

## Ability of Coating Materials in Maintaining Empek-Empek Quality during Vacuum Storage

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### Abstract

Pempek is Palembang people traditional food made from basic material of minced fish meat and tapioca flour with a distinctive taste. Empek empek is served with a sauce called as "cuko empek-empek". The shelf life of empek-empek is very limited. Various studies of empek-empek are conducted more on attention to improve the quality and flavor. Among of them is the addition of carrageenan (Murtado, Dasir and Ade Verayani 2014) and wheat flour porridge (Murtado Danade Verayani, 2015). The addition of Carrageenan on making empek-empek, in addition to improving the taste, it also extends the shelf life of up to 4 days at cold temperatures. The limitation of the shelf life is an obstacle in the distribution for a long time. Palembang people usually treat empek-empek when shipping by smearing it beforehand with oil or tapioca before being packed. This treatment is able to maintain the shelf life of empek-empek up to 2 days during transport at room temperature. Growned fungi that have yellow color, wet, sticky and bad smell are damage types in empek-empek commonly occur after transportation and storage. Vacuum packaging is proven to maintain the shelf life in various products. The study aims to determine the shelf life of empek-empek due to treatment of types of coating materials, namely oil, tapioca and margarine. Empek-empek is first smeared with oil, tapioca and margarine. Then, it is vacuum packed using Polyethylene with a thickness of 0.05 mm. After vacuumed, then stored in cold temperatures. Parameters measured are protein level, moisture content, degree of whiteness, smell, crispness and total appearance. The results show that the shelf life of empek-empek with the coating material of palm oil is 12 days, tapioca coating is 6 days, margarine coating is 9 days and without coating material is 6 days.

**Keywords:** coating, empek-empek, storage

### INTRODUCTION

Pempek is Palembang people traditional food made from basic material of minced fish meat and tapioca flour with a distinctive taste. Empek-empek is served with sauce called as "cuko empek-empek". Other than by the taste, empek-empek quality is determined by the color, aroma and crispness. The crispier the empek-empek with a distinctive aroma is, the more appreciated the empek-empek is. Empek-empek distinctiveness is strongly influenced by the type of fish used. Catfish is the best in producing empek-empek. Mackerel fish and parang-parang fish are marine fish species widely used in producing empek-empek. However, both fish species do not produce empek-empek as good as catfish. There are differences in hedonic quality of empek-empek generated from catfish and marine fish, especially in its crispness and smell.

Empek-empek shelf life is very limited. In storage at room temperature and open condition, empek-empek will experience drying and hardening. In storage at cold temperatures with low humidity, there will be cracking on the surface. Various studies of empek-empek focus more on the attention to improve the quality and taste, such as a study of the addition of carrageenan (Murtado, Dasir and Ade Verayani, 2014) and the addition of wheat flour porridge (Murtado and Ade Verayani, 2015). The addition of carrageenan in producing empek-empek, in addition to improving the taste, it also extends the shelf life of up to 4 days at cold temperatures. The limitation of shelf life is a constraint in distributing it for a long time. Palembang people usually treat empek-empek when shipping by smearing it beforehand with oil or tapioca before being packed. This treatment is able to maintain the shelf life of empek-empek up to 2 days during transport at room temperature. Growned fungi that have yellow color, wet, sticky and bad smell are damage types in empek-empek commonly occur after transportation and storage. Vacuum packaging is proven to maintain the shelf life in various products. Vacuuming is performed by sucking the entire gas in the box until it is completely empty. 1

Combination of vacuuming and coating treatment stored at cold temperatures is expected to extend the shelf life to be longer.

### MATERIALS AND METHODOLOGY

Materials used were catfish, mackerel, tapioca flour, vegetable oils, and margarine. The tools used were knives, pans, stove, basins, spoons, and stirrer.

It was tested three types of coating materials, namely palm oil, tapioca flour and margarine. It was made also treatment without coating as a control. Empek-empek was made using the procedures of Murtado and Ade Verayani (2014), that was by adding kappa carrageenan. 1 kilogram of minced fish was mixed with 1 kilogram of flour and added with water. We mixed it well. Then, we added Kappakaragenan 0.45%, while it was stirred. After that it was shaped into long cylindrical shape with the length and diameter of 5cm X 2cm and boiled. The

boiling process was done until the empek-empek float and get bigger than the original size.

After cold, it was given the coating treatment from three types of materials, namely: (L0) without coating materials, (L1) tapioca flour, (L2) margarine and (L3) palm oil. These three treatments had to certainly coat empek-empek. Then, each was stored in a cool temperature for 10 minutes until the oil was frozen. Furthermore, each was packed with polyethylene plastic bags with thickness of 0.05 mm and vacuumed. Each package of empek-empek was arranged one layer containing 10 *lenjer* (2 rows x 5). Vacuuming was performed until it was made sure that there was no remaining part of air. Then, it was stored in cold temperatures of 10°C – 12°C. Observations were made on days 0, 3, 6, 9 and so on every three days until the materials were declared damaged and not fit for consumption. The observations made were moisture content by AOAC method (2005), protein level by Kjeldahl method (AOAC, 2005), color and smell by pair comparison method. As a comparison, it was provided new empek-empek. The hedonic level was by hedonic test method. The test procedures were as follows:

### Color hedonic quality

Color hedonic quality testing was measured by looking and comparing carefully the color with the color of comparative empek-empek. Then it was given assessment as the following guideline:

Color Specifications	Score
Not different	4
Slightly	3
More dull	2
Very dull	1

### Smell hedonic quality

It was measured by smelling empek-empek served and then compared with the smell of comparative empek-empek. Give the response of smelling results by following these guidelines:

Smell Specifications	Score
Not different	4
Slightly less fresh	3
Less fresh	2
Not fresh	1

### Hedonic level

It was tested by tasting the material and tasted carefully. Tasting was done till panelists get an impression of the hedonic level for the products. Give the impression by following these guidelines

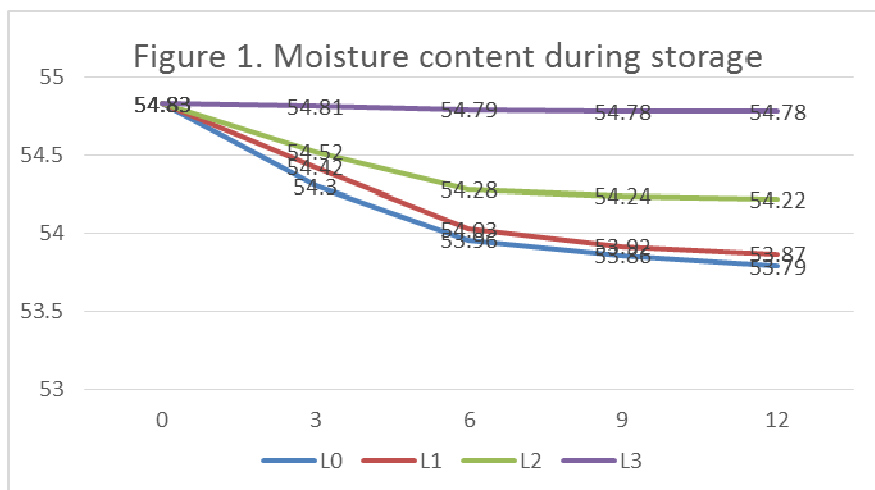
A level value

Hedonic Level	Score
Liked	4
Slightly less liked	3
Less liked	2
Not liked	1

## RESULTS AND DISCUSSION

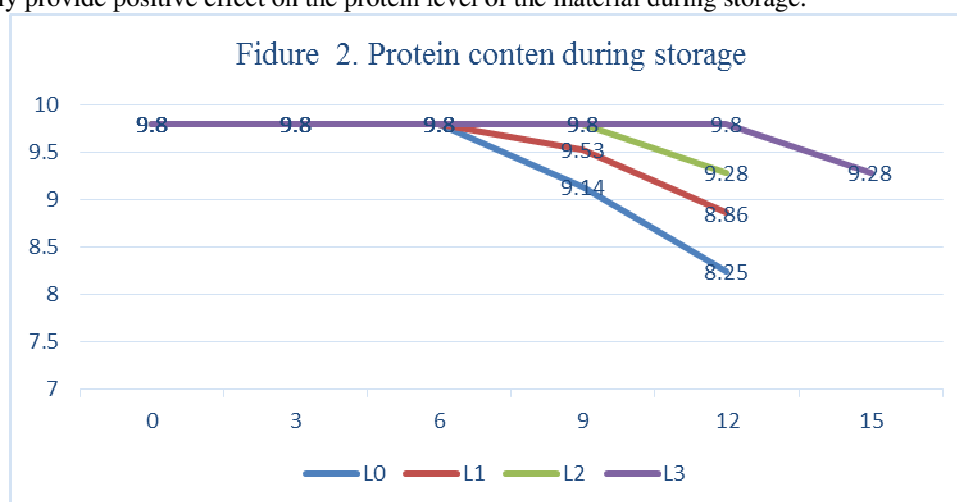
### Moisture content

Palm oil is able to maintain material humidity up to 12 days. No decrease in moisture content of empek-empek during storage. Palm oil as coating material has water-insoluble nature. Therefore, the mass of water vapor cannot penetrate the surface of the material. Empek-empek with other coating materials, from day 3 significantly experience a sharp drop in moisture content. On day 6, the decrease is getting slowly until reaching day 12. It also happens in model empek-empek. Coating material from margarine, tapioca and without coating materials have relative same pattern of decline in moisture content, dropping sharply and then with ramps. However, all of the three have different evaporation rate



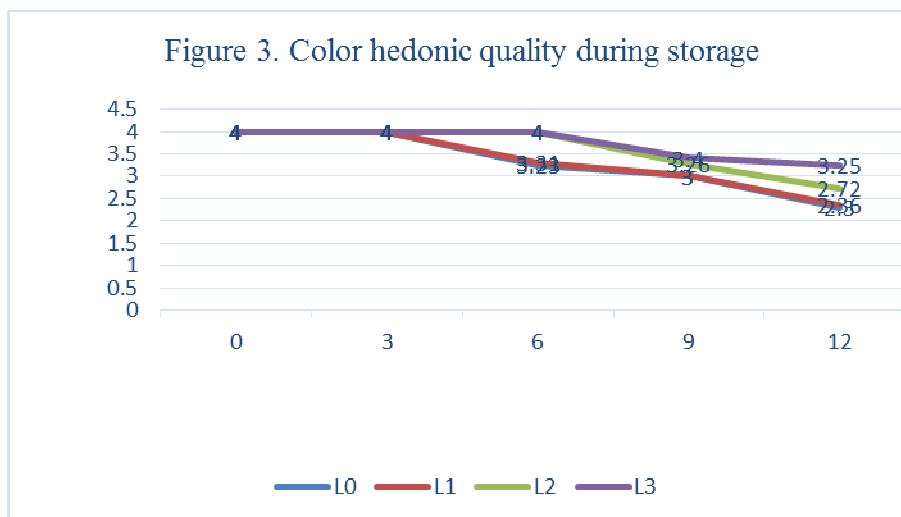
### Protein content

Figure 2, shows that there are differences in the nature coating material in maintaining protein content of the material. Palm oil as a coating material looks better than tapioca and margarine in inhibiting protein damage of the materials up to day 12 (L3). It is different with the coating material of margarine (L2), decreased from day 9 and day 6 to for the coating material from tapioca (L1). Decreased content of protein is accompanied by the growth of yellow mucus on the surface of empek-empek and bad smell. All coating materials applied significantly provide positive effect on the protein level of the material during storage.



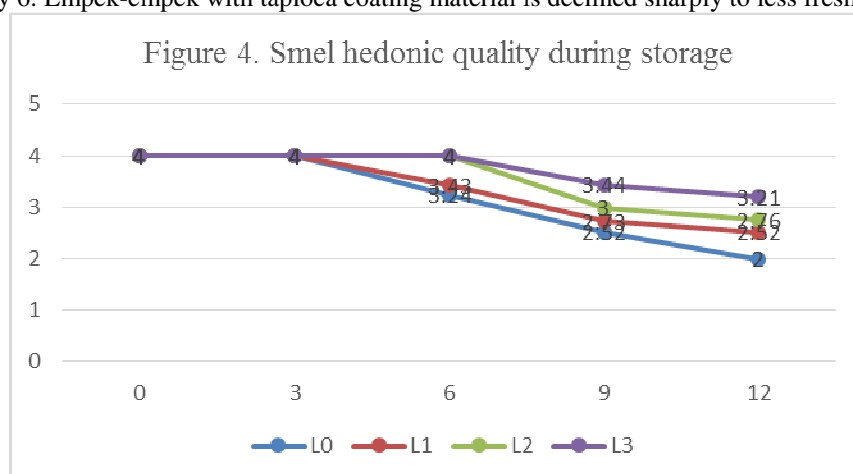
### Color Hedonic Quality

Empek-empek color is changed on day 6 for coating material from palm oil and margarine and day 3 for tapioca coating material and without coating materials. Empek-empek color with palm oil coating material on day 6 is not different from the comparator, then decreased up to day 9 becoming a little more dull than the comparator and continued experiencing a decline in the color hedonic quality to more dull and rejected by panelists. Empek-empek with the coating materials from margarine, tapioca and without coating materials experience decreased color hedonic quality from day 3 and on day 6 to be a little more dull than the comparators. The decrease in color hedonic quality is increasingly apparent after day 6 till the panelists reject it.



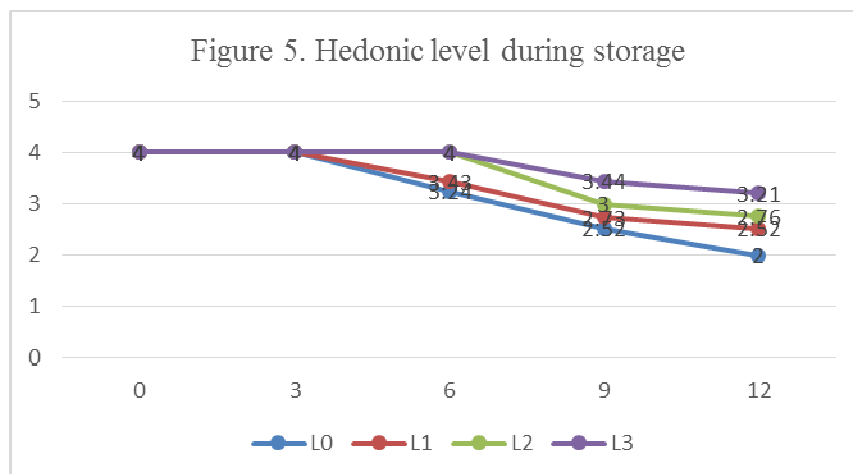
### Smell Hedonic Quality

Figure 4 shows that palm oil coating material is able to maintain color hedonic quality until day 6. Then, it is slowly decreased to be slightly less fresh on day 9. It is also common to treatment with the margarine. Empek-empek smell hedonic quality with tapioca and without coating material coating material is decreased to slightly less fresh on day 6. Empek-empek with tapioca coating material is declined sharply to less fresh on day 12.



### Hedonic Level

Empek-empek with palm oil coating material remains preferred by panelists until day 12. As for empek-empek with other coating materials begin to decline to slightly less liked on day 6 and continue to fall to less liked on day 12. The effect of palm oil coating material is not significantly different with margarine coating material on the hedonic level on day 12, and significantly different from tapioca coating material and without coating materials on day 9. The hedonic level is declined sharply from day 6 for empek -empek with tapioca coating material and without coating materials.



## CONCLUSIONS

1. Coating materials from palm oil, margarine and tapioca are significantly able to maintain the shelf life of empek-empek.
2. Palm oil coating material is able to maintain the quality of empek-empek up to 12 days, margarine coating material until 9 days and tapioca margarine can maintain the quality of empek-empek for 6 days.

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