

## **Analysis Scientific Knowledge of The Process Making Jenang Kudus and Its Potential for Empowering Logical Thinking Skills**

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**Abstract.** The low knowledge of students' local wisdom, especially jenang kudus, has an impact on Indonesia's identity in the future. In addition, Indonesian students have low logical thinking skills, this also affects the fading of local wisdom in Indonesia, students have difficulty filtering foreign cultures carried by globalization. This study aims to: (1) analyze the scientific knowledge contained in the process of making jenang Kudus; (2) analyze the potential of scientific knowledge contained in the process of making jenang Kudus to empower junior high school students' logical thinking skills; (3) analyze the relationship of scientific knowledge contained in the process of making jenang Kudus to the material in science learning. This research is a descriptive qualitative research with an ethnographic approach. The data sources include informants and articles. The sampling technique was done with snowball sampling technique. Data collection was collection using interview, observation, documentation and journal analysis. The data validity test technique was carried out using triangulation techniques. Data analysis techniques using interactive analysis techniques. The results of this study show that the process of making Jenang Kudus contains scientific knowledge of science from three aspects including biology, chemistry and physical. Scientific knowledge in the process of making jenang Kudus has the potential to empower logical thinking skills which include 5 indicators including ordering, comparing, contrasting, evaluating, selecting. Scientific knowledge in the process of making jenang Kudus is related to junior high school science materials including temperature and heat, mixtures, physical and chemical changes, additives, and food substances.

**Keywords:** Jenang kudus, logical thinking skills, scientific knowledge

## **Introduction**

Since the start of the First Industrial Revolution in England, rapid technological development and many scientific breakthroughs have been able to change the lives of people around the world (Siekmann et al., 2023). The development of the Industrial Revolution 4.0 era is accompanied by the rapid development of technology and

communication. The quick access to various sources of information means that people must be able to assess the information needed and evaluate the truth and relative value of information (Starkey, 2011). Reflective reasoning is needed to make informed judgments and choices about the information and communication obtained (Van Laar et al., 2017). Logical thinking skills train students to think scientifically, reasonably, easily understood, reasoned, analytically, and interrelated so as to be able to solve complex problems to face the ever-changing and competitive demands of the 21st Century (Ash-Shiddieqy et al., 2018; Damayanti et al., 2017; Sari et al., 2018). In addition, improving students' higher-order thinking skills such as comparison, contrast, evaluation and inference is indispensable in the 21st century because scientific reasoning assessment is at the core of effective science education (Osborne, 2013).

The development of technology and communication should ideally facilitate people to access and disseminate information about the diversity of local wisdom in Indonesia. Local wisdom is a local idea that is wise and embedded in society as a cultural identity (Sudarmin, 2014). Preservation of local wisdom can be done by implementing local wisdom into the curriculum. Implementation of local wisdom in learning provides direct observation experience so that it trains students' independence in finding concepts and is able to stimulate students to love their region and nation (Damayanti et al., 2017). The implementation of local wisdom in learning can protect the existence of local wisdom and help students through learning in the real world (Khusniati et al., 2017). Local wisdom-based learning is adapted to students' daily activities so that it makes learning more meaningful, students construct meaning based on their experiences so that it not only improves learning outcomes but also improves students' thinking skills (Sung et., 2015).

One of the local wisdoms that can be implemented in science learning is the process of making jenang Kudus. Jenang Kudus is one of the local foods of Kudus Regency made from sticky rice flour, coconut milk, coconut sugar, granulated sugar and other additives to obtain a distinctive and sweet taste (Susanti & Wijayati, 2020). The process of making jenang Kudus can be integrated as teaching material for science learning to make it easier for students to understand and constructed to empower logical thinking skills. Local wisdom is suggested to be used as a material for developing science teaching materials because local wisdom has been proven to be able to maintain environmental balance. Local wisdom can be used as a source of learning in the scope of education (Sudarmin, 2014). Local wisdom can be implemented into several subjects, including science subjects (Parmin, 2015). The integration of local wisdom is in line with the objectives of science education according to Curriculum 2013 which emphasizes an understanding of the importance of preserving the natural environment in the fields of biology, physical, and chemistry (Permendikbud, 2014). Integration of science in science will be maximized by integrating scientific knowledge and local knowledge (Persson et al., 2018). In addition, science learning becomes more meaningful when it is able to link science concepts with the culture of the surrounding community which is the identity of the Indonesian nation (Hadi et al., 2019).

Facing the challenges of the 21st Century which are always changing and competitive requires good logical thinking skills, logical thinking skills have 5 indicators namely ordering, comparing, contrasting, evaluating, and selecting which stimulate students to be able to obtain, process, and utilize information properly so that it is indispensable in facing the progress of the 21st Century (Sari et al., 2018; Stevens, 1996). Logical thinking ability is a type of scientific thinking that relies on understanding and visualizing the relationship between information obtained to reach conclusions related to new situations (Al-Ajmi & Ambusaidi, 2022). Logical thinking skills play a role in processing and filtering incoming foreign cultures. In addition, the ability to use logical thinking and reasoning skills plays an important role in students' academic success, understanding scientific concepts and the

nature of science (Yesseikyzy et al., 2022). However, the reality is that students' logical thinking skills are still below standard (Anggraini & Irawan, 2021; Noviani, et al., 2020). The low logical thinking ability of students is caused by internal and external factors of students (Zuwariyah & Irawan, 2021). The lack of reasoning possessed by students is a problem in the development of logical thinking skills so that treatment is needed that can train students' logical thinking skills (Nugraha & Mahmudi, 2015). Thus, efforts are needed to empower students' logical thinking skills.

The easy mobility of information in the 21st century has a negative side for Indonesian culture, namely causing foreign cultural acculturation to shift the existence of local wisdom in Indonesia (Permana et al., 2022). The rapid flow of globalization and modernization in the 21st century has caused an erosion of the sense of belonging and love for local wisdom in Indonesia (Kholidah, 2020; Wigunadika, 2018). One of the local wisdoms that faded its existence is the *tebogan* tradition. This is indicated by the lack of understanding of the younger generation about the process of making *Jenang Kudus* contained in the *tebogan* tradition (Fibriyanti & Listyorini, 2019). The younger generation tends to be less interested in the process of making *jenang* because the process is complicated and takes a relatively long time. Therefore, it is necessary to preserve the *tebogan* tradition, especially the process of making *Jenang Kudus* by introducing local wisdom through education (Damayanti et al., 2017). However, the reality is that the integration of local wisdom in science learning is still less effective, this is characterized by a lack of student understanding of local wisdom even in their own area (Safitri et al., 2018). Students tend not to know the relationship between local wisdom and science concepts, especially in the process of making local products in everyday life and tend to focus only on the concept of scientific knowledge (Arlianovita et al., 2015).

The teacher as a facilitator in learning is one of the indicators that influence the success of integrating local wisdom (Parmin, 2015). In learning activities, teachers should not only emphasize cognitive aspects, but also psychomotor aspects and affective aspects of students, namely by integrating local wisdom into science domain-based learning so as to improve students' abilities and scientific attitudes (Wilujeng et al., 2019). However, in reality, teachers tend to experience obstacles in integrating local wisdom in learning, especially science learning. Teachers have difficulty in understanding the scientific concepts contained in local wisdom so that it is difficult when linking learning materials with local wisdom and are still less skilled in preparing effective teaching materials based on the conditions of the social and cultural environment of students (Damayanti et al., 2017; Lestariningsih & Suardiman, 2017). This is due to the lack of information and efforts to explore local wisdom that can be constructed and integrated into scientific knowledge.

Based on the background description of the problem, it is necessary to conduct research that aims to (1) analyze the scientific knowledge contained in the process of making *jenang Kudus*; (2) analyze the potential of scientific knowledge contained in the process of making *jenang Kudus* to empower junior high school students' logical thinking skills; (3) analyze the relationship of scientific knowledge contained in the process of making *jenang Kudus* to the material in science learning.

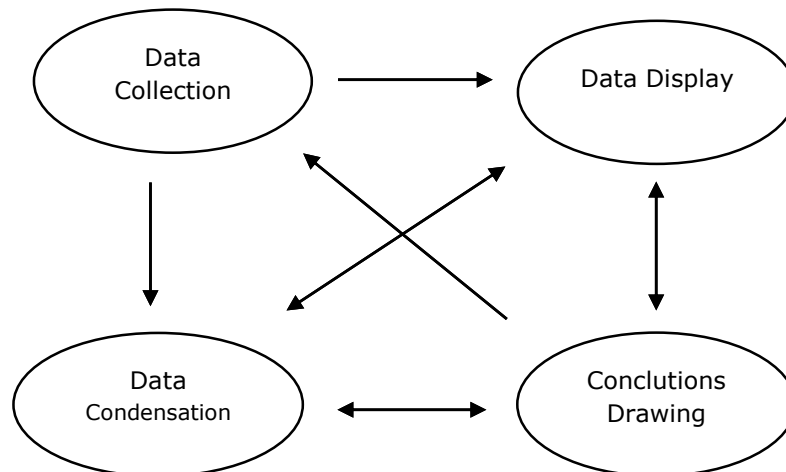
## **Methods**

The research was conducted at a production site or producer of *Jenang Kudus* in Kudus Regency. The data sources in this research are informants and relevant documents. Informants are indispensable as providers of information in qualitative research. *Jenang Kudus* producers acted as informants in providing information about the process of making *Jenang Kudus*. Teachers also become informants in additional data information about the application of local wisdom-based learning in junior high school. Sources of document

information can be in the form of journals, articles, or books that are relevant to the scientific knowledge contained in the process of making jenang Kudus.

The sampling technique in this study was a snowball sampling type purposive sampling technique. Purposive sampling technique is a sampling technique with certain criteria or considerations (Sugiyono, 2019). The snowball sampling technique begins with the selection of the first subject in accordance with the research criteria, which then recommends other suitable subjects to be the next subject and so on until the saturation point has been reached (Parker et al., 2019). Lincoln & Guba (1985) state that sampling in qualitative (naturalistic) aims to obtain quality information rather than generalize it like quantitative (conventional) research. Samples in qualitative research are more representative of the information than the population to get more complete and representative data (Nugrahani & Hum, 2014). So, the determination of the sample in qualitative can be determined during the research until it obtains saturated data. The number of jenang Kudus producers operating in Kaliputu Village, Kudus Regency is 21 producers. This research has several criteria in determining informants including: 1) producers of jenang Kudus, 2) domiciled in Kudus Regency, and 3) still actively operating until now.

Qualitative data analysis is inductive, which means that the results of data analysis will be developed into hypotheses, then hypotheses will be developed into theories when hypotheses are accepted after being analyzed with repeated data collected using triangulation techniques (Sugiyono, 2019). Qualitative data analysis is carried out while data collection is ongoing until after data collection takes place. According to Miles & Huberman (1984) data analysis is carried out interactively and continues continuously until it reaches saturated data. The interactive analysis model according to Miles et al. (2014) is presented in Figure 1.



**Figure 1.** Components of interactive data analysis (Miles et al., 2014)

Based on Figure 1. it is known that the interactive data analysis model has four components, namely: 1) data collection, the process of collecting data obtained from several data collection techniques, namely interviews, observation and documentation; 2) data condensation, the process of selecting, focusing, simplifying, abstracting and transforming data; 3) data display, the process of presenting data as a set of information that allows conclusions to be drawn; 4) conclusion drawing, the process of summarizing all the data obtained and carried out starting from the beginning of the data collection process by identifying non-patterned understanding, noting the suitability of explanations and identifying causal flows (Miles et al., 2014).

## Results and Discussion

### Scientific Knowledge Contained In The Process of Making Jenang Kudus

Analysis of scientific knowledge in the process of making jenang can be grouped into three parts, namely tools, materials and the process of making jenang. Scientific knowledge can be grouped into three aspects, namely aspects of biology, chemistry and physical. The main tool used in the process of making jenang is a crater made of copper. The local and scientific knowledge in the crater tool is presented in Table 1.

