OPTIMIZATION OF BOILING CONDITION OF POST-FERMENTATION NATA DE COCO BY RESPONSE SURFACE METHODOLOGY (RSM): A CASE STUDY AT CV. SEMPURNA BOGA MAKMUR

OPTIMISASI KONDISI PEREBUSAN PASKA-FERMENTASI NATA DE COCO DENGAN METODOLOGI RESPON PERMUKAAN (MRP): SEBUAH STUDI KASUS DI CV. SEMPURNA BOGA MAKMUR

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By:
NAWANG SARI ADHIYANTI MULJO KUSUMO
09.70.0072

DEPARTMENT OF FOOD TECHNOLOGY
FACULTY OF AGRICULTURAL TECHNOLOGY
SOEGIJAPRANATA CATHOLIC UNIVERSITY
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By:
NAWANG SARI ADHIYANTI MULJO KUSUMO
NIM : 09.70.0072
Department : Food Technology

This thesis has been approved and defended
in front of the examination committee at : June 18, 2013

Semarang, July 3, 2013
Faculty of Agricultural Technology
Soegijapranata Catholic University

Supervisor Dean

Prof. Dr. Ir. Y. Budi Widianarko, MSc Ita Sulistyawati, STP., MSc.
SUMMARY

A case study was conducted in CV. Sempurna Boga Makmur which produces nata de coco. CV. Sempurna Boga Makmur is facing a problem with the less optimal quality of nata de coco produced. The company wants to achieve good quality nata de coco typified by good physical attributes i.e. thick, white, and soft. The objective of this research was to figure out the optimal condition for boiling process of post-fermentation nata de coco in terms of water ratio, boiling time, and boiling repetition by using response surface methodology (RSM). Central composite design with three factors namely water ratio (1:3, 1:4, 1:5, 1:6, and 1:7), boiling time (3, 5, 7, 9, and 11 minutes) and boiling repetition (1, 2, 3, 4, and 5 times) was used for experimental design. The results were analyzed by fitting a second-order polynomial regression equation. The study showed that boiling process improved the quality of nata de coco as it increased the thickness, reduced the hardness, and made the color lighter. The $R^2$ value for all responses is very low. The significant regression was found only in thickness and hardness. Results of lack of fit test indicate the inadequacy ($P>0.05$) of the fitted response surface model, except for hardness ($P>0.1$). The optimal boiling condition should be picked by compromising the adequacy of the model. Therefore, it can be concluded that the optimum boiling condition, in terms of minimizing hardness, is boiling with nata and water ratio of $\approx 1:5$, boiling time $\approx 6.5$ minutes, and boiling repeated $\approx 1$ times. The critical value of water ratio and boiling time obtained in this research is giving an improvement for the company in setting standardize of time and amount of water used in the boiling process. The critical value of boiling repetition in this research suggests that the company actually can reduce the boiling repetition used from 5-6 times up to 1.
RINGKASAN

Dalam penelitian ini dilakukan sebuah studi kasus di CV. Sempurna Boga Makmur yang memproduksi nata de coco. CV. Sempurna Boga Makmur menghadapi permasalahan mengenai kualitas nata de coco yang kurang optimal. Perusahaan tersebut ingin menghasilkan nata de coco dengan kualitas yang baik dalam segi fisik, yaitu nata yang tebal, berwarna putih, dan lunak. Tujuan dari penelitian ini adalah untuk mengetahui kondisi perebusan paska-fermentasi nata de coco yang optimal, dalam konteks rasio air, waktu perebusan, dan ulangan perebusan dengan menggunakan metode respon permukaan (MRP). Central composite design dengan 3 faktor yaitu rasio air (1:3, 1:4, 1:5, 1:6, dan 1:7), waktu perebusan (3, 5, 7, 9, dan 11 menit) dan ulangan perebusan (1, 2, 3, 4, dan 5 kali) digunakan sebagai rancangan penelitian. Setiap faktor terdiri dari lima tingkat. Percobaan pada titik tengah (center point) diulang sebanyak dua kali. Hasil penelitian menunjukkan bahwa proses perebusan meningkatkan tebal, menurunkan tingkat kekerasan, dan membuat warna nata de coco menjadi lebih putih. Nilai $R^2$ pada semua respon sangat kecil. Regresi yang signifikan hanya terdapat pada model ketebalan dan model kekerasan. Hasil tes ketidaksesuaian menunjukