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Journal homepage: [medlabtecnjournal.com](http://medlabtecnjournal.com)***Staphylococcus aureus* in Traditional Coconut milk Drinks****Putri Mustika Sari\*, Leka Lutpiatina, Ahmad Muhlisin**

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**Abstract.** Coconut milk is a food ingredient that is used to increase the taste of food and drinks. Coconut milk has processed products in the form of traditional drinks such as ice dawet and cendol ice. According to the Indonesian National Standard in 2009 about Maximum Microbial Contamination in Food in liquid coconut milk must be in accordance with the requirements of TPC parameters, MPN Coliform, Salmonella sp., and Staphylococcus aureus. This study aims to determine the description of Staphylococcus aureus contamination in traditional coconut milk in the Banjarbaru region. This type of research is a descriptive survey. The samples in this study were traditional drinks (es dawet and es cendol) that used coconut milk by using Purposive sampling techniques as many as 6 sellers who made 2 times taking, namely taking 1 hour (testing I) after processing and 2 hours after the first take (testing II) . From the research that has been done, it is found that there are 4 samples of Staphylococcus aureus contamination in 4 samples, namely 3 samples fulfilling the requirements of the Indonesian National Standard and 1 sample that does not meet the requirements of the Indonesian National Standard. It is expected for the seller to always maintain personal hygiene, pay attention to the cleanliness of drinks sold either during processing or serving, noting the cleanliness of the appliance and storing the ingredients of the drinks sold.

**Keywords:** coconut milk; traditional drink; *Staphylococcus aureus*

**INTRODUCTION**

Food is an essential requirement for humans for growth and for survival. However, the incidence of diseases caused by food is not small. Unhygienic and sanitary food processing can result in ingredients that can cause health problems to consumers<sup>1</sup>. Food and beverages can cause disease due to two things, which contain toxic components in the form of heavy metals and toxic chemicals and contaminated with pathogenic microorganisms that can cause symptoms of poisoning<sup>2</sup>.

One of the microorganisms that cause poisoning is Staphylococcus aureus. These bacteria are commonly found in air, dust, waste, grow in food and produce enterotoxins. The resulting enterotoxin causes poisoning<sup>3</sup>. Symptoms arising from Staphylococcus aureus poisoning include dizziness, vomiting, intestinal cramps, and diarrhea<sup>4</sup>. Staphylococcus aureus has heat-resistant properties and high salt content<sup>5</sup>, propolis<sup>6</sup> and honey<sup>7</sup> can inhibit its growth. High risk of transmission can be through ulcer diabetikum<sup>8</sup>, nose paramedic<sup>9</sup> or steteskop<sup>10</sup>. In foods such as saos<sup>11</sup>, sausage<sup>12</sup> Staphylococcus aureus can contaminate. Other foods that can be contaminated by Staphylococcus aureus are coconut milk. Coconut milk is used to add to the taste of food and drinks. The consumption level of coconut milk in Indonesia is quite high at 6.5-8.2 kilograms per capita<sup>13</sup>.

Coconut milk has processed products in the form of traditional drinks such as ice dawet and cendol ice. Ice dawet and cendol ice are drinks that are sold without special packaging, produced and prepared at the point of sale so that it is difficult to monitor the quality. Food and beverages that are good when produced and circulated to the general public must meet health requirements.

Poisoning cases occurred in Blitar in 2017, as many as 42 people from Ngrendeng Village, Selorejo District, Blitar District were poisoned after drinking dawet ice purchased from the local village market<sup>14</sup>. Coconut milk which does not go through the process of processing and presenting good and not in accordance with food processing sanitation standards can support the occurrence of contamination of microbial contamination. Based on the provisions of the Indonesian National Standard concerning the Maximum Limit of Microbial Contaminants in Food, liquid coconut milk has a maximum limit of *Staphylococcus aureus* as much as  $1 \times 10^2$  colonies/g<sup>14</sup>.

While the survey results in Banjarbaru, South Kalimantan, Indonesia, there are traditional beverage sellers made from coconut milk such as dawet ice and cendol ice, but the quality of this drink is not yet known based on the maximum limit of *S. aureus* from the Indonesia National Standard. The purpose of this study was to determine the description of contamination of *Staphylococcus aureus* in coconut milk traditional drinks in the Banjarbaru region.

## **MATERIALS AND METHODS**

The type of research used in this study is a Descriptive Observational, which is a method carried out with the aim of seeing a picture of contamination of *Staphylococcus aureus* in coconut milk traditional drinks in Banjarbaru in 2018.

The sample in this study was coconut milk from 6 traditional beverage sellers (es dawet and es cendol) which were sold in the Banjarbaru region. The sampling technique in this study was purposive sampling with inclusion criteria: sellers of ice dawet or ice cendol in the Banjarbaru region, not moving places to sell, processing coconut milk done by sellers themselves. Sampling is carried out 2 times, namely 1 hour after processing (retrieval I) and 2 hours after the first take (taking II).

Samples in the form of coconut milk were taken as much as  $\pm 5$  ml from sellers of different places. The media used for this study were Mannitol Salt Agar/MSA (Merck), Nutrient Agar/NA (Merck), glucose and mannitol (Merck) media, Trypticase Soy Broth/TSB (Merck). *Staphylococcus aureus* was isolated by the TPC method (Total Plate Count) using MSA media. Dilutions used are 100-101. Gram staining is carried out on suspect colonies that grow on MSA media. Biochemical tests using glucose and mannitol were incubated 24 hours at 37°C. The catalase test uses hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) 10%. The coagulase test uses 3.8% citrate plasma.

## **RESULTS AND DISCUSSION**

Based on the results of *S. aureus* examination on coconut milk traditional drinks in the Banjarbaru region in 2018 conducted at the Bacteriology Laboratory, Department of Health Analyst, the results can be seen in the table below:

Table 1 Results of S.aureus Examination on Coconut Milk Traditional Drinks

No	Code sample	Type of retrieval	Amount of S. aureus (coloni / ml)	Classification of results (max limit of Indonesia National Standard: 1x10 <sup>2</sup> )
1	1A	I	0	Qualify
2	2A	II	0,18 x 10 <sup>2</sup>	Qualify
3	1B	I	0	Qualify
4	2B	II	0,3 x 10 <sup>2</sup>	Qualify
5	1C	I	0	Qualify
6	2C	II	0,12 x 10 <sup>2</sup>	Qualify
7	1D	I	0	Qualify
8	2D	II	0	Qualify
9	1E	I	0	Qualify
10	2E	II	9,92 x 10 <sup>2</sup>	Not eligible
11	1F	I	0	Qualify
12	2F	II	0	Qualify

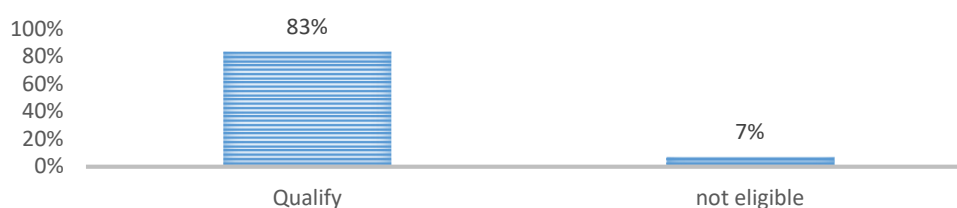


Figure 1. Results of S.aureus Examination on Coconut Milk Traditional Drinks based on Indonesian national standards

Based on observations the habit of washing hands before serving drinks shows that 6 sellers (100%) do not wash their hands and there are no sellers (0%) who wash their hands. Use of Personal Protective Equipment (PPE) as many as 6 sellers (100%) did not use aprons, headgear, gloves and mouth cover when serving drinks and no seller (0%) used them. The results of observations from 6 sellers were 4 sellers (67%) who did not use tightly closed containers before and after the presentation process, while 2 sellers (33%) used closed containers. All sellers (100%) do not put the tool in a clean place after the process of serving drinks and no seller (0%) puts it in a clean place. Observations from 6 sellers have 3 sellers (50%) who milk their own coconut milk and 3 sellers (50%) buy coconut milk in the market. The observation results from 6 sellers have 3 sellers (50%) using well water in the process of making coconut milk, while 3 sellers (50%) use PDAM water in the process of making coconut milk. Observations from 6 sellers have 5 sellers (83%) warming up the coconut milk making and 1 seller (17%) not warming up. The observation of the location of selling all sellers (100%) is located near public roads.

Based on the results of the study in table 1 and figure 1, it shows that in taking II, five samples (83%) fulfilled the requirements and one sample (7%) did not meet the requirements of the Indonesian National Standard for S.aureus in liquid coconut milk. This is similar to the research of Andriani and Lasti (2014), with the results of

4 samples of coconut milk tested there was 1 positive sample containing *S.aureus* as much as  $1 \times 10^2$  colonies/ml<sup>16</sup>. Contamination may be caused by poor hygienic packaging or storage.

Coconut milk is a good medium for microbial growth, because it contains lots of fat and protein. The high fat and protein content in coconut milk causes an increase in microbial growth and increased microbial resistance in the heating process<sup>17</sup>. The observation results of most sellers (80%) stated that the coconut milk processing was done well through the heating process, even though there was one seller (20%) who did not carry out the heating process and only used hot water. The growth temperature of *S.aureus* ranges from 7-48 C with the optimum temperature for growth of 35-37 C. The heating process at 66°C in 10 minutes will cause *S.aureus* to die, but the toxin can still survive at a temperature of 100°C<sup>18</sup>. The Aini study (2015), showed that the temperature and duration of heating were very influential on the viability of *S.aureus*<sup>19</sup>. So, the possibility of contamination in take II can come from storage or presentation.

In retrieval II, positive results can be caused by storage factors. Based on the observations of the sellers who did not close the container with the meeting as many as 4 sellers (67%) and only 2 sellers (33%) who closed the container tightly. From the results of the research, sellers who did not close the container with a positive *S.aureus* contamination with 1 sample (17%) did not meet the requirements and 3 samples (50%) still met the requirements of the Indonesia National Standard of *S.aureus*. This shows that the storage of food/drinks left in an open state can be easily insect perched on food/drinks and dust that flies around the place of sale can stick which allows to contain *S. aureus*.

Based on observations, positive results are also obtained at the selling location that is close to public roads. Bacterial pollution can also be caused by dirty environments, close to sewers and exposure to vehicle smoke dust<sup>20</sup>. This is indicated by the seller who does not close the container tightly with the result of *S.aureus* contamination, which is 1 sample (17%) does not meet the requirements of the Indonesian National Standard and 3 samples (50%) that still meet the requirements of the Indonesian National Standard. *S. aureus* can be found in soil, water and dust in the air. Contamination from air containing dust allows *S.aureus* contamination in coconut milk samples.

The hand is the part of the body that allows *S.aureus* the most if a seller does not maintain good personal hygiene. From the observations it is known that all sellers (100%) do not wash their hands after serving drinks. According to Marda et al 2014, there are two groups of microbes that are in the hand, namely natural microbes and temporary microbes that are in the hand. Natural hand microbes generally reside in skin pores that are mostly harmless, such as *S.epidermidis* and microbes while in the hands originating from various sources because the hands are not washed clean which eventually microbes can stick to<sup>21</sup>. *S. aureus* can be found in the nose, mouth, skin, eyes, fingers, intestines and liver. These bacteria will last a long time in various places where the seller can contaminate coconut milk through hands that have touched the skin area containing *S.aureus*<sup>22</sup>.

Other results that can cause *S.aureus* contamination are equipment at work. This can be seen from the results of the research of sellers not wearing aprons, headgear, gloves and mouth cover during presentation. According to Purnawijayanti (2001) food handlers are recommended to wear headgear to prevent hair and hair drop in food / drink and help absorb sweat on the forehead<sup>23</sup>. The use of aprons is highly recommended for food handlers because the microorganisms contained in

the air are usually attached to solid materials such as dust that may be attached to the clothes<sup>24</sup>. Clothing, headgear and apron must be clean, often replaced and washed to avoid contamination of food / drinks. Dirty clothes can be for nesting germs and become a disease transmitting medium.

Based on the results of the study, 4 positive samples of *S.aureus* ie 1 sample (17%) did not meet the requirements and 3 samples (50%) that met the requirements of the Indonesian National Standard *S.aureus* parameters. According to Nugroho (2005) food poisoning caused by *S. aureus* can be prevented through good hygiene and sanitation programs on equipment, workers and supervision of worker habits<sup>25</sup>. Besides that, it can also be prevented by washing hands with soap after from the toilet, preventing the hands from holding the mouth, nose or hair when working/cooking, and closing the mouth/nose when coughing/sneezing with tissue.

## CONCLUSION

*Staphylococcus aureus* is present to exceed the maximum requirements of the Indonesian National Standard in taking coconut milk liquid II as much as 1 sample (17%). Possible factors causing contamination of *Staphylococcus aureus* are sellers who do not close the container tightly, sell locations, use personal protective equipment and clean the tools used when selling.

## REFERENCES

1. BPOM. (2016). *Keracunan Pangan Akibat Bakteri Patogen*
2. Naria E. (2016). Hiegen Sanitasi Makanan dan Minuman Jajanan Di Kompleks USU Medan. *Jurnal USU*, 25(2),118-126
3. Djaafar TF dan Rahayu S., (2007). Cemaran Mikroba Pada Produk Pertanian, Penyakit Yang Ditimbulkan dan Pencegahannya. *Jurnal Litbang Pertanian*, 26(2), 67-75.
4. Siagian A., (2002). *Mikroba Patogen Pada Makanan dan Sumber Pencemarannya. Fakultas Kesehatan Masyarakat. Universitas Sumatera Utara*
5. Amalia, R. D. Dwiyantri, and Haitami. (2017). Inhibition of Nacl on the Growth of *Staphylococcus aureus* (Daya Hambat Nacl Terhadap Pertumbuhan *Staphylococcus aureus*). *Medical Laboratory Technology Journal*, 2(2), 42–45
6. Leka Lutpiatina. (2015). Effectiveness of Propolis Bee (*Trigona spp*) Extract in Inhibiting the Growth of *Salmonella typhi*, *Staphylococcus aureus* and *Candida albicans* (Efektivitas Ekstrak Propolis Lebah Kelulut (*Trigona spp*) Dalam Menghambat Pertumbuhan *Salmonella typhi*, *Staphylococcus aureus* dan *Candida albicans*). *J. Skala Kesehatan*, 6(1)
7. Leka Lutpiatina, Ratih Dewi Dwiyantri, Anny Thuraidah. (2018). Inhibition of Propolis and *Trigona spp*'s honey towards Methicilin-Resistant *Staphylococcus aureus* and Vancomycin-Resistant *Staphylococcus aureus*. *Indian Journal of Public Health Research and Development*, 9(10)
8. Leka Lutpiatina, Nisa Nur Agistni Eriana. (2018). *Staphylococcus aureus* and Methicillin resistant *Staphylococcus aureus* from The Diabetic Ulcer. *Medical Laboratory Technology Journal*, 4(1), 30-34
9. R. D. Dwiyantri, A. Muhlisin, and A. Muntaha. (2015). MRSA and VRSA in Paramedics at Ratu Zalecha Hospital Martapura (MRSA dan VRSA pada Paramedis RSUD Ratu Zalecha Martapura). *Medical Laboratory Technology Journal*, 1(1), 27–33

10. Lutpiatina, L. (2017). Cemaran *Staphylococcus aureus* dan *Pseudomonas aerogenosa* Pada Stetoskop di rumah sakit. *J. Teknol. Lab*, 6(2).
11. Dwiyantri RD, L Lutpiatina. (2016). Bacteriological Quality of Pentol Tomato Sauce in Banjarbaru (Mutu Bakteriologis Saus Tomat Pentol di Banjarbaru). *Medical Laboratory Technology Journal*, 2(1), 1-5
12. Rahayu N. P. N., Retno K., Ni L. S. (2014). Test for the presence of *Staphylococcus aureus* in traditional sausages (sequences) that circulate in traditional markets in Denpasar, Bali. *Jurnal Simbiosis II*, (1), 147 - 157
13. Anugrah R, (2011). *Minuman Coconut milk Kelapa (Cocos nucifera L.) Rendah Lemak Dengan Penambahan Ekstrak Daun Stevia rebaudiana Sebagai Produk Diversifikasi Pangan Berbasis Coconut milk Kelapa*. Institut Pertanian Bogor.
14. Riady E., 2017. *Puluhan Warga Blitar Keracunan Es Dawet*. Jawa Timur: detiknews.
15. Standar Nasional Indonesia, (2009). *Batas maksimum cemaran mikroba dalam pangan. Standar Nasional Indonesia 7388:2009*. Jakarta: Badan Standardisasi Nasional.
16. Adriani dan Lasti Y. (2014). Identifikasi Keberadaan *Staphylococcus* sp Pada Coconut milk Kelapa Kemasan Yang Di Perdagangkan Di Kota Makassar. *Jurnal Biotek Jurusan Biologi*, 1(1) : 31-34.
17. Ubaidillah. (2006). Faktor Produksi Yang Berhubungan Dengan Kontaminasi Coliform Pada Jajanan Es Dawet Di Kecamatan Banguntapan Bantul Yogyakarta. *Jurnal Kesehatan dan Keperawatan Surya Medika*, 1(1) : 10-19.
18. Pinchuk VI, Beswick EJ, Reyes VE., (2010). *Staphylococcal enterotoxins*. *Toxins*, 2(8) : 2177-2197.
19. Aini Q, (2015). *Pengaruh Suhu dan Waktu Pemanasan Terhadap Viabilitas dan Profil Protein Isolat Staphylococcus aureus Sebagai Bahan Vaksin*. Universitas Islam Negeri Maulana Malik Ibrahim Malang.
20. Kurniawan A. (2013). *Deteksi Bakteri Pathogen dalam Es Balok Yang dijual di Pasar Tradisional Bandar Lampung*. UNILA.
21. Marda N, Sirajuddin S, Najamuddin U. (2014). Analisis Mutu Mikrobiologis Pada Pangan Jajanan Anak di SD Kompleks Larianbangi Makassar. *Jurnal Unhas*, 1(1) : 1-6.
22. Radji, Maksum. (2009). *Buku Ajar Mikrobiologi Panduan Mahasiswa Farmasi dan Kedokteran*. Jakarta: EGC.
23. Purnawijayanti, Hiasinta A. (2001). *Sanitasi, Higiene, dan Keselamatan Kerja dalam Pengolahan Makanan*. Yogyakarta: Kanisus.
24. Gobel B, Risco. (2008). *Mikrobiologi Umum dalam Praktik*.
25. Nugroho WS. (2005). Aspek Kesehatan Masyarakat Veteriner *Staphylococcus* Bakteri Jahat yang Sering Disepelekan. Universitas Gajah Mada.