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Analysis of Yeast Mold Contamination in Commercialized Chicken Sempol in Karanganyar District, Karanganyar Regency, Central Java

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Abstract

This research wants to find out if there is yeast mold in chicken sempol in Karanganyar Regency. The scientists used 10 chicken meat samples and a special kind of food for the bacteria to grow on. They also used water that had been purified. We did a study by watching how yeast mold grows, and then describing the results. The yeast mold test was done using the Total Plate Count (TPC) method. The samples were kept at a warm temperature for 7 days, and information was recorded on the 3rd, 5th, and 7th day. We compared the results with regulations from the Food and Drug Supervisory Agency (BPOM) No. In 2019, a new rule was made about how much yeast mold is allowed in processed meat. Please re-write this text using simpler words. The research found that samples A, B, and C had the most mold and yeast between the 3rd and 7th days of observation. At that time, sample G had the least amount of mold and yeast.

Keywords:chicken sempol, yeast mold contamination, TPC.

Introduction

Good food is safe to eat. Everyone has the right to safe food. Good food needs to not only look and taste good but also be safe to eat. Food safety means making sure that our food is safe to eat by taking steps to keep it free from any harmful substances that could make us sick. This includes keeping it free from germs, chemicals, and other things that could cause harm to our health.

Now, there are a lot of people getting sick from eating bad food, and the news about it is being talked about in Indonesian newspapers and TV. Food poisoning happening in the neighborhood can sometimes be deadly. In the past 10 years (2010-2020), there were 76 cases of people getting sick from eating wild mushrooms in Indonesia. In total, 550 people got sick and 9 of them died. Food poisoning happens in many places because things aren't always clean. The tools and materials used are dirty, because they are exposed to dust from the road with lots of traffic. Tiny living things found all over can make food products not completely clean. When tiny living things grow in food, it can make the food go bad and not safe to eat. Food that has bacteria, viruses, parasites, or harmful chemicals can make people sick with over 200 different diseases. So, we have to be careful of foods with harmful bacteria and poisons that are being sold, sometimes on the roadside.

A favorite snack that people eat on the street is called chicken sempol. Chicken sempol is a popular snack from Malang City. It is made from chicken meat and tapioca flour, dipped in egg, and then fried. This popular food from Malang is also found in other cities like Sidoarjo, Banyuwangi, and Jombang. Sempol is a new snack that has become very popular in Malang

City and has become more popular than cilok snacks. Mold and yeast can easily grow in chicken sempol because the places that sell this snack are not very clean.

Due to the hygiene problems from food poisoning, we need to evaluate chicken sempol food products to find out why people are getting sick. One reason could be the growth of mold and yeast in the food.

Materials and Methods

The research materials used were chicken sempol sold by 10 different traders in the Karanganyar District, Karanganyar Regency, as well as distilled water and Potato Dextrose Agar (PDA) as growing media. The equipment used includes Erlenmeyer, Petri dishes, hot plate stirrers, dry ovens and analytical scales.

The method used is an observation method starting with samples purchased from 10 different traders with the criteria (1) only selling one type of snack, namely chicken sempol; (2) chicken sempol is made by the seller himself; (3) traders sell their products in Kec. Karanganyar, Kab. Karanganyar. The sempol sellers whose samples we tested were obtained from the areas listed in Table 1.

Table 1. Data on the Number of Molds on Chicken Sempol for 7 Days of Storage at Room Temperature (37°C)

Sample Code	Sales Location
A	Pancasila Park
B	In front of Wikarya High School
C	SDN 3 Karanganyar
D	Karanganyar Square
E	Bejen Market
F	Delingan Reservoir
G	Delingan Reservoir Entrance
H	Bejen Housing
I	Food court behind the Karanganyar Regent's office
J	Corner Field

The second step is sterilizing laboratory equipment using the dry sterilization method (Wulandari et al., 2021) then continuing with making microbial growth media from PDA and distilled water.

The third step is microbial isolation using the Total Plate Count (TPC) method with multilevel dilutions (Arantika et al., 2019), the isolation plates are incubated for 7 days at room temperature (37oC) and on days 3, 5 and 7 microbial plates are counted. using the Total Plate Count (TPC) method. The results of the TPC were analyzed descriptively and compared with the applicable Food and Drug Supervisory Agency (BPOM).

Results and Discussion

Mold Contamination on Sempol Chickens

According to the information in Table 2, the research showed mold test results from watching for 7 days. Each sample had more mold than before. On the third day, we saw a lot of mold growing in sample E. There were about 65,300 colonies per milliliter. Meanwhile, the sample that had the least mold was sample C, with 4. 2 x 102 colonies/ml. On the 5th day, we collected information on samples with a high amount of mold. This includes sample B, which

had 288. 7 x 102 colonies/ml. On the 5th day, sample G had the least amount of mold, with 73. 7 x 102 colonies per milliliter. On the 7th day, we found a lot of mold in samples A, B, and C - so much that it seemed like there was no end to it. At the same time, sample G had the least amount of mold, with only 61 x 102 colonies/ml.

Table 2. Data on the Number of Molds on Chicken Sempol for 7 Days of Storage at Room Temperature (37°C)

Days to-	Number of Molds (nx 102)									
	A	B	C	D	E	F	G	H	I	J
3	38	18.9	4.2	38.7	65.3	56	7.8	49.7	19	19.3
5	261.6	288.7	238.1	104	140.1	142.8	28.5	73.7	169.2	39.6
7	TB	TB	TB	261.2	296.5	353.6	61	404	343.6	84.5

Mold grows for different reasons. One important thing to think about is how and where to store chicken sempol. The mold in the chicken samples increased because it was in a form that could easily spread through the air. Tiny mold spores can be blown around by the wind because they are very light. This is about the bad storage area for 10 chicken ball sellers, which lets mold spores get into the chicken balls. According to Rosmiah and others In 2020, the storae area and equipment need to be big enough and have different spaces for dry and wet storage. More moisture makes mold grow faster.

Another thing to consider is the temperature at which the item is stored. The temperature used for storing things in this study is the same as the temperature in a normal room (25 degrees Celsius). Items are usually more damp at room temperature than at cold temperatures. This agrees with Zubaidah and others. In 2022, we learned that yeast mold grows faster in a warm and humid place. I also agree with Manoe and others. In 2019, one way to keep food from spoiling is to store it in the fridge at a temperature below 4oC. This helps the food stay fresh for longer. There are three types of molds based on how hot or cold it needs to be to grow. Some molds can grow in cold temperatures (4-5oC), some can grow in moderate temperatures (25-30oC), and some can only grow in very hot temperatures (45-90oC). So, the mold that grew in this study was a type that grows at moderate temperatures.

Another thing that can cause mold to grow is the type of nutrients in the food. Chicken sempol is a yummy snack made from tapioca flour and tasty spices. It has garlic, salt, and other flavors mixed with ground chicken. The chicken sempol mixture can grow mold because it has chicken meat and tapioca flour which have lots of protein and water. According to Adawyah (2023), mold can harm food with lots of protein and high fat. Mold can easily grow on foods that contain a lot of water, about 54. 1%

Besides the things mentioned earlier, how long something is stored can also affect mold growth. The longer food can be kept before it goes bad, the more germs there will be in it. The traders in Karanganyar Regency said that the chicken sempol they sell can be kept in the freezer for 1 week. This information was gathered from observations and interviews with the traders. Some traders also said that if they don't keep their food in the freezer, it can get moldy and have yeast grow on it after 3 days at room temperature.

The rule number of BPOM says. In 2019, a new rule was made about the most yeast mold allowed in processed meat. The limit is 102 colonies per gram. Ten chicken sempol sold in Karanganyar Regency did not have enough mold numbers on them after the third day.

Yeast Contamination in Chicken Sempol

Based on the data in Table 3,Results were obtained showing yeast test data from observations for 7 days. In this test, yeast did not appear much and did not appear at all in some samples. On the 3rd day of observation, the sample with the most yeast appearing was sample C, namely 41.5 x 102 colonies/ml. The sample with the fewest yeasts appeared was sample I, namely 1 x 102 colonies/ml. Meanwhile, other samples where yeast appeared were samples B and E and samples A, D, F, G, H and J did not appear yeast. On the 5th day of observation, the only sample that appeared yeast was sample A, namely 250 x 102 colonies/ml. For samples B, C, and I, on the 3rd day of observation yeast appeared, then on the 5th day of observation it did not appear, this was because the yeast that had grown was covered by the large number of molds that were growing more and more. Meanwhile, some samples (D, F, G, H, J) did not grow yeast. On observation on day 7, the only sample that grew yeast was sample A. Meanwhile, the other samples did not grow yeast.

Table 3. Data on the number of yeasts in chicken sempol for 7 days of storage at room temperature (37°C)

Days	Number of Yeasts (nx 102)									
to-	A	B	C	D	E	F	G	H	I	J
3	0	22.6	41.5	0	20.8	0	0	0	1	0
5	250	0	0	0	0	0	0	0	0	0
7	203	0	0	0	0	0	0	0	0	0

Generally, the growth factors for yeast are the same as mold, namely looking at the cleanliness factor in the processing process and the shelf life of the raw material. Based on observations and interviews with respondents conducted during sampling, several traders said that the storage time for the chicken sempol they sell can last for 1 week in the freezer. Apart from that, the appearance of yeast is also influenced by temperature or humidity. This relates to the storage of food products. Most yeasts are mesophilic (grow well at room temperature). Optimum temperature for yeast growth according toFaturrachman and Mulyana (2019)is around 25-30oC but some can grow at temperatures of 35-37oC or higher.

Another factor that can influence the growth of yeast is the substance contained in a food. Yeast grows easily on foods that contain lots of sugar and are acidic. Yeast has a growth pH range of 1.5 – 8.5. However, most yeasts are more suited to growing in acidic conditions, namely at pH 4-4.5, so damage by yeast is more likely to occur in acidic products (Rorong and Wilar, 2020). Therefore, in this study yeast did not grow in chicken sempol food products. Yeast grows more in acidic food products such as fruit.

KAnother ingredient that can trigger the growth of yeast is fat. Ingredients or food products that contain dominant fat often grow yeast (Susilo et al., 2019). Meanwhile, sempol contains 7.94 g of fat (Fatsecret, 2022). Therefore, on the third day of observation, there were several samples that had yeast growing, including samples B, C and I. Meanwhile, on the 5th and 7th days of observation, there was only one sample that had yeast growing, namely sample A. Meanwhile, several of the samples did not have yeast growing. .

Based on BPOM regulationsNo. 13 of 2019 concerning the maximum limit for yeast mold microbial contamination in processed meat foods, namely 102 colonies/g. The number of yeast numbers in 10 chicken samples sold commercially in Karanganyar Regency with the results of the yeast numbers on the 3rd day of observation with a total of 0x102 colonies/ml to 41.5 x 102 colonies/ml did not meet the standards. On the 5th day of observation, the yeast number reached 0x102 colonies/ml to 250 x 102 colonies/ml, so it did not meet the standard. On the 7th day of observation, the yeast numbers reached 61 x 102 colonies/ml to infinity. So, on the 7th day of observation it did not meet the quality requirements.

Conclusion

The study found that all the chicken sempol samples sold by traders in Karanganyar Regency don't meet the standards. Chicken sempol should not be kept at room temperature for more than 3 days.

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