Evaluation of The Influence of BHA (*Butylatedhydroxyanisole*) on The Rancidity Level of Corn Extruded During The Storage

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Evaluasi Pengaruh BHA (*Butylatedhydroxyanisole*) Pada Tingkat Ketengikan Extrudat Jagung Selama Penyimpanan

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The Value of Wisdom

My child, if you accept my words and treasure up my commandments within you,
making your ear attentative to wisdom and inclining your heart to understanding;
if you indeed cry out for insight, and raise your voice for understanding;
if you seek it like silver and search for it as for hidden treasures –
then you will understand the fear of the LORD and find the knowledge of God.

For the LORD gives wisdom; from his mouth come knowledge and understanding;
he store up sound wisdom for the upright; he is a shield to those who walk blamelessly,
guarding the paths of justice and preserving the way of his faithful ones.

Then you will understand righteousness and justice and equity, every good path;
for wisdom will come into your heart, and knowledge will be pleasant to your soul;
prudence will watch over you; understanding will guard you.

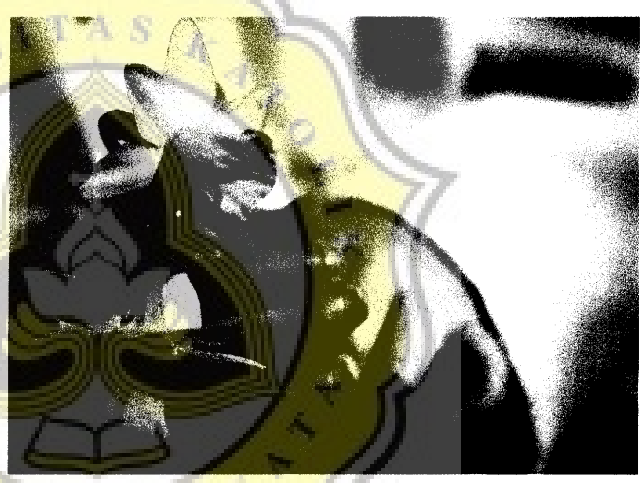
It will save you from the way of evil, from those who speak perversely,
who forsake the paths of uprightness, to walk in the ways of darkness,
who rejoice in doing evil and delight in the perverseness of evil;
those whose paths are crooked, and who are devious in their ways.

You will be saved from the loose woman, from the adulteress with her smooth words,
who forsakes the partner of her youth and forgets her scared covenant;
for her way leads down to death, and her paths to the shades;
those who go to her never come back, nor do they regain the paths of life.

Therefore walk in the way of the good, and keep to the paths of the just.
For the upright will abide in the land, and the innocent will remain in it;
but the wicked will be cut off from the land,
and the treacherous will be rooted out of it.

A True Champion should know this...
Proverb 2

I dedicated this thesis to
My beloved mother, Ong Bik Hoen
My beloved passed mother, Ong Bik Giok
My great brothers / sisters
And all my relatives



SUMMARY

Corn extruded is one kind of popular snack in Indonesia. In its production process, fat and oil were added to create an acceptable texture, taste, and flavor. On the other hand fat and oil are known to have contribution on rancidity in food that resulted in bad taste and off flavor and shorten shelf life of product. This condition leads to product losses. One alternative solution to prolong shelf life of corn extruded is by addition of BHA (*Butylatedhydroxyanisole*) as antioxidant agent. BHA has ability to reduce oxidation level of the product so it can prolong shelf life and maintain the quality of the product. The aim of this research is to evaluate the effectiveness of the use of BHA to decrease rancidity level of corn extruded during storage. Corn extruded was produced by the use of margarine as BHA carrier. Then the products store in the box (a triple wood styrofoam box), set at 40ºC for 30 days using ASLT (Accelerated Shelf Life Test) method. Extruded samples were taken on day 0, 5, 10, 15, 20, 25, and 30. The level of rancidity was determined using TBA (Thiobarbituric Acid) value analysis while the concentration of BHA was measured using HPLC (High Performance Liquid Chromatography). The data results were statistically analyzed using One Way Anova. During storage for 2.83 months, the concentration of antioxidant was significantly decreased. The lowest concentration in control sample was 0.66 ppm and in treated sample was 6.76 ppm. The rancidity was significantly increased during storage. The highest rancidity during storage was 1.37 mg malonaldehyde/kg sample in control sample and 0.73 mg malonaldehyde/kg sample in treated sample. According to National Standard of Indonesia, this amount was still below the maximum rancidity level allowed in food (3 mg malonaldehyde/kg sample). The water content was significantly increased during storage. The highest water content during storage was 8.73 % in control sample and 8.63% in treated sample. These amount were exceeded the maximum standard allowed that was 4% according to National Standard Indonesia for snack.

