesh container (Figure 4.a), which functions to drain and filter the ingredients after washing. An ingredient gripper (Figure 4.b) is used to pick up or move the ingredients, enabling processing without direct hand contact. The ingredients are then crushed using a mortar, pestle, or ulekan (Figure 4.c) to facilitate extraction. The boiling process is carried out in a large pot, or *panci* (Figure 4.d), which is heated on a traditional stove or *tungku* to maintain the authentic taste of *bir pletok*. The ingredients are measured using a digital scale (Figure 4.e) to ensure consistent flavor during brewing. Once cooked, *bir pletok* is served in a simple glass (Figure 4.f), reflecting the authenticity of a tradition that has been preserved.



Fig. 4. *Bir pletok* making tools (a) container (b) material scoop (c) mortar (d) pot (e) stove (f) digital scale (g) glass jar

Informants (A1-A3) stated that the process of making *bir pletok* can be summarized into six main steps. The method of making *bir pletok* begins with pounding, or *geprek*, ingredients such as ginger, cloves, cardamom, nutmeg, and lemongrass (Figure 5a). *Geprek* is a pounding technique that uses a pestle and mortar to grind ingredients until they are smooth, aiming to extract the essence of the ingredients. After that, the ingredients are boiled in a pot of boiling water (Figure 5b). Then, spices such as sugar and salt are added to the stew (Figure 5c). Furthermore, secang wood and pandanus leaves are added to give color and aroma (Figure 5d). All ingredients are stirred thoroughly and boiled until the aroma and flavor are perfect (Figure 5e). Once cooked, *bir pletok* is then served in a container or bottle, ready for enjoyment (Figure 5f).

The results of exploratory research on *bir pletok*, based on ethnobiological principles regarding the species and its production process, are used as content in creating educational videos. The video about *Bir Pletok* was uploaded to YouTube using the link https://youtu.be/xDW_ox2fu7Q. The video is 11 minutes and 59 seconds long. The video consists of three main parts: the opening, the content, and the closing. The opening section explains the title and learning objectives related to indigenous knowledge, particularly in the Betawi community. The content section describes the history, ingredients, how to make *bir pletok*, the classification of species found, and explanations with vlogs and interviews. The closing section contains the conclusion of the *Bir Pletok* material. Video screenshots are presented in Figure 6.



Fig. 5. *Bir pletok* Making Process. (a) Pounding the Ingredients (Ginger, Cloves, Cardamom, Nutmeg, and Lemongrass); (b) Boiling the Ingredients in a Pot; (c) Adding spices such as sugar and salt; (d) Adding sappan wood and pandan; (e) Stirring the Ingredients; (f) Serving *Bir pletok*.

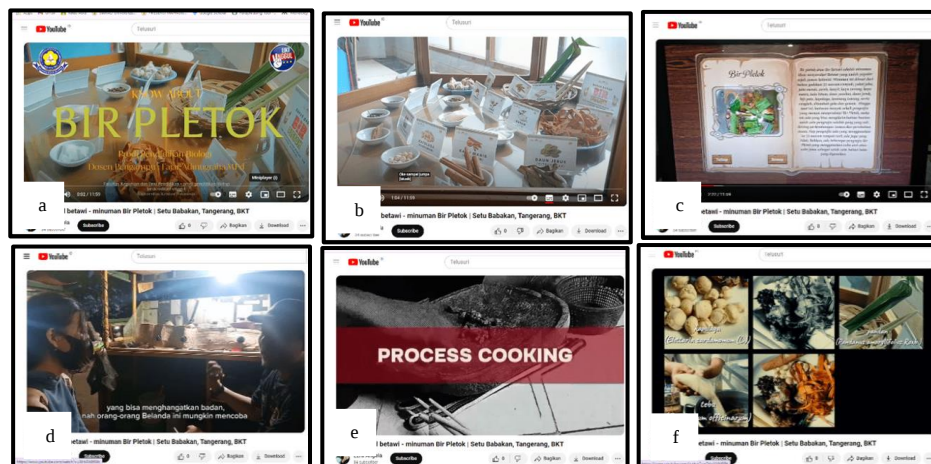


Fig. 6. Educational video on indigenous knowledge. (a) Video title: Kearifan Lokal *Bir pletok*; (b) Explanation of learning objectives and concepts about Betawi Culture; (c) Explanation of *bir pletok*, history, how to make; (d) Explanation with interview vlog; (e) *bir pletok* brewing process; (f) conclusion and video closure

This research is currently limited to the ethnobiological study of *Bir Pletok* and its implementation in video form. Teachers must incorporate indigenous knowledge and culture-based approaches, as well as ethnobiological studies, into their learning activities. Therefore, future researchers are encouraged to develop instructional strategies that integrate indigenous knowledge to introduce biodiversity [15], such as traditional medicines derived from medicinal plants, offerings used in traditional rituals, ethnoecology-based environmental studies, and traditional food. Integrating Indigenous knowledge or local wisdom into learning will foster a character of curiosity and deepen understanding about biodiversity.

4 Conslusions

Bir pletok is a drink passed down from generation to generation by the Betawi people. In making *bir pletok*, various tools are needed for preparing dishes, such as an ulekan, stove, pot, capitan, scales (if required in production), glass, and a place to put ingredients that have been pounded. In preparing the tools for this study, traditional tools are still used, including a digital scale. There are nine species used in making *bir pletok*, consisting of Jahe or Ginger (*Zingiber officinale* Rosc.), Serai or Lemongrass (*Cymbopogon ciratus* (DC.)), Kayu manis or Cinnamon (*Cinnamomum burmannii*), Pala or Nutmeg (*Myristica fragrans* Hault), Kapulaga or Cardamom (*Elettaria cardamomum* (L.)), Pandan (*Pandanus amaryllifolius* Roxb.), Secang or Sappan wood (*Caesalpinia sappan* L.), Sugarcane (*Saccharum officinarum*), and Cloves (*Syzygium aromaticum*). The making of *bir pletok* consists of six steps, namely (a) grinding the ingredients (ginger, cloves, cardamom, nutmeg, and lemongrass); (b) boiling the ingredients in a pot; (c) adding spices such as sugar and salt; (d) adding sappan wood and pandanus; (e) stirring the ingredients; (f) serving *bir pletok*. The educational video about *bir pletok* is 11 minutes and 59 seconds long, available at the link https://youtu.be/xDW_ox2fu7Q. The educational video disseminated through YouTube is expected to increase students' knowledge of biodiversity while promoting appreciation for indigenous knowledge and culture.

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