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Effect of combination of poultry eggs and acids on the color profile and consumers' acceptance on mayonnaise

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Abstract. Mayonnaise is a types of emulsion product that uses basic ingredients including egg yolk, acids, salts, sugars, and vegetable oils. The uses of a combination of egg yolk from several poultry and different types of acids has not been widely studied. The aim of the studies was to explain the effect of the combination of poultry eggs and acids on the color profile and fondness mayonnaise. This studies used a completely randomized design (CRD), with 9 combinations and 3 replications. The treatment combinations were A1; duck eggs and lime, A2: duck eggs and apple vinegar, A3: duck eggs and synthetic acid, A4: native chicken eggs and lime, A5: native chicken eggs and apple vinegar, A6: native chicken eggs and synthetic acid, A7: chicken eggs and lime, A8: chicken eggs and apple vinegar, A9: chicken eggs and synthetic acid. The parameters measured were the color profile including lightness, redness, yellowness, and consumers' acceptance on mayonnaise. The results showed that the combination of different types of poultry eggs and acids had no effect on the lightness value of mayonnaise. However, it showed a very significant effect ($P \leq 0.01$) on the resulting redness, yellowness and fondness mayonnaise values. The combination of chicken eggs and synthetic acid increased the color profile and consumers' acceptance on mayonnaise.

1. Introduction

Eggs are a poultry products that have a very high nutritional content [1]. Eggs consist of three main parts, ie. egg shell weighing about 11%, egg whites (albumen) weighing about 58%, and egg yolk (yolk) weighing about 31% [2]. Mayonnaise is one type of dressing sauce [3]. Mayonnaise is most widely used in various food products in the world today. In Indonesia, mayonnaise has long been recognized by the public. Mayonnaise is used as a sauce dressing in food products, such as salads, burgers, pizza, sandwiches, french fries, risoles, sausages and others [4]. Acid functions as a water binder and coagulation of mayonnaise.

Mayonnaise is generally made using chicken eggs and vinegar. It is necessary to use other types of eggs and other types of acids. That will be affect the final product such as color profile and fondness. One of the highlights of mayonnaise is color. Besides that, fondness is also an important factor. Consumers will be regularly consume mayonnaise if they like it [5].

The research objective was to determine the color profile and fondness of mayonnaise made from a combination of different types of eggs and acids.

2. Research method

The materials used in this study were duck eggs, native chicken eggs, chicken eggs, lime, apple vinegar, and synthetic acids, sugars, salts and palm oils. This research used equipments, i.e., sample



bottles, beaker glass, mixers, trays, analytical scales, containers, spoons, infrared sterilizers, stationery, panelists, chromameters and test sheets packages. Complementary materials included label paper, aluminum foils, tissues and clean clothes.

This studies used a completely randomized design (CRD), with 9 combinations and 3 replications. The treatment combinations were A1: duck eggs and lime, A2: duck eggs and apple vinegar, A3: duck eggs and synthetic acid, A4: native chicken eggs and lime, A5: native chicken eggs and apple vinegar, A6: native chicken eggs and synthetic acid, A7: chicken eggs and lime, A8: chicken eggs and apple vinegar, A9: chicken eggs and synthetic acid. The parameters measured were the color profiles including lightness, redness, yellowness, and preference on mayonnaise.

The procedure for making mayonnaise was (a) washed eggs to remove dirt on the surface of the egg shells, (b) dried eggshells with a tissue, (c) eggs wrapped in aluminum foil, (d) sterilized eggs in an infared sterilizer [3]. Then, the eggs were separated from the shell and the contents of the eggs. The contents of the eggs were put into a container and then added with sugars, oils, acids, and salts. The mixture of these ingredients were stirred until the dough was homogeneous and expands. Then the dough was put in a bottle and cooled in the refrigerator for 120 minutes [3]. After that, measurement of color profiles was carried out using chromameters. Consumers' acceptance were tested by panelists by using the score of 1 for very dislike; 2 for dislike; 3 for slightly dislike; 4 for less like; 5 for like and 6 for really like.

3. Results and discussion

3.1. Lightness

Figure 1 showed that the combination of egg types and acids has no significant effect ($P > 0.05$) on the lightness value of mayonnaise. This showed that the combination of egg types and the acids used did not contribute to the lightness of the mayonnaise. However, there was a trend for the uses of a combination of chicken egg and lime to be higher than the other combinations.

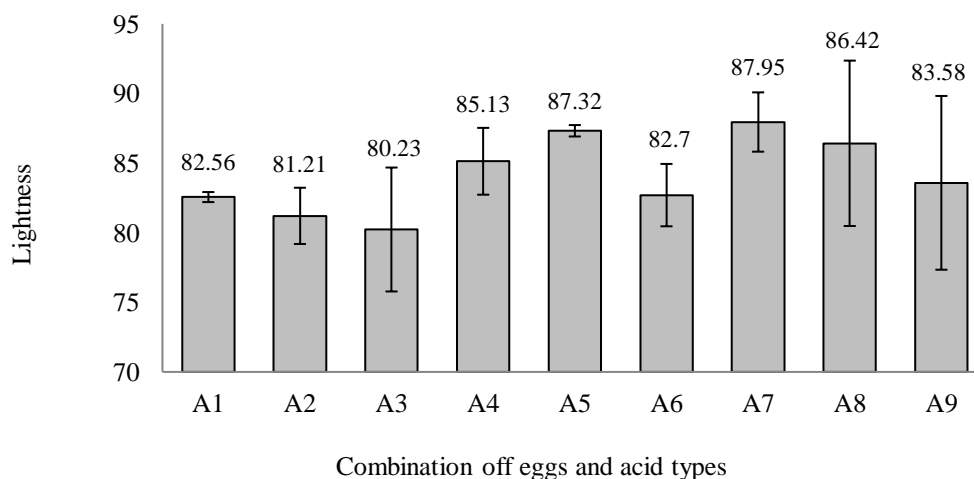


Figure 1. Average value of mayonnaise lightness with a combination of different types of eggs and acids

A1 = Duck eggs and lime, A2 = Duck eggs and apple vinegar, A3 = Duck eggs and synthetic acids, A4 = Native chicken eggs and lime, A5 = Native chicken eggs and apple vinegar, A6 = Native chicken eggs and synthetic acids, A7 = chicken eggs and lime, A8 = Chicken eggs and apple vinegar, A9 = Chicken eggs and synthetic acids

This study also showed a the tendency of using chicken eggs and native chicken eggs in mayonnaise has a higher lightness value than using duck eggs. This was due to the pale color of the yolk in the chicken egg and native chickens egg. While the egg yolk color in ducks was reddish orange. Diet, rearing methods and different types of feed affect the color of the resulting yolk. This was in accordance with the opinion of Purnamasi et al which stated that if the feed contained more carotene, the egg yolk will be more reddish-orange in color [6].

3.2. Redness

Figure 2 showed that the combination of egg types and acids had a very significant effect ($P < 0.01$) on the redness value of mayonnaise. The using of duck eggs with various combinations of acids were significantly higher than the combination of other types of eggs and acids.

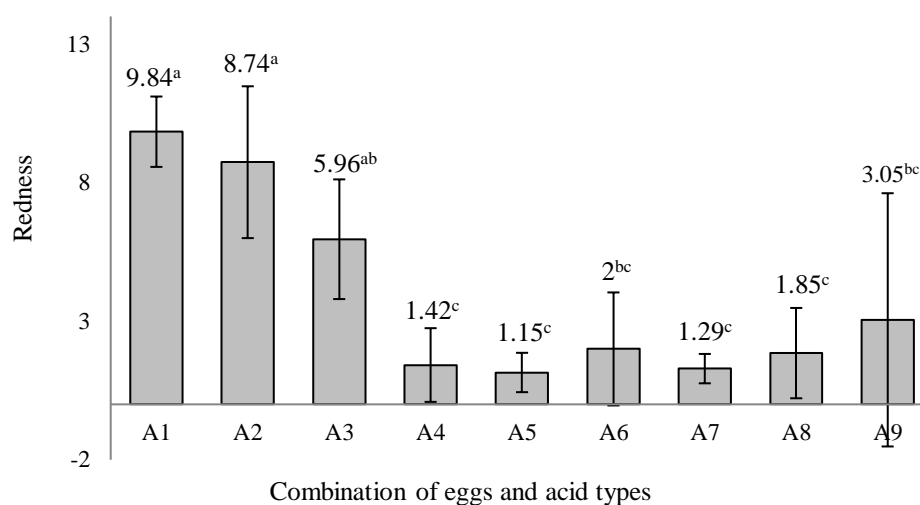


Figure 2. Average value of mayonnaise redness with a combination of different types of eggs and acids

^{abc}Different superscripts in each treatment showed a very significant difference ($P < 0.01$).

A1 = Duck eggs and lime, A2 = Duck eggs and apple vinegar, A3 = Duck eggs and synthetic acids, A4 = Native chicken eggs and lime, A5 = Native chicken eggs and apple vinegar, A6 = Native chicken eggs and synthetic acids, A7 = chicken eggs and lime, A8 = Chicken eggs and apple vinegar, A9 = Chicken eggs and synthetic acids

Mayonnaise using various types of acids had no effect on the redness value, while using different types of eggs affects the redness value of mayonnaise. Mayonnaise using duck eggs has a higher redness value compared to using chicken eggs and native chicken eggs. This indicated that the yolk in duck eggs were yellow to reddish due to the carotenoid pigments contained in the feed given to ducks. This was in accordance with the opinion of Simanjuntak et al which stated that plants were a source of carotenoid pigments that gave egg yolk color from yellow to red [7]. The increase in egg yolk color was due to the intake of carotenoid pigments into the duck's body.

3.3. Yellowness

Figure 3 showed that the combination of egg types and acids had a very significant effect ($P < 0.01$) on the yellowness value of mayonnaise. The using of duck eggs with various combinations of acids were significantly higher than the combination of other types of eggs and acids.

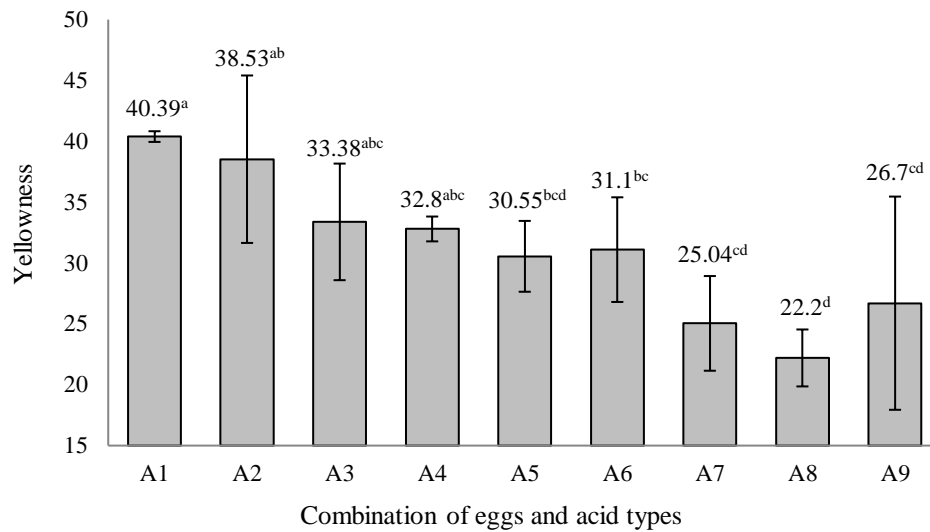


Figure 3 Average value of mayonnaise yellowness with a combination of different types of eggs and acids

^{abcd}Different superscripts in each treatment showed a very significant difference ($P < 0.01$)

A1 = Duck eggs and lime, A2 = Duck eggs and apple vinegar, A3 = Duck eggs and synthetic acids, A4 = Native chicken eggs and lime, A5 = Native chicken eggs and apple vinegar, A6 = Native chicken eggs and synthetic acids, A7 = chicken eggs and Lime, A8 = Chicken eggs and Apple vinegar, A9 = Chicken eggs and synthetic acids

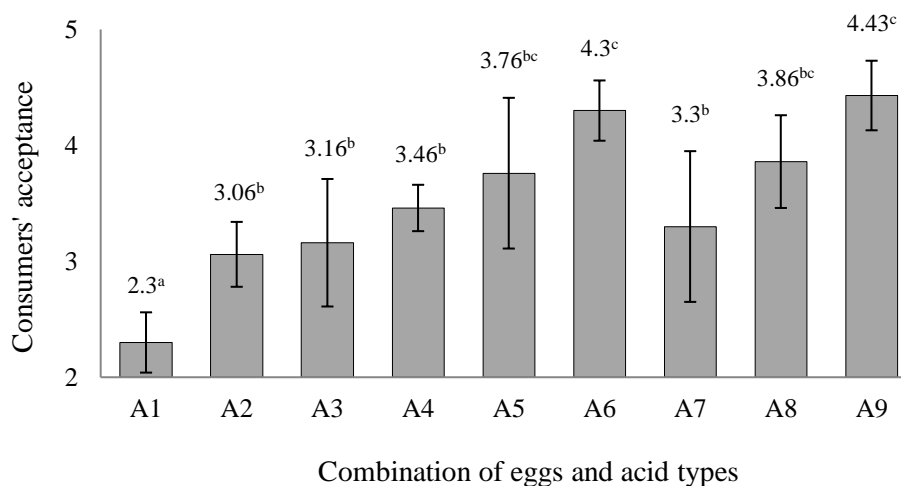


Figure 4. Average value of mayonnaise consumers' acceptance with a combination of different types of eggs and acids

^{abc}Different superscripts in each treatment showed a very significant difference ($P < 0.01$). 1 = very disliked 2 = disliked 3 = slightly disliked 4 = less liked 5 = liked 6 = really liked

A1 = Duck eggs and lime, A2 = Duck eggs and apple vinegar, A3 = Duck eggs and synthetic acids, A4 = Native chicken eggs and lime, A5 = Native chicken eggs and apple vinegar, A6 = Native chicken eggs and synthetic acids, A7 = chicken eggs and Lime, A8 = Chicken eggs and Apple vinegar, A9 = Chicken eggs and synthetic acids

The using of different types of acids in the mayonnaise did not affect the yellowness value, but using different types of eggs in the mayonnaise affected the yellow value of the mayonnaise. The using of duck eggs in the manufacture of mayonnaise had a higher yellow value than using chicken eggs and native chicken eggs. This showed that the feed given to ducks will affected the eggs to be produced. This was in accordance with the opinion of Sujana et al which stated that ration had a direct effect on eggs yolk color. Light yolks contain more vitamin A than egg yolks that were pale in color [8]. The more vitamin A content in the ration given, the better the quality of vitamin A in egg yolk

3.4 Consumers' acceptance

Figure 4 shows that the combination of egg types and acids has a very significant effect ($P < 0.01$) on the fondness value of mayonnaise. Mayonnaise using chicken eggs and native chicken eggs has a higher consumers' acceptance value than using duck eggs.

This showed that mayonnaise was generally made using chicken eggs and native chicken eggs. Panelists were more accustomed to consume mayonnaise with the used of chicken eggs and native chicken eggs, so they were not used to try mayonnaise using duck eggs. This was in accordance with the opinion of Jaya et al which stated that the manufacture of mayonnaise generally used chicken egg yolk [9]. Likewise, reference found that the used of chicken eggs in mayonnaise was able to maintain sensory characteristics and consumers' acceptance [10].

4. Conclusion

The combination of chicken eggs and synthetic acid increased the color profiles and consumers' acceptance on mayonnaise.

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