Keyword: BHA, corn, extruded, ASLT

RINGKASAN

Ekstrudat jagung adalah salah satu jenis *snack* yang populer di Indonesia. Dalam proses pembuatannya, lemak dan minyak ditambahkan untuk menciptakan tekstrur, rasa dan aroma yang dapat lebih baik. Di lain pihak, lemak dan minyak diketahui memberikan kontribusi pada ketengikan dalam makanan yang menyebabkan penurunan rasa dan aroma dan memperpendek umur simpan. Kondisi ini mengakibatkan penurunan kualitas produk. Salah satu alternatif untuk memperpanjang umur simpan ekstrudat jagung adalah dengan penambahan BHA (*Butilatedhidroksianisole*) sebagai senyawa antioksidan. BHA memiliki kemampuan untuk mengurangi tingkat oksidasi produk sehingga BHA ini dapat memperpanjang umur simpan dan menjaga kualitas produk. Tujuan dari penelitian ini adalah untuk mengevaluasi keefektivitasan penggunaan BHA untuk mengurangi tingkat ketengikan ekstrudat jagung selama penyimpanan. Ekstrudat jagung dibuat dengan menggunakan margarin sebagai pembawa BHA. Kemudian produk disimpan di dalam kotak (terbuat dari tripleks lapis tiga dan ditambah dengan styrofoam), dikondisikan pada suhu 40^{o}C selama 30 hari dengan tingkat kelembaban 93% menggunakan metode ASLT (*Accelerated Shelf Life Test*). Sampel ekstrudat diambil pada hari ke- 0, 5, 10, 15, 20, 25, dan 30. tingkat ketengikan ditentukan menggunakan anlisa angka TBA (*Thiobarbituric Acid*) sedangkan konsentratsi BHA diukur menggunakan metode HPLC (*High Performance Liquid Chromatography*). Data yang diperoleh dianalisa menggunakan *One Way Anova*. Selama penyimpanan 2.83 bulan, konsentrasi antioksidan menurun secara signifikan. Konsentrasi terendah pada sampel kontrol adalah 0.66 ppm dan pada sampel perlakuan adalah 6.76 ppm. Ketengikan secara signifikan meningkat selama penyimpanan. Tingkat ketengikan paling tinggi selama penyimpanan adalah 1.37 mg malonaldehid/kg sampel pada control sample dan 0.73 mg malonaldehid/kg sampel pada sampel perlakuan. Menurut Standar Nasional Indonesia, jumlah ini masih dibawah tingkat ketengikan maksimal yang diijinkan dalam makanan (3 mg malonaldehid/kg sampel). Kadar air secara signifikan meningkat selama penyimpanan. Kadar air tertinggi selama penyimpanan adalah 8.73 % pada kontrol sampel dan 8.63% pada sampel perlakuan. Jumlah ini melebihi standar maksimum yang diperbolehkan yaitu 4% menurut Standar National Indonesia untuk *snack*.

Keyword: BHA, jagung, ekstrudat, ASLT

PREFACE

A great praise and worship is given to my Lord, Jesus Christ, for all His blessing and mercy to finish my study, especially this thesis. It's a very long journey to fulfill all requirements to get the Bachelor Degree in Food Technology. I believe that my experiences in university will be valuable memories to step the next level of my life. Without His guidance, it would be impossible for me to pass all examinations and assignments on time. He always gives me the right thing in the right time and place.

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Semarang, November 2005

LINDAWATI

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