**Table 1.** Description of Local and Scientific Knowledge of Crater

| Name   | Local Knowledge                                | Scientific Knowledge                                                                                                | Picture                                                                                              |
|--------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Crater | The crater is made of copper for even cooking. | Copper craters have a high thermal conductivity value so that they have excellent heat conductivity (Astuti, 2015). | <br>Copper crater |

Based on Table 1, it shows that the copper crater in making jenang can accelerate the maturity process because copper has a high thermal conductivity value (physical aspect), where the greater the thermal conductivity value, the greater the ability of copper to conduct heat (physical aspect) (Astuti, 2015). Copper (Cu) is a reddish-brown transition metal element (chemical aspects) that has the ability as an excellent conductor of heat (physical aspects), so that heat can be conducted very well and accelerate the process of equalization of maturity (Fahmi, 2015). In general, copper is reddish brown but can experience discoloration due to the oxidation process (chemical aspects). oxidation is a chemical reaction that occurs when copper molecules on the surface mix with molecules in the air. discoloration of copper occurs because it is outdoors or in humid conditions, but discoloration can also occur in copper that is heated to the extreme (physical aspects) as in the process of making jenang (Asadipour et al., 2022). Furthermore, the ingredients needed in making jenang Kudus are glutinous rice flour, coconut milk, coconut sugar, granulated sugar. The local and scientific knowledge in glutinous rice flour ingredients is presented in Table 2.

**Table 2.** Description of Local and Scientific Knowledge of Glutinous Rice

| Local Knowledge                                                                    | Ingredient                                                                                                                | Scientific Knowledge                                                                                                                                                                                                                                                                                       | Picture                                                                                                 |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Glutinous rice is the main ingredient of jenang, giving the jenang a chewy texture | Starch (63.31%)<br>Amylopectin 98-99% & Amylose 1-2%;<br>Carbohydrate (81.05%); Protein (6.61%); Fat (1.00%); Ash (0.29%) | Glutinous rice contains amylopectin which gives a thickening and gelling effect (Imanningsih, 2012). Glutinous rice flour contains high gluten which makes it more chewy and elastic. (Rodisi et al., 2006). The starch content in flour creates a distinctive flavor and aroma (Widiantara et al., 2018). | <br>Glutinous rice |

Table 2 shows that each content in glutinous rice affects the characteristics of the jenang produced. White glutinous rice (*Oryza sativa glutinosa*) has a characteristic non-transparent color and has a distinctive smell. Glutinous rice flour affects the chewy, firm texture and moisture content of the jenang (Breemer et al., 2010). Wet glutinous rice flour

contains water (11.05%), starch (63.31%) consisting of amylopectin and amylose, carbohydrate (81.05%), protein (6.61%), fat (1.00%) and ash content (0.29%) (Imanningsih, 2012). Glutinous rice flour contains high gluten, where the higher the gluten, the texture of the jenang formed will be more chewy and elastic (Rodisi et al., 2006). In addition, the starch content in flour also creates a distinctive flavor and aroma that comes from amylose in flour (Widiantara et al., 2018). Glutinous rice has a high amylopectin starch content with 98-99% amylopectin content and 1-2% amylose content, where the higher the amylopectin content, the higher the adhesive properties of starch (Winarno, 2004). The high amylopectin content gives an effect in the form of thickening and gel formation in dough (Imanningsih, 2012).

The molecular bonds within the granule are broken when the starch is heated to the gelatinization temperature (physical aspects). The mixture of glutinous rice flour and coconut milk heated to a high temperature will cause a starch gelatinization event. This event occurs when the hydrogen bonds in the starch granules are broken due to heat energy so that water can enter the granules and form hydrogen bonds with amylose and amylopectin starch. The amount of water that enters the granule causes the granule to expand and then break and results in a change in viscosity. This change in viscosity causes the jenang dough to thicken during the heating and stirring (Kusumaningrum et al., 2017). This process shows that heated starch will change viscosity to become thicker (Imanningsih, 2012). The change in shape is marked by the loss of birefringence properties, namely the ability to reflect polarized light (physical aspects) (Chen et al., 2017). The next raw material for jenang is coconut milk. The local and scientific knowledge in coconut ingredients is presented in Table 3.

**Table 3.** Description of Local and Scientific Knowledge of Coconut

| Local Knowledge                                           | Ingredient                                                        | Scientific Knowledge                                                                                                                                                                                                  | Picture                                                                                          |
|-----------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Coconut gives a savory taste and provides an oily texture | Water<br>Fat (11.61%)<br>Protein (0.44%)<br>Carbohydrate (28.83%) | The older the coconut, the higher the protein, fat, carbohydrate content and the lower the water content (Patil & Benjakul, 2017). The high fat content gives the jenang a delicious and savory taste (Nuroso, 2013). | <br>Coconut |

Based on Table 3 shows that the jenang raw material uses old coconut, because the more mature the coconut is, the higher the protein, fat, carbohydrate content and the lower the water content (biological aspects) (Patil & Benjakul, 2017). Coconut (*Cocos nurifera*) has a fat content of 31.8-35,3%, protein 1,92-3,46% and carbohydrates 1,51-1,53% (biological aspects) (Rifdi & Zhulhida, 2022). The high fat content in coconut milk gives a delicious and savory taste to the resulting jenang (Nuroso, 2013). High temperature heating causes an increase in free fatty acid levels in coconut milk due to the non-optimal activity of lipase enzymes in coconut milk (physical & chemical aspects) (Cahya & Susanto, 2014). Coconut oil contains more than 90% saturated fatty acids consisting of 48.6% lauric acid (C12:0) and myristic acid (C14:0) and other acids. Old coconut contains caprylic (C8:0) 4.34%, capric (C10:0) 6.22%, lauric (C12:0) 48.6%, myristic (C14:0) 19.2%, palmitic (C16:0) 9.64%, stearic (C18:0) 3.32%, oleic (C18:1) 7.18% and linoleic (C18:2) 1.59% (Santoso et al., 1996) (biological aspects). In addition, heating coconut milk causes evaporation of water content, so that coconut milk has increased viscosity (physical aspects). The next main ingredients are coconut sugar and granulated sugar. The local and scientific knowledge in coconut sugar and granulated sugar is presented in Table 4.

