Jack Bean Tempeh, Traditional and Nutritious Food from Indonesia

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A. INTRODUCTION

A. Tempeh as Traditional and Nutritious Food

Tempeh is an Indonesian staple food most often made from soybeans but also from a wide variety of other legumes. It is produced through a solid-state fungal fermentation process leading to a mycelia-knitted compact cake of beans (Gibbs, Zougman, Massé, & Mulligan, 2004).

Several research have investigated about several positive effects of tempeh for human health. The key microorganism leading the process is a fungus from the Rhizopus genus, which degrades the starch materials significantly increasing its nutritional value for human consumption (Azeke, Fretzdorff, Buening-Pfaue, & Betsche, 2007).

B. Jack Bean and its bioactive compound

- Methanolic extract of C. ensiformis seeds contained acceptable levels of free phenolics with promising antioxidant and type II diabetes related enzyme inhibition properties. (Vadivel, Cheong, & Biesalski, 2012)
- The seed decocition or powdered seeds from C. ensiformis arose as an antibiotic and antiseptic.
- The urease-derived peptide from jackbean represents a new example of membrane-active peptide with insecticidal and fungitoxic activities. (Martellini et al., 2014)

C. MATERIAL AND METHODS

A. Production of Jack Bean Tempeh

1. Jack bean
2. Soaking
3. Boiling
4. Dehulled bean
5. Boiling II
6. Inoculation of starter
7. Fermentation for 24h, 36h, 48h and 60h

B. Soluble Protein

The soluble protein content was measured by following the Modified Lowry's method.

C. Color measurements

Color were measured with Chroma Meter (Minolta CR 400, Japan). The instrument was calibrated with white calibration plate before the measurement. Parameters that are observed including Lightness (L*), redness (a*), and yellowness (b*), C, Hue and ∆E.

D. RESULTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Packaging Type</th>
<th>Fermentation Time (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BL</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>0</td>
</tr>
<tr>
<td>Total Soluble Protein [g/100g]</td>
<td>BL</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>0.00</td>
</tr>
<tr>
<td>Color L. (Lightness) [BL]</td>
<td>75.2</td>
<td>71.88</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>75.66</td>
</tr>
<tr>
<td>a</td>
<td>BL</td>
<td>1.77</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>1.77</td>
</tr>
<tr>
<td>b</td>
<td>BL</td>
<td>12.03</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>10.46</td>
</tr>
<tr>
<td>C</td>
<td>BL</td>
<td>12.85</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>10.61</td>
</tr>
<tr>
<td>Hue</td>
<td>BL</td>
<td>1.43</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>1.40</td>
</tr>
<tr>
<td>∆E</td>
<td>BL</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>LDPE</td>
<td>0.61</td>
</tr>
</tbody>
</table>

E. DISCUSSIONS

- After 24 h miselia of Rhizopus hasn’t been formed., but it is fully formed after 36 h fermentation for all formulated tempeh with two different packaging. The miselia started to form brown miselia after 36 h fermentation. Further investigation will be needed to investigate several phsyicochemical, sensory and functional properties of jack bean tempeh.

- Growth of miselia in different packaging showed that tempeh packaged with plastic packaging had more compact miselia than tempeh packed with banana leaves packaging.

- During the fermentation time, there are several change in physicochemical parameters e.g. total soluble protein and color including L, a, b, C, Hue and ∆E.

F. CONCLUSIONS

- In the present research work, we demonstrated that different fermentation time and packaging will give influence to the growth of miselia, and several phsyicochemical characteristics including total soluble protein and color.

- Further research are needed to investigate to know further phsyicochemical characteristic, sensory and functional properties e.g. antioxidant of jack bean tempeh.

G. ACKNOWLEDGMENT

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References


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