



# Local Wisdom in the Coffee Production Process as Content for Science Learning in Elementary Schools

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**Abstract.** The purpose of this study is to describe the value of local wisdom in the coffee production process which can be used as scientific knowledge as teaching material for science learning content in elementary schools. And identify the scientific concepts contained in the coffee-making process. Local wisdom in making coffee needs to be formalized, reconstructed, and become scientific knowledge that can be used as an alternative contextual learning resource. This research is qualitative with ethnographic design based on experience and observation. Researchers in the research process include understanding the situation in the field so as to find problems in society or society. Collecting data using interviews, documentation and observations. The validity of the data using triangulation of sources and techniques. The data analysis technique uses reduction, display and verification as well as raising conclusions. The results showed that the coffee production process from Temanggung and from the slopes of Merapi still retains elements characterized by maintaining the value of local wisdom in producing it and identifying the original scientific content in the coffee-making process. Starting from the stage of planting coffee beans to the process of making the coffee storage media. Meanwhile, the science studies that we can take are the influence of weather on the growth and development of coffee, the continuous planting process, heat transfer, coffee acidity, water content in coffee, coffee sensitivity, heterogeneous and homogeneous mixtures, and coffee fermentation processes.

**Keywords:** Coffee · Science Learning · Production · Local Wisdom

## 1 Introduction

Local wisdom is in the form of knowledge, myths, and ancestral messages which contain prohibitions, invitations, and sanctions in environmental management. Local wisdom includes the values of life that apply to the community in the form of wise, wisdom-filled local ideas embedded and followed by residents to protect a sustainable environment [1]. Local wisdom is values that are historical but still positive. It is also the values taken

by the ancestors and then passed down from generation to generation [2]. Local wisdom is part of a long journey of efforts to preserve culture or customs that have deep-rooted influences and positions in people's lives [3]. This opinion is in line with Chaiphar et al. [4] which explains that local wisdom is a community habit that becomes a new culture inherited by their descendants in social life. The process of preserving local wisdom can be done verbally while the heirs do not accept it passively, but can add or subtract and be processed so that wisdom only applies situationally and cannot be separated from several systems in the environment or ecological or ecosystem systems that must be faced by people who understand and practice and implement the local wisdom [2].

Local wisdom becomes a national identity, which can turn into a national culture [5]. But in the era of globalization which is growing very rapidly, resulting in outside cultural influences entering without any filtering of society. The influence of the entry of foreign cultures at this time has reduced the understanding of culture and local wisdom of the Indonesian people, the existence of local wisdom which has begun to fade also has resulted in the erosion of the sense of nationalism of the people, especially children. The shift in cultural and social values that is influenced by globalization has resulted in changes in the current pattern of actions of the younger generation [6]. Local wisdom that should be passed down from generation to generation has begun to be eroded by the currents of modernization and globalization. For this reason, it is very rare to find people who still apply local wisdom as a way of life, including in their efforts to respond to their environment [7]. Children as the nation's successors need to be instilled in the love of the homeland and taught to preserve Indonesian culture. Local wisdom is one of the drivers of planting children's noble character by implementing local culture-based programs. The values that exist in society have the potential to be developed and introduced by today's young generation [8].

Instilling the value of local wisdom in children can be done by accommodating culture into the learning content. As stated by Subawa [9], namely the cultivation of local wisdom in children can be integrated with learning content in schools. The value of local wisdom is implemented in learning because it has cultural-based learning resources and also character value values to establish a strong and characterful nation [10]. Educational innovation in integrating with local wisdom is the merging of science with cultural wisdom called ethnoscience. Ethnoscience is taken from the Greek language, namely *ethnos* which means nation and Latin *scientia* which means knowledge. The definition of ethnoscience is knowledge that comes from a nation or social group combined with language; customs and culture; moral; and integrate technology that contains scientific knowledge. The ethnoscience approach in learning is based on local wisdom which is the basis for the development of education as a form of developing local culture-based education [11].

The integration of local wisdom values in science learning concepts will be embedded in students because of the nature of authenticity, the uniqueness of learning concepts that can be found directly by students will be a strengthening of science learning materials. Some cultures or local wisdom have been tested empirically so that they will find new knowledge values so that they become genuine science [12]. We can see the implementation of the ethnoscience approach from the traditional coffee production process

by using natural resources that are still preserved. Coffee is an agricultural commodity that people are most familiar with, from the upper to lower economic circles. Until now, coffee still occupies the mainstay of Indonesia's agricultural export commodities besides oil palm, rubber, and cocoa. Coffee is one of the plantation commodities which is expected to increase the foreign exchange value of Indonesia's exports [13].

The process of processing coffee beans into real ground coffee has interconnected manufacturing steps. From the process of picking coffee beans to the process of brewing coffee. The coffee processing process is divided into 2 (two) namely primary processing and secondary processing. The difference in the coffee processing process is in the stages carried out, the primary coffee processing process starting from the drying process until the moisture content reaches 25%, the fruit peeling process, drying stage, the second until the water content reaches 12%, and the sorting stage. Meanwhile, the secondary coffee processing process starts from roasting, cooling, grinding into coffee grounds, packaging, packaging, to distribution [14].

Based on the explanation above, the processing process for making coffee grounds uses a scientific approach that is still being maintained. Research conducted by Safitri et al. [15] states that in making teaching materials it can be integrated with local coffee wisdom in science learning content. The use of teaching materials in the form of modules based on local wisdom encourages teachers and students to collaborate with each other to achieve learning objectives. The purpose of the module based on local wisdom is to increase students' awareness to maintain, conserve, and develop natural resources around them by combining students' scientific knowledge, so that there is a synergy between local knowledge (local knowledge) and scientific knowledge (scientific knowledge) [16]. In line with research conducted by Juliyanto & Rahayu [17] that the process of making coffee has a scientific process that is still used. The scientific processes involved in coffee processing include picking, peeling, drying, and cooking coffee beans or commonly called coffee roasting. Utilization of traditional tools that are still carried out in the coffee-making process can become genuine science that can be used as scientific knowledge in the process of learning science content in elementary schools. The purpose of this study is to describe the original science in the coffee production process which becomes scientific knowledge as teaching material for science learning content in elementary schools. Explore the scientific concepts contained in the coffee-making process, and identify the value of local wisdom in the coffee-making process as an alternative contextual learning resource.

## 2 Method

This research is qualitative with an ethnographic design based on observational studies and interviews. Researchers in the research process include understanding the situation in the field. The research method with qualitative research is carried out by describing the facts in the actual field while still paying attention to the results in their interpretation. The method of data collection in this study is the technique of interview, observation, and documentation. The interview technique was carried out by researchers with sources directly to collect information or data from the traditional coffee-making process. After the researcher conducted the interview, the researcher conducted direct field observations

to see the real situation at the traditional coffee-making production site. The search for evidence will later be studied by researchers as data strengthening information for researchers. The validity of the data used in this study is triangulation of sources and techniques. As the final stage of research is data analysis using reduction, display and verification.

### 3 Result and Discussion

Local wisdom is a tradition that develops in the community to manage existing resources so that their sustainability is maintained. According to *kompas.com*, location and climate helped Indonesia become the third largest producer of robusta coffee beans in the world. The total production of robusta and arabica beans in Indonesia is 10.7 million sacks weighing 60 kg in 2019–2020. So, it is proper that coffee local wisdom is internalized into learning in schools, so that students are more familiar with local coffee wisdom in their area. In the coffee processing process, there are stages that must be passed systematically and continuously in order to produce quality coffee. In maintaining a good coffee taste, the coffee processing process must be maintained properly.

Coffee processing has systematic stages to produce coffee with an original taste. The authenticity of the coffee that is maintained by the coffee processor is maintained, so the steps in the manufacturing process must be carried out carefully and patiently. In Table 1, briefly describes the coffee processing process from the planting process to brewing coffee by maintaining the distinctive taste of coffee (Figs. 1 and 2).

Indonesia generally grows Arabica and Robusta seeds. Almost 90% of coffee production in Indonesia is Robusta. However, from this small amount of Arabica production, Indonesian coffee has triumphed. Indonesia is famous for its intense Arabica coffee and its unique taste. These Indonesian Arabica coffees occupy the ranks of the world's best coffees [18].

Indonesian people generally consume coffee as a hereditary drink that is enjoyed by steeping hot water. The community began to produce coffee independently or on a large scale (distributed) which was done naturally or mechanically. The process of making coffee starts from the stage of planting coffee beans to the process of brewing ground coffee. In the process of making coffee, people prioritize the taste, aroma, color, and consistency of the authenticity of the coffee being processed. Traditional coffee processing is maintained in order to maintain the taste of the coffee produced [19]. Most people process coffee from the process of planting coffee beans to producing quality coffee beans.

The process of planting coffee is done from planting seeds for 1–2 years, then followed by a continuous planting system for 1 year. After that the coffee begins to flower for the harvest process to be carried out once a year, namely in June, July, August, or September. This is influenced by the weather, cloudy weather will usually slow down the fruiting of the coffee so that the harvest month will decline. In April it begins to flower. Robusta coffee is grown at an altitude of 500 m above sea level with supervision, while robusta is better at an altitude of 800–1000 m above sea level. The characteristics of the height of the coffee plantation affect the productivity and quality of coffee. The original science in this process is knowledge of the level of soil fertility with the properties of coffee in order to maximize its growth and development.

**Table 1.** Result of Coffee Processing Observation

Informant	Observed Aspects	Observation result	Shortcuts
Spt, Ptr, Ds	Planting coffee trees in the Temanggung area	<p>The process of planting coffee is done from planting seeds for 1–2 years, then followed by a continuous planting system for 1 year. After that the coffee begins to flower for the harvest process to be carried out once a year, namely in June, July, August, or September. This is influenced by the weather, cloudy weather will usually slow down the fruiting of coffee so that the harvest month experiences a setback. In April it begins to flower. After the coffee picking process, the farmers sort the coffee that is red, green, or discard the coffee that is less suitable. Sometimes when picking uses the Root system, namely picking koi without sorting so that sorting is needed</p>	<p>Land use for coffee cultivation without fertilizers only relies on natural weather</p>

*(continued)*

Table 1. (continued)

Informant	Observed Aspects	Observation result	Shortcuts
Spt, Ptr, Ds, Smm	The process of drying coffee after soaking with a bamboo mat	<p>After the sorting process, then the farmers carry out the process of soaking or mining the coffee. It aims to sort out good coffee or not. Good coffee is characterized by sinking when soaked, otherwise if the coffee floats it indicates that the coffee is not good. The drying process uses the braid or para-para method, this braid method does not use plastic but uses a pandan mat, using a viewing mat the drying process will be faster and cleaner. The drying method is called the natural method, the other method is semi-full washing, full washing, and broken skin. Full washing method, namely the skin is broken after it is soaked and used a huller for washing and removing mucus, then the coffee is soaked again and dried. So, in the full washing method, the seeds are directly dried in the process. Farmers themselves use natural methods like the ancestors, with drying done after picking and sorting the quality of the beans.</p>	Manual drying using sunlight.

(continued)

Table 1. (continued)

Informant	Observed Aspects	Observation result	Shortcuts
Spt, Ptr, Ds, Smm	Separation of coffee with the skin	After the coffee is completely dry, the next process is peeling the skin with a selep tool. For approximately 3–5 min. The coffee immersion is done not for long, because if it is too long it will destroy the coffee beans themselves.	With dry coffee skin, it will be easier to separate the skin from the coffee beans
Spt, Ptr, Ds	Coffee enrichment with winnowing	After separating the coffee husks, the farmers make enrichment so that the coffee is perfectly clean. Enrichment with winnowing by utilizing the wind.	After separating the coffee husks, the farmers make enrichment so that the coffee is perfectly clean. Enrichment with winnowing by utilizing the wind.
Spt, Ptr, Ds	Heating a pot made of earthenware	At the time of frying or roasting for the first time, we use dry and hard wood to maintain the quantity of fire such as coffee wood, the fire is not large at the beginning, place the earthenware skillet until it is hot, the use of pottery pans is due to maintain the taste and aroma of the coffee. Then prepare coffee that has been dried because coffee contains a water content of usually 14–12%, then put it in the pottery pan.	Using a cooking stove and fuel in the form of wood during the roasting process.

(continued)

**Table 1.** (continued)

Informant	Observed Aspects	Observation result	Shortcuts
Smr, Spt, Ds	Coffee roasting process	<p>At the time of frying or roasting for the first time, we use dry and hard wood to maintain the quantity of fire such as coffee wood, the fire is not large at the beginning, place the earthenware skillet until it is hot, the use of pottery pans is due to maintain the taste and aroma of the coffee. Then prepare coffee that has been dried because coffee contains a water content of usually 14–12%, then put it in the pottery pan.</p>	<p>Using a cooking stove and fuel in the form of wood during the roasting process.</p>
Spt, Ptr, Ds, Smm	Cooling process by putting roasted coffee on a tray / winnowing	<p>After the coffee is roasted then the coffee is cooled by placing the coffee on a tray. Coffee that has been rested for 3–6 h, then put in a glass jar and closed for 3 days. This process is used to remove the unpleasant taste of coffee or to bring out the taste.</p>	<p>Using room temperature without any technology involved.</p>



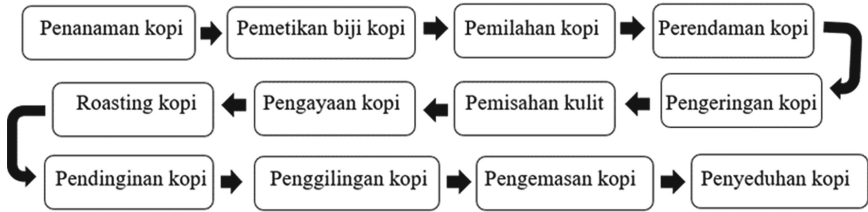


Fig. 1. Coffee Processing.



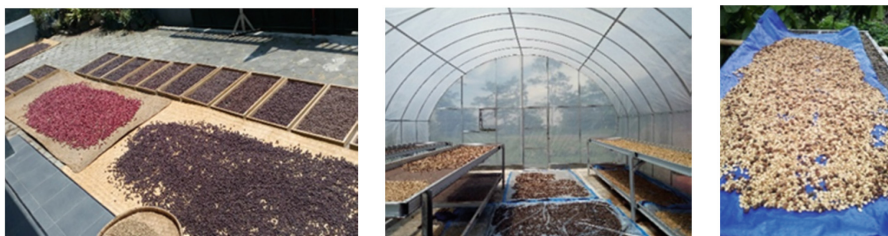
Fig. 2. Planting Coffee Trees in Temanggung and on the Slopes of Merapi.

The local wisdom that is taken from this process is that the use of land for coffee cultivation without fertilizers only relies on natural weather. The point in this process has a connection with the field of science, namely the process of grafting, namely by connecting two logs that have been cut with a larger coffee stem and then tying it with raffia rope and covered with clear plastic to maintain the stability of the plant temperature. The emergence of new shoots will be seen after 3–4 weeks, this process is also influenced by the weather in the coffee plant development process. Meanwhile, the coffee plant on the slopes of Merapi is Robusta coffee. Robusta coffee is grown at an altitude of 500 m above sea level with supervision, while robusta is better at an altitude of 800–1000 m above sea level. The characteristics of the height of the coffee plantation affect the productivity and quality of coffee. The original science in this process is knowledge of the level of soil fertility with the properties of coffee in order to maximize its growth and development (Fig. 3).

The selection of coffee beans is done manually according to the quality of the coffee. Selection according to the quality of coffee affects the results of the coffee powder that will be produced. Coffee producers usually prioritize the quality of the coffee grounds they produce because coffee producers prioritize customer satisfaction. According to Apriani [20] manual sorting of coffee beans takes a long time based on the expected accuracy and standard criteria. Defective coffee beans and coffee color are the criteria for standard coffee sorting [21]. In the process of sorting coffee based on the color of coffee, namely red, green, or discarding coffee that is less suitable/defective. Sometimes when picking uses the Root system, namely picking coffee without sorting so that there is a need for sorting. Judging from the picture above, the coffee from Temanggung has almost the same level of coffee quality, which means that planting in Temanggung



**Fig. 3.** Coffee Bean Picking.



**Fig. 4.** Coffee Drying with the Para-Para (Braid) Method.

has advantages over the slopes of Merapi coffee. This proves that the grafting system technique can produce better coffee quality. According to Irlando [22] by using the continuous planting method, the plant will experience rejuvenation and can produce more fruit.

Local wisdom that is raised in the picking process is when the picking process is done manually by patiently picking seeds per tree. According to Kembaren [23], harvesting must be done very carefully and manually, namely hand picking which aims to get a minimum of 85% red logs, a maximum of 15% yellow spindles, with no green or black spindles. In accordance with research conducted by Puspitawati [24], fruit picking is done when the fruit is evenly ripe which is marked by feeling soft when held. When the coffee is perfectly ripe on the tree, it cannot be too late, and must be picked as soon as possible. While the green fruit is considered not old enough and should not be picked because it is considered to reduce the quality of the coffee itself. The connection between the picking process and science is in the various coffee maturation processes and results in the conclusion that grafting techniques produce better beans. The process from planting to fruiting is about 3 years from the slopes of Merapi. As for the Temanggung coffee tree planting, in the first 2 (two) years, continuous planting is carried out and one year later it begins to flower. The harvest process is in June, July, August, or September depending on the weather at that time (Fig. 4).

After the sorting process, then the farmers carry out the process of soaking or mining the coffee. It aims to sort out good coffee or not. Good coffee is characterized by sinking



**Fig. 5.** Peeling the skin with a huller and a lumpah tool.

when soaked, otherwise if the coffee floats it indicates that the coffee is not good. Coffee that sinks means it has a heavy mass or has seeds with a good size, while coffee that floats means that coffee has a small mass, meaning that the beans inside are small. In line with research conducted by Ayub et al. [25] that a floating object is not seen from the size, shape, weight of the type of object but its relation to the object's mass and pressure.

The drying process uses the braid or para-para method, this braid method uses a pandan mat; special place of iron; or plastic mats. With these three methods affect the drying time of coffee, the method of drying mats in the open takes 7–10 days, while using iron in a plastic house takes 5–7 days, and drying with plastic mats takes 10–14 days with flipping coffee to dry quickly. The drying method is called the natural method, the other method is semi-full washing, full washing, and broken skin. The full washing method is splitting the skin after it is soaked and using a huller for washing and removing mucus, then the coffee is soaked again and dried.

So, in the full washing method, the seeds are directly dried in the process. Temanggung farmers use natural methods like the ancestors, with the drying done after picking and sorting the quality of the beans. Drying of the slopes of Merapi using a full washing technique, namely in coffee there are several layers of skin including cherry skin, horn skin, and epidermis. The process of peeling the skin using a tool or machine *selep*. In the stripping process there are several stages, namely first peeling the red skin and then drying it. Then dried with a moisture content of 14–12% there is a tool to check. When stripping is followed by soaking which will be dried in the sun and peeled off the skin of the horns.

Local wisdom that is raised in this process is drying with the para-para technique, by spreading the coffee on a mat. The connection with science is heat transfer by radiation or heat transfer without an intermediary. The difference in drying media also affects the speed at which the coffee dries, iron with heat-conducting properties or a conductor, while plastic that cannot conduct heat will hinder the drying process. In the soaking process using Newton's law properties in sorting the quality of coffee beans. Other knowledge gained is that coffee has layers including cherry skin, horn skin, and epidermis. In addition, coffee also has a high moisture content before drying, so coffee producers are looking for the right moisture content for coffee before it is produced into powder (Fig. 5).



**Fig. 6.** Enrichment with Tampah.

After the coffee is completely dry, the next process is stripping the skin with a tool called a huller or with a mortar if traditionally. If you use a huller, it is faster and produces coffee beans that are not easily crushed, whereas if you use a mortar, the peeling takes a long time and the coffee beans are more prone to crushing. According to Novita et al. [26] the work of the huller machine that is less than perfect can be caused by the influence of the water content of the coffee beans which is more than 12%. This process if done by natural methods. If you use full washing, the systematic peeling of the skin is at the beginning, after sorting the coffee beans. Fullwash coffee processing (wet processing) is a method of processing coffee that begins with a washing process using running water until clean and soaking, which will usually produce better coffee quality [27]. The full wash method is usually applied to Arabica coffee which is more acidic. To maintain the acidity of the coffee, the coffee beans are peeled and then soaked. The coffee immersion is done not for long, because if it is too long it will destroy the coffee beans themselves.

The process of local wisdom that is raised is the process of peeling the skin with a mortar for preserving the taste which is maintained by the coffee producers. A mortar is a container in the form of a cylindrical vessel or bowl made of stone, wood, or iron with a hole in the middle for pounding grain, rice, coffee, corn, or other processed materials. The connection between the skin separation process and science is that the dry coffee skin will make it easier to separate the skin from the coffee beans and the coffee will not break easily. Next, on the full washing technique to maintain the acidity of the coffee (Fig. 6).

After separating the coffee skin, enrichment is carried out so that the coffee is perfectly clean. The enrichment is done with a winnow like the picture above by utilizing wind pressure to remove the coffee skin flakes. Tampah, winnowing, or nyiru is one of the tools used for winnowing, namely cleaning rice from husks or other grains of cereal from the skin. Tampah is generally in the form of a large round tray/tray made of woven bamboo tree trunks. Local wisdom that is raised is using a winnowing tool as a separating tool. The connection between the sifting process and science is the pressure of the wind to provide air space for the coffee husk flakes (Fig. 7).

When heating, use dry and hard wood in order to maintain the quantity of fire such as coffee wood, the fire at the beginning is not large, place the earthenware skillet until it is hot, the use of pottery pans is due to maintain the taste and aroma of the coffee. When the process of heating and roasting coffee with a gas stove, you also still use



**Fig. 7.** Coffee Heating.

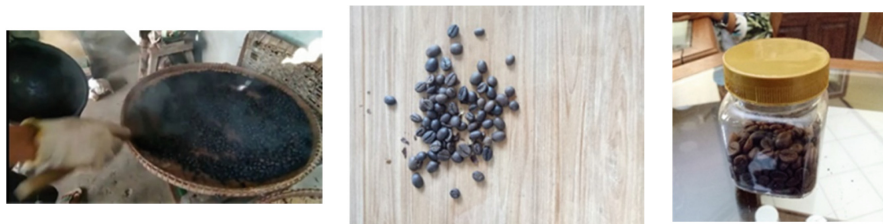


**Fig. 8.** Coffee Bean Roasting Process.

earthenware and a wooden spoon so that the authentic taste of the coffee is maintained. Then prepare the dried coffee with coffee containing a water content of usually 14–12%, then put it in the pottery pan. Local wisdom raised is the use of pawon as a substitute for gas stoves, earthenware pans as special fryers, and wooden spoons. When coffee producers no longer use pawon, they still use pots of earthenware and wooden spoons. Research conducted by Marpaung [28] if roasting coffee is done with a stainless skillet, it will cause the water content of the coffee to be low because the evaporation produced is faster. This will affect the color, aroma, taste, bitterness of the coffee.

The connection between the coffee bean roasting process and science is heat transfer by conduction, namely heat transfer that occurs due to direct contact with two objects. The selection of the selected media as a fire mat is also included in a knowledge because not just any wood is used as a fire mat by maintaining the quantity of fire produced. The use of a spoon made of wood was chosen because of the nature of wood that does not conduct heat, so that when the stirrer is continuously stirring the coffee, their hands will not feel hot. The use of stainless pans will result in faster breakdown of organic acids in coffee and produce a high pH (Fig. 8).

The roasting process for coffee is only made from coffee without any additives. The quality of coffee commodities is not only based on the type and physical condition of the coffee beans, but also based on the coffee bean roasting process. In the first 20 min the heat is on low, then the next 25–30 min increase the heat, and stir constantly until



**Fig. 9.** Cooling Coffee After Roasting.

the colour is dark. Then the coffee will start to crack or expand, up to 40–45 min. The roasting process does not use oil or margarine because of the nature of coffee which has a water content so that when roasting only coffee is made. The coffee roasting process also has levels, namely light, medium, and dark. Local wisdom that is raised is using a clay stove with firewood aids, an earthenware skillet, and a wooden spoon. Heat transfer by conduction is heat transfer that occurs due to direct contact with two objects. Calculation of roasting coffee beans to produce good coffee and not burnt is also new knowledge about the process of determining the size of the boiling point with the water content of the coffee (Fig. 9).

In this process, the average coffee shrinks, after roasting it will shrink by 25% [29]. Based on research conducted by Mardiana [30], the results of the analysis of the pH value of Robusta coffee before roasting is 6.2 while the pH after roasting at temperature variations ranges from 5.5 to 5.8. This happens because the acid concentration will be inversely proportional to the pH value before roasting has a high pH value, the acid concentration will be low. There was an increase in the concentration of acid after roasting, but the concentration of acid tends to decrease with increasing roasting temperature.

After the coffee is roasted, the coffee is cooled by placing the coffee in a winnowing tray. The reason for using a base made of bamboo winnowing is because bamboo has an uneven and odorless surface that makes the cooling process more perfect [31]. Coffee that has been left for 3–6 h, then put in a jar and closed for 3 days. The cooling process aims to remove the unpleasant taste of coffee or to bring out the taste. Local wisdom that is raised in the cooling process is the use of winnows and winds. The attachment of science in this process is that if a hot object is placed in a wide and open place, it will accelerate with the evaporation process. This is in line with Mursalin's [32] statement that the higher the evaporation, the lower the water content in the coffee (Figs. 10 and 11).

Farmers only produce robusta coffee, but this robusta coffee has several types and different processing methods. The first type is classic, the type of seed used is 99% red or in the sense that it is ripe and of good quality. In line with research conducted by Pulungan [33], the maturity level of coffee cherries greatly determines the quality of coffee with the characteristics of the best coffee cherries for harvesting are those that are fully ripe, red. The second type is ordinary coffee, the type of bean used is a mixture of red, pink, and green coffee beans or in the sense of standard quality. The third type is wine, the type of seed used is 99% red but through a fermentation process. According to Hikmah [34], coffee wine is fermented coffee in post-harvest processing which takes



**Fig. 10.** Arabica and Robusta Coffee Beans.



**Fig. 11.** Wine Coffee

between 30 and 60 days to ferment this wine coffee. The second picture is the type of robusta coffee, the type of robusta coffee has 2 (two) types, namely wedok coffee and lanang coffee. The difference between these two types is in their shape, namely Lanang coffee is round while Wedok coffee is semicircular. The wedok coffee fruit can produce 2 seeds per fruit, while the lanang coffee fruit only produces 1 seed per fruit. Therefore, the price of lanang coffee beans is more expensive than wedok coffee and the efficacy of lanang coffee that makes the price more expensive is because lanang coffee can increase strength for men. The taste of these two types of coffee is different even though they are both from the Robusta type. Local wisdom that is lifted from the process of selecting the type of coffee that still maintains the original taste of the coffee even though it has been modified. The connection of science in the process of sorting coffee types, namely with different coffee mixtures also affects the results or the resulting taste, calculating the dose of each type of coffee so as to produce a new taste but still maintain the authenticity of the coffee.

From the initial process, namely picking, red coffee beans are selected, followed by the mining process. According to research conducted by Maujudin [35], the red coffee that has been sorted is then mined with the aim of reducing the dirt attached to the coffee skin and removing the empty fruit. Furthermore, the coffee fermentation process is carried out in a dark place with a plastic container that must be tightly closed. According to Muzaifa [31] the purpose of fermentation in coffee is to convert sugar compounds that are in the layer between the fruit skin and seed coat into alcohol. Fermentation of



**Fig. 12.** Coffee Grinder.



**Fig. 13.** Coffee Brewer.

coffee that farmers do is using the 4-4-7 method, which is 4 days of soaking and then 3 h in the air, 4 days of soaking then 3 h in the air, the last is 7 days of soaking and then the drying process continues. This drying takes approximately 2 weeks due to the humid conditions of the coffee. Therefore, this coffee wine produces a different taste such as fruity odors and the taste is slightly less bitter than other types of coffee, this coffee wine produces a sour taste. Local wisdom raised in this process is the fermentation process using a plastic container placed in a dark place. The connection between the coffee-wine production process and science is the coffee fermentation process so that the acidity of the coffee increases (Fig. 12).

The coffee grinder process can be adjusted according to consumer demand. There are consumers who ask for smooth while those who ask for rough. The tool for grinding coffee is called a grinder. There are two types of this tool, namely a small grinder with electric rock and a large grinder for the production of large quantities of coffee (Figs. 13 and 14).

Serving coffee can use a V60 filter or a Vietnamese drip which drips without pulp. Brewing with this v60 filter uses paper to filter the coffee, while the Vietnamese drip device is usually used for coarse coffee. The connection between the coffee brewing process and science is the filtering of coffee without pulp from a heterogeneous mixture into a homogeneous mixture.

For coffee itself, it can last 3 months after opening and for packaging it comes from aluminum foil. We order the packaging ourselves and if we use aluminum foil it can last 1–3 years by maintaining the density of the packaging. If you use white plastic (clear) it will be affected by the temperature and will affect the quality of the coffee. The local wisdom adopted in this process is that the coffee packaging is self-printed and carries





Fig. 14. coffee Packaging

the Sumbing Mountain theme on the logo on the top of the packaging. The connection between choosing coffee packaging and science is that coffee will remain at the same quality if it is placed in a closed and airtight place, because the nature of coffee is very sensitive to the environment.

## 4 Conclusion

The coffee production process from Temanggung and the slopes of Merapi still maintains local wisdom in producing it. The community still uses local wisdom to manage existing resources in order to maintain their sustainability. Starting from the stage of planting coffee beans to the process of making the coffee storage media. The steps used to maintain local wisdom are still using lumpah and tampah to separate the coffee skin. The process of cooking coffee still uses pawon or stoves and pans that are still made of clay (pottery). This is nothing but the aim of producing the highest quality coffee in each of its productions. The type of coffee that is widely processed is the robusta type because of the nature of the plant that is suitable for soil conditions, besides that, robusta coffee can be made into several types according to the method of production. Besides still using local wisdom, this coffee-making process also uses a scientific process for several activities. Science studies that we can take are the influence of weather on the growth and development of coffee, the process of grafting, heat transfer, coffee acidity, water content in coffee, coffee sensitivity, heterogeneous and homogeneous mixtures, and coffee fermentation processes.

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