**Table 4.** Description of Local and Scientific Knowledge of Sugar

| Local Knowledge                                                                 | Ingredient                                                                                                                                | Scientific Knowledge                                                                                                                                                                                      | Picture                                                                                                 |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| coconut sugar gives a sweet, savory salty taste, color, texture and aroma       | Water 9.16%<br>Sucrose 84.31%<br>Reducing sugar 0.53%<br>Fat 0.11%<br>Protein 2.28%<br>Mineral 3.66%<br>Calcium 1.35%<br>Phosphorus 1.37% | Coconut sugar has a slightly sour taste and has a distinctive caramel aroma (Hesty, 2016). Sucrose when heated will give a brown color due to caramelization. Starch affects the texture (Winarno, 2004). | <br>Coconut sugar    |
| Granulated sugar Gives sweetness, affects texture and is a natural preservative | Water<br>Sucrose 97.1%<br>Reducing sugar 1.24%<br>Ash<br>Calcium<br>Phosphorus                                                            | Sucrose gives a brown color due to caramelization (Winarno, 2004). High concentrations of sugar can bind water in food thus inhibiting the growth of mycoorganisms (Darwin, 2013).                        | <br>Granulated sugar |

Table 4 shows that the sugar used in making jenang is a combination of coconut sugar and granulated sugar. The combination of sugar types in making jenang affects the color, texture, and taste of jenang (Sukmawati et al., 2015). Coconut sugar contains 68.35% sucrose, while granulated sugar contains 94% sucrose (biological aspects) (Mahmud, 2009; Thampan, 1982; Wijanarti et al., 2020). Granulated sugar with 94% sucrose content has a sweeter taste and greater water binding ability compared to coconut sugar which has a lower sucrose content (Widiantara et al., 2018). The high binding ability of granulated sugar can make granulated sugar a natural preservative. Sugar has the ability to bind water with hydrogen bonds so that water activity in food is reduced (chemical aspects) (Buckle et al., 1987). The reduction of water causes disruption of microbial growth which will eventually dry out and die (biological aspects) (Gautara & Soesarsono, 2005). The more sugar is added, the more water is bound, thus affecting the texture and moisture content of the product used in the process of making jenang, predominantly coconut sugar combined with granulated sugar to add sweetness and improve product color (Wulandari et al., 2023). Granulated sugar has a medium glycemic index (GI 58) which is higher than coconut sugar which has a glycemic index (GI 35), so the combination of granulated sugar and coconut sugar is very suitable for balancing the glycemic index (chemical aspects) (Putri et al., 2015).

Sugar concentration affects the taste, color and texture of dodol, where the more sugar is added, the sweeter, harder and more brown-colored the jenang, while the less sugar is added, the less sweet the jenang (Setiavani et al., 2018). The higher the sugar concentration, the darker the color produced due to the browning reaction (chemical aspects). Heated sucrose will evaporate and increase its concentration (physical aspects). If the liquid sugar continues to be heated beyond the melting point (160C) (physical aspects), sucrose caramelization occurs (Winarno, 2004). Sugar is dehydrated and split into ketones and aldehydes which are divided into two types of compounds, namely polymer compounds and volatile compounds. Polymeric compounds are compounds formed from small molecules that are responsible for the discoloration of liquefied sugar. Volatile compounds are volatile compounds that are responsible for changes in the caramel aroma of sugar. Sustained high temperatures can remove 6 water molecules from each sugar molecule to form glucosan, glucosan is a molecule that is continuous with fructosan. The process of sucrose breakdown and dehydration followed by polymeration produces a brownish color or what is commonly referred to as the caramelization process of sugar (chemical aspects) (Arsa, 2016). When sugar is heated, a non-enzymatic browning

reaction will occur. Reactions that occur in reducing sugars and amino acids in proteins cause maillard reactions that produce dark colors (chemical aspects) (Winarno, 2004).

After all the tools and materials have been prepared, the next stage is the jenang making stage. The process of making jenang Kudus is divided into two stages, namely: the processing stage consisting of coconut milk processing, sticky rice processing, boiling coconut sugar, boiling coconut milk, boiling sticky rice, adding coconut sugar, heating and stirring, adding sugar, adding coconut milk, cooling the dough; and the presentation stage consisting of cutting and packaging the jenang. The local and scientific knowledge in the coconut milk processing stage is presented in Table 5.

**Table 5.** Description of Local and Scientific Knowledge of Coconut Processing

| Stages                  | Local Knowledge                                                             | Scientific Knowledge                                                                                                                                                                                                                                                                                                                                                                               | Picture                                                                               |
|-------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Coconut milk processing | 1. Peeling the coconut                                                      | Coconut milk is an emulsion of oil in water obtained by squeezing grated coconut fruit which contains water, fat and protein which is quite high (Sidik et al., 2013). Boiling coconut milk causes the water content of coconut milk to evaporate, resulting in oil with low water content. Heating coconut milk aims to kill microorganisms and inactivate enzymes (Fellow, 1992; Winarno, 2004). |    |
|                         | 2. Grating the old coconut using a grater                                   |                                                                                                                                                                                                                                                                                                                                                                                                    |    |
|                         | 3. Squeezing grated old coconut using a squeezing machine into coconut milk |                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |
|                         | 4. The coconut milk is boiled until the oil comes out                       |                                                                                                                                                                                                                                                                                                                                                                                                    |  |

Table 5 shows that the first stage is coconut processing, namely peeling, grating, and squeezing the coconut into coconut milk. Coconut milk is an emulsion of oil in water obtained by squeezing grated coconut fruit which contains water, fat and protein which is quite high (biological aspects) (Sidik et al., 2013). Boiling coconut milk causes the water content of coconut milk to evaporate during the heating process, resulting in oil with low water content with increased viscosity (physical aspects). Heating with high temperatures causes an increase in free fatty acid levels in coconut milk due to non-optimal lipase enzyme activity in coconut milk (physical & chemical aspects) (Cahya & Susanto, 2014). Heating coconut milk aims to kill microorganisms and inactivate enzymes such as lipase (biological aspects) so as to minimize the hydrolysis process (Fellow, 1992; Winarno, 2004). The next stage is the processing of glutinous rice flour. The local and scientific knowledge in the glutinous rice flour processing stage is presented in Table 6.

**Table 6.** Description of Local and Scientific Knowledge of Glutinous Rice Processing

| Stages                    | Local Knowledge                                                        | Scientific Knowledge                                                                                                                                                                                                                                                                                                  | Picture                                                                               |
|---------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Glutinous Rice Processing | 1. Washing glutinous rice thoroughly                                   | Kneading glutinous rice flour with coconut milk Washing aims to increase the moisture content of the seeds so that the texture is soft and easy to grind (Rikizaputra et al., 2022). Kneading glutinous rice dough containing gliadin and glutenin proteins causes hydration of glutinous rice flour (Winarno, 2004). |  |
|                           | 2. Grinding glutinous rice in a grinding machine while it is still wet |                                                                                                                                                                                                                                                                                                                       |  |
|                           | 3. Kneading glutinous rice flour with coconut milk                     |                                                                                                                                                                                                                                                                                                                       |                                                                                       |

Table 6 shows that the second stage of glutinous rice processing is washing, grinding, and kneading glutinous rice. Washing aims to clean and hydrate glutinous rice which increases the moisture content of the seeds up to twice the original so that the texture of the rice is softer (chemical aspects) (Rikizaputra et al., 2022). Glutinous rice flour is made from glutinous rice which is ground and then sieved (Martiyanti et al., 2022). The kneading of glutinous rice dough containing gliadin and glutenin proteins causes hydration of glutinous rice flour so that gluten is able to interact with other components (chemical aspects) (Winarno, 2004). The next stage is the boiling of coconut sugar. The local and scientific knowledge in the coconut sugar boiling stage is presented in Table 7.

**Table 7.** Description of Local and Scientific Knowledge of Sugar Processing

| Stages           | Local Knowledge                                                                                                                                             | Scientific Knowledge                                                                                                                                                                                                                      | Picture                                                                                                     |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Sugar processing | <ol style="list-style-type: none"> <li>1. Boiling coconut sugar with coconut milk until melted</li> <li>2. Filtering coconut sugar using a sieve</li> </ol> | The caramelization reaction in sugar occurs when heated sugar reaches the melting point (Wilberta et al., 2021). Filtering liquid coconut sugar aims to separate coconut sugar with impurities or foreign objects mixed in coconut sugar. |  <p>Sugar processing</p> |

Based on Table 7, it shows that the coconut sugar boiling stage is carried out until it melts and then mixed into the sticky rice dough. Boiling coconut sugar causes a caramelization reaction that occurs when sugar is heated to the melting point (chemical & physical aspects) (Wilberta et al., 2021). After melting the coconut sugar is filtered using a sieve to separate foreign objects mixed in the coconut sugar. The next stage is the cooking and stirring stage. The cooking and stirring stage consists of several stages including: cooking glutinous rice, adding coconut sugar, adding coconut milk, adding sugar and adding flavorings or sesame. The local and scientific knowledge in the sticky rice cooking stage is presented in Table 8.

**Table 8.** Description of Local and Scientific Knowledge of Glutinous Rice Cooking

| Stages                 | Local Knowledge                                              | Scientific Knowledge                                                                                                                                                                                                                                                                                                                                                                         | Picture                                                                                                             |
|------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Glutinous Rice Cooking | Glutinous rice is boiled until smooth, smooth and thickened. | The high amylopectin (low amylose) content in glutinous rice flour causes glutinous rice flour to be difficult to gelatinize and requires high temperatures to reach its gelatinization point (Rodisi et al., 2006). The high temperature in heating causes the water content in the dough to decrease very drastically, causing the dough to have a soft texture (Widiantara et al., 2018). |  <p>glutinous rice cooking</p> |

Based on Table 8, it shows that boiling glutinous rice is done until the texture of glutinous rice changes to chewy and smooth or smooth. The high amylopectin (low amylose) content in glutinous rice flour causes glutinous rice flour to be difficult to gelatinize and requires high temperatures to reach its gelatinization point (physical aspects) (Rodisi et al., 2006). The high temperature in heating causes the water content in the dough to decrease drastically, causing the dough to have a soft texture (chemical aspects) (Widiantara et al., 2018). The next stage is the addition of coconut sugar. The local and scientific knowledge in the coconut sugar addition stage is presented in Table 9.

**Table 9.** Description of Local and Scientific Knowledge of Adding Coconut Sugar

| Stages                    | Local Knowledge                                                                      | Scientific Knowledge                                                                                                                                                                                                              | Picture                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Addition of coconut sugar | Strained coconut sugar is mixed into the glutinous rice dough to give a sweet taste. | Coconut sugar affects the taste, texture, and distinctive aroma that contains lower sucrose content and can be used to balance the high glycemic level of granulated sugar (Mahmud, 2009; Thampan, 1982; Wijanarti et al., 2020). |  <p>Addition of coconut sugar</p> |

Based on Table 9, it shows that coconut sugar affects the flavor, texture and aroma. Coconut sugar contains 68.35% sucrose and reducing sugars such as glucose and fructose by 6.5%, 10% fat, protein, calcium and phosphorus while granulated sugar contains 94% sucrose (biological aspects) (Mahmud, 2009; Thampan, 1982; Wijanarti et al., 2020). Granulated sugar has a medium glycemic index (GI 58) and coconut sugar has a glycemic index (GI 35), so the combination of granulated sugar and coconut sugar is suitable for balancing the glycemic index (chemical aspects) (Putri et al., 2015). The next stage is heating and stirring. The local and scientific knowledge in the heating and stirring stage is presented in Table 10.

**Table 10.** Description of Local and Scientific Knowledge of Heating and Stirring

| Stages               | Local Knowledge                                                                                                                                                                                                 | Scientific Knowledge                                                                                                                                                                                                                                                                          | Picture                                                                                                                                                                                                                                                    |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heating and Stirring | The dough that has been mixed with liquid sugar and coconut milk is cooked and stirred continuously for 3-7 hours until smooth. Duration depends on the composition and cooking method using manual or machine. | Stirring aims to prevent settling, clumping of flour and facilitate heat delivery so that it can cook evenly and avoid burning the dough (Haryadi et al., 1998). The longer the stirring process with low heat, the softer and more evenly mixed the dough will be (Nasaruddin et al., 2012). |  <p>Cooking and stirring using a machine</p>  <p>Manual cooking and stirring</p> |

Based on Table 10, it shows that the stirring stage in making jenang aims to prevent settling, clumping of flour, and facilitate the delivery of heat (physical aspects) in the dough so that it can be cooked evenly and avoid the dough becoming burnt (Haryadi et al., 1998). The heating temperature affects the results of the jenang obtained, heating with a low temperature with a long time produces jenang with a softer texture and evenly mixed (physical aspects) (Nasaruddin et al., 2012). The mixture of glutinous rice flour and coconut milk heated at high temperatures will cause a starch gelatinization event. This event occurs when the hydrogen bonds in the starch granules are broken due to heat energy so that water can enter the granules and form hydrogen bonds with amylose and amylopectin starch. The amount of water that enters the granules causes the granules to expand and then break and cause changes in viscosity (Kusumaningrum et al., 2017). The process of heating and stirring starch dough has four phases, namely the starch temperature is at the starch gelatinization temperature so that the viscosity of the dough is still low (first phase), then the temperature continues to be increased until it exceeds the starch gelatinization temperature which causes the starch granules to swell and the viscosity increases, the swelling of the starch granules causes the dough to reach the peak viscosity temperature faster (second phase) the temperature continues to be increased and stirring continues to

be carried out causing the rupture of starch granules, When the dough undergoes a cooling process the starch molecules will experience a re-association (setback) which forms a gel and increases the viscosity until it reaches the final viscosity (Physical aspect) (Bahnassey & Breene, 1994). The next stage is the addition of granulated sugar. The local and scientific knowledge in the sugar addition stage is presented in Table 11.

**Table 11.** Description of Local and Scientific Knowledge of Adding Granulated Sugar

| Stages                       | Local Knowledge                                                                                                                               | Scientific Knowledge                                                                                                                                                                                                                     | Picture                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Addition of granulated sugar | Granulated sugar tastes sweeter and is used as a natural preservative. Granulated sugar is added at the end over low heat to prevent burning. | Granulated sugar contains a lot of sucrose so that it increases the ability to bind water (Widiantara et al., 2018). Sugar cooked at high temperatures will experience excessive caramelization and cause burntness (Dewi et al., 2014). | <br>Addition of granulated sugar |

Table 11 shows that granulated sugar has a sweeter taste and as a preservative. Granulated sugar with 94% sucrose content has a greater water binding ability compared to coconut sugar (Widiantara et al., 2018). When liquid sugar is heated beyond the melting point (160C) (physical aspect), sucrose caramelization (chemical aspect) occurs (Winarno, 2004). Sugar cooked at too high a temperature (physical aspect) will experience excessive caramelization (chemical aspect) and cause the sugar to burn (Dewi et al., 2014). The next stage is the addition of coconut milk. The local and scientific knowledge in the stage of adding coconut milk is presented in Table 12.

**Table 12.** Description of Local and Scientific Knowledge of Adding Coconut Milk

| Stages                   | Local Knowledge                   | Scientific Knowledge                                                                               | Picture                                                                                                              |
|--------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Addition of coconut milk | Coconut milk gives a savory taste | The savory taste in coconut milk is caused by the high fat content of coconut milk (Nuroso, 2013). | <br>Addition of granulated milk |

Table 12 shows that the purpose of adding coconut milk is to provide a savory taste. The savory and delicious taste that coconut milk has is due to the high fat content in coconut milk (biological aspects) (Nuroso, 2013). The next step is the addition of sesame seeds. The local and scientific knowledge in the sesame addition stage is presented in Table 13.

**Table 13.** Description of Local and Scientific Knowledge of Adding Sesame

| Stages             | Local Knowledge                 | Scientific Knowledge                                                                                                                      | Picture                                                                                                  |
|--------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Addition of sesame | Sesame is roasted before mixing | Sesame roasting increases the fat content of sesame due to the saturation point in the range of sesame addition (Romadhona et al., 2015). | <br>sesame roasting |

Based on Table 13, it shows that sesame must be roasted first before mixing it into the dough. Sesame needs to be roasted first in order to increase the fat content of sesame due to the saturation point in the sesame heating process (physical aspects) (Romadhona

et al., 2015). The next stage is dough cooling. The local and scientific knowledge in the cooling stage is presented in Table 13.

**Table 14.** Description of Local and Scientific Knowledge of Cooling

| Stages  | Local Knowledge                                                                        | Scientific Knowledge                                                                                                                                                                                     | Picture                                                                                        |
|---------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Cooling | The dough is cooled for at least 12 hours to avoid kemringet or watery and then moldy. | Cooling aims to reduce the temperature of the jenang and shape the texture (Koswara, 1995). Jenang that has not cooled down will sweat when packed with plastic and help microbial growth (Arini, 2017). | <br>Cooling |

Based on Table 14, the cooked jenang dough was cooled at room temperature for at least 12 hours. This cooling aims to reduce the temperature in the jenang and form a chewy texture (Koswara, 1995). If the jenang has not cooled down, it will condense or sweat when packed with plastic (physical aspects). condensation that occurs on the surface of food ingredients will produce water that helps microbial growth (biological aspects) (Arini, 2017). The next stage is dough cutting. The local and scientific knowledge in the cutting stage is presented in Table 15.

**Table 15.** Description of Local and Scientific Knowledge of Cutting

| Stages  | Local Knowledge                                                                                           | Scientific Knowledge                                                                                          | Picture                                                                                          |
|---------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Cutting | The cooled jenang is cut using a knife or scissors. 1 kg of dough can be cut into 40-50 pieces of jenang. | Cutting with a weight of about 25 gr and packed with plastic as basic packaging (Kusumaningrum et al., 2017). | <br>Cutting |

Based on Table 15, it shows that the cooled jenang is cut into small pieces weighing about 25 grams and packed with plastic as the basic packaging (Kusumaningrum et al., 2017). The next stage is packaging. The local and scientific knowledge in the packaging stage is presented in Table 16.

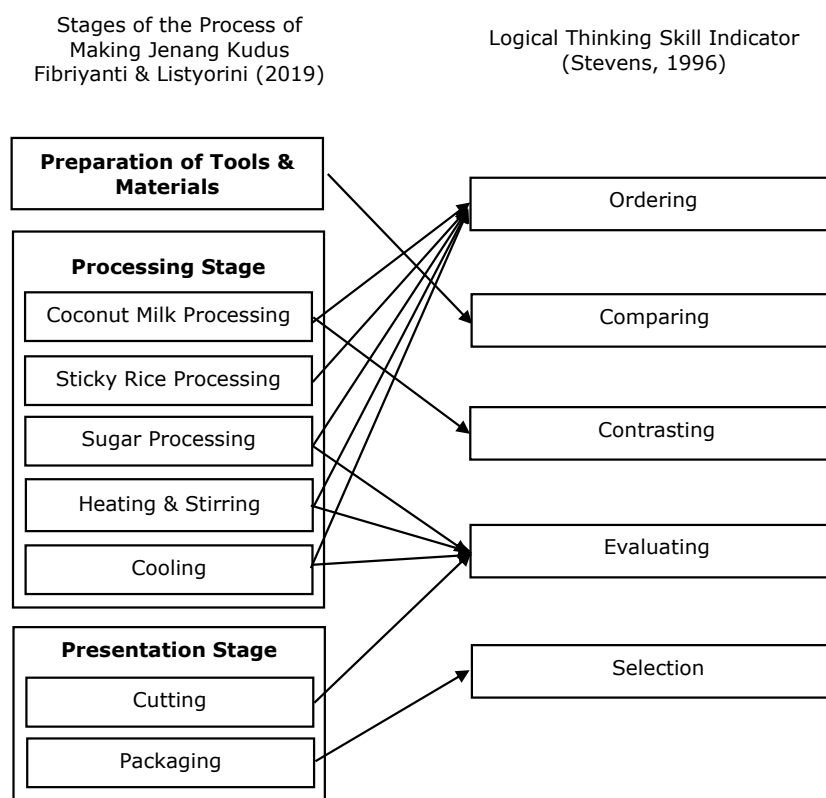
**Table 16.** Description of Local and Scientific Knowledge of Packaging

| Stages    | Local Knowledge                                                                           | Scientific Knowledge                                                                                                                                                                                                           | Picture                                                                                            |
|-----------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Packaging | Jenang is wrapped using a 15 x 15 cm plastic jenang base, then can be packaged as needed. | Plastic packaging has a high density, is resistant to temperature and humidity, has low water absorption, is elastic and transparent in color so that the product is visible from outside the packaging (Achmad et al., 2016). | <br>Packaging |

Based on Table 16, the jenang was wrapped in 15x15 cm plastic. Plastic packaging has several advantages, namely: 1) has a high density; 2) is resistant to temperature and humidity; 3) has a low water fiber power, so it can protect the product; 4) is elastic and transparent in color, so the product will be visible from outside the packaging (Achmad et al., 2016).

## The Potential of Scientific Knowledge

The scientific knowledge in the process of making jenang has the potential to empower junior high school students' logical thinking skills. The process of making jenang is expected to stimulate the indicators of logical thinking ability. The potential of scientific knowledge of the tebokan tradition in making jenang Kudus for logical thinking skills is presented in Figure 2.



**Figure 2.** Schematic of Potential Empowerment of Logical Thinking Skills in the Jenang Making Process

Based on Figure 2, it shows that each stage of the process of making Jenang Kudus has the potential to empower students' logical thinking skills. The process of making jenang can stimulate the indicators of logical thinking ability. The explanation of the potential of making jenang in empowering students' logical thinking skills is as follows:

### a. Preparation of Tools and Materials

Preparation of tools and materials has the potential for sorting and comparing indicators. Comparing is the ability to compare based on similarities and differences in nature. Indicators of comparing in the selection of ingredients for making jenang include choosing the use of original or packaged sticky rice flour, this is because packaged sticky rice produces jenang products that are too soft because the texture of the flour is too dry and fine. In addition to the selection of the use of sticky rice flour, there is also the selection of the use of sugar, where sugar has many types with different characteristics, a combination of coconut sugar and granulated sugar with a composition of more granulated sugar with the consideration that granulated sugar has a sweet taste and as a natural preservative. The selection of tools and materials in the process of making jenang uses the analytical hierarchy process (AHP) theory, which is

a measurement theory to determine the ratio scale by comparing factors in pairs (Sonalitha et al., 2015). The tool and material selection stage trains students' ability to compare subjects based on their similarities and differences so as to improve logical thinking skills.

b. Stages of the Jenang Kudus Processing Process

The process of making Jenang Kudus as a whole has potential for the sorting indicator. Sequencing is the ability to determine the order of something based on its nature. Based on the results of the research, it was found that generally all producers carried out the production of Jenang Kudus in the same order, namely: coconut milk processing, glutinous rice processing, coconut sugar processing, heating and blending, cooling, cutting and packaging. The processing process must be in accordance with the sequence of existing procedures and carried out correctly (Indriani et al., 2021). The sequencing indicator in the jenang making stage trains students' ability to determine the sequence of a process or mechanism, especially in science learning which is an indicator of logical thinking ability.

c. Coconut Milk Processing

The coconut milk processing stage has potential for the sorting and contrasting indicators. Contrasting is the ability to construct and categorize based on its nature. This contrasting indicator can be seen in the coconut milk processing process, especially in the stage of classifying or dividing coconut milk into several parts, as in accordance with the statements submitted by the respondents as follows;

P: "Oalah iyaa mas, selanjutnya alur proses pembuatan jenang gimana yaa mas?"

(P: "Yes, then what is the process flow of making jenang kudus?")

R: "....., pertama itu santan e diparut terus diperes mba ketane juga digiling sik, terus perasan Santen e dibagi jadi empat ember satu buat direbus, satu buat dicampur tepung, satu dicampur gula, terus yang satune pas dicampur semua mba ...."

(R: "....., first the coconut is grated, then pressed, the glutinous rice is also ground first, then the coconut milk is divided into four buckets, one for boiling, one for mixing flour, one for mixing sugar, then one when it's all mixed together....")

**(HWP/ABD/L/4)**

Based on the respondent's statement, it can be seen that after being grated, the coconut milk will be divided or grouped into four buckets, namely kani coconut milk, coconut sugar mixture coconut milk, sticky rice mixture coconut milk, and coconut milk to be mixed into the dough. The stage of contrasting coconut milk trains students' ability to categorize things based on similar properties.

d. Coconut Sugar Processing

The coconut sugar boiling stage has the potential for the sorting and evaluating indicators. Evaluating is the ability to assess and resolve logical statements. At the coconut sugar boiling stage, students are expected to be able to assess the characteristics of coconut sugar that are quite appropriate. The characteristics of coconut sugar and this stage are that the coconut sugar has melted and mixed perfectly with coconut milk. This evaluating stage trains students' ability to assess whether this stage is appropriate to then proceed to the next stage.

e. Heating and Stirring

The heating and stirring stage has potential for the sequencing and evaluating indicators. Evaluating is the ability to assess and resolve logical statements. In the heating and stirring stage, students are expected to be able to assess the characteristics

of the cooked jenang, as in accordance with the statements submitted by the respondents as follows:

|                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><i>P: "oalah ada beberapa factor ya pak ternyata, lalu selanjutnya itu untuk ciri adonan sudah matang itu apa saja ya pak?"</i></p> <p>(P: "It turns out that there are several factors, sir, then what are the characteristics of the cooked dough?")</p> |
| <p><i>R: "itu mba warnanya jadi lebih gelap, kalis, dan teksturnya jadi kenyal mba"</i></p> <p>(R: "the color becomes darker, the texture becomes smooth, and the texture becomes chewy")</p> <p><b>(HWP/ISN/W/7)</b></p>                                     |

Based on the respondent's statement, it can be seen that the characteristic of the dough is ripe is that the color of the dough becomes darker, the texture becomes chewy and smooth or not sticky. This evaluation stage trains students' ability to assess whether this stage is appropriate to then proceed to the next stage.

f. Cooling

The cooling stage has potential for the sorting and evaluating indicators. Evaluating is the ability to assess and resolve logical statements. In the cooling stage, students are expected to be able to assess the characteristics of jenang that has been completely cooled. Jenang must be completely cooled as a whole by sitting for at least 12 hours, the characteristics include the temperature being the same as room temperature and the texture of the jenang becoming harder. This evaluating stage trains students' ability to assess whether this stage is appropriate to then proceed to the next stage.

g. Cutting

The cutting stage has the potential for the evaluating indicator. Evaluating is the ability to assess and complete logical statements. At the cutting stage, students are able to assess the appropriate size so that it can be packaged using clear plastic. This evaluating stage trains students' ability to assess whether the size of the jenang is appropriate to then proceed to the next stage, namely packaging.

h. Packaging

The packaging stage has the potential for sorting and selecting indicators. Selecting is the ability to select and then draw conclusions. The packaging stage is the stage of packing the jenang that has been cut then packaged using clear plastic which is then continued with secondary packaging using large plastic, mica, cardboard, trays, or as needed. The selection indicator is carried out when selecting the appropriate packaging and checking again based on the criteria for jenang that is suitable for consumption, including having a chewy texture, fragrant aroma, not rancid, and not contaminated by mold spores or white in color. The selection stage trains students' ability to select and choose then draw conclusions by determining the most suitable product which is an indicator of logical thinking ability.

## The Relationship Of Scientific Knowledge To The Material In Science Learning

The scientific knowledge contained in the process of making jenang can be used as a learning resource for junior high school science. The mapping of scientific knowledge of the process of making Jenang Kudus in junior high school science materials based on curriculum 2013 is presented in Table 17.

**Table 17.** Mapping of Science Materials in the Process of Making Jenang Kudus in Junior High School Based on *Kurikulum 2013*

| Class | Basic Competencies                                                                                                                                                       | Subject Matter                                                    | Scientific Knowledge in Jenang Making Process                              |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------|
| VII   | 3.3 Explain the concepts of mixtures and single substances (elements and compounds), physical and chemical properties, physical and chemical changes in everyday life.   | Substances and Characteristics                                    | The mixture formed during the process of making jenang Kudus               |
|       |                                                                                                                                                                          | Physical and chemical changes                                     | Changes in substances that occur during the process of making jenang Kudus |
|       | 3.4 Analyze the concepts of temperature, expansion, heat, heat transfer, and their applications.                                                                         | Temperature and Heat                                              | Concept of heat transfer in the cooking process                            |
| VIII  | 3.5 Analyze the digestive system in humans and understand the disorders associated with the digestive system, as well as efforts to maintain a healthy digestive system. | Food Substances                                                   | Substance content in traditional jenang Kudus                              |
|       | 3.6 Explain various additives in food and beverages, addictive substances, and their impact on health.                                                                   | Types of additives (natural and artificial) in food and beverages | Additives contained in the traditional food jenang Kudus                   |

(Kemendikbud, 2013)

Based on Table 17, it can be seen that the process of making jenang can be mapped into four basic competencies consisting of five science materials in grades VII and VIII. The 7th grade materials are substances and their characteristics, physical and chemical changes, temperature and heat. Class VIII materials are food substances and types of additives in food and beverages. In addition to the mapping of material based on the 2013 curriculum, there is also a mapping of material based on the independent curriculum. The mapping of scientific knowledge of the tradition of *tebogan*-making jenang Kudus in junior high school science materials based on the *Kurikulum Merdeka* in Kemendikbud (2022) is presented in Table 18.

**Table 18.** Mapping of Science Materials in the Process of Making Jenang Kudus in Junior High School Based on *Kurikulum Merdeka*

| Scope of Material                            | Code | Learning Objective                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Structure and properties of substances       | 7.8  | Investigate various materials that can be used in daily life, identify the properties of these materials (physical and chemical properties, including acid-base), their utilization, as well as the advantages and disadvantages/dangers of these materials and present them in various forms such as infographics/video/power point. |
| Temperature and Heat                         | 7.10 | Design an experiment to investigate the effect of heat on the temperature and embodiment of objects and heat transfer by examining the exposure of the concepts of temperature and heat.                                                                                                                                              |
| Body structure and function of living things | 8.1  | Break down the human digestive system and its relationship to human digestive disorders and Develop a healthy eating plan to avoid these digestive disorders.                                                                                                                                                                         |

|                                                                             |     |                                                                                                                                                                                           |
|-----------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lements, compounds and mixtures                                             | 8.7 | Make a poster about an element or a compound formed from the element by including information about the constituent substances, properties, uses, and limitations of the compound formed. |
| Nervous system and hormones (including additives and addictive substances). | 9.4 | Compose a narrative story about someone who is caught up in substance abuse and how as a responsible teenager can help that person escape from substance abuse.                           |

(Kemendikbud, 2022)

Based on Table 18, it can be seen that the process of making Jenang Kudus can be mapped into five materials in the independent curriculum which are materials from classes VII, VIII and IX. Grade VII materials are structure and properties of substances as well as temperature and heat. Class VIII materials are elements, compounds and mixtures (including atoms and separation of mixtures). Class IX material is nervous system and hormone material (including additives and addictive substances).

## Conclusion

Based on the results of the analysis that has been carried out by researchers, conclusions can be drawn that can answer the problem formulation of the research, namely: 1) the process of making jenang Kudus there is scientific knowledge that can be viewed from three aspects, namely aspects of biology, chemistry, and physical; 2) the process of making jenang which includes: (1) preparation of tools and materials; (2) coconut milk processing; (3) glutinous rice flour processing; (4) sugar processing; (5) cooking and stirring; (6) cooling; (7) cutting; (8) packaging has potential in empowering logical thinking skills of junior high school students; 3) the scientific knowledge in the process of making Jenang Kudus has a connection with junior high school science materials, namely physical and chemical changes, temperature and heat, mixtures, food substances, and addictive substances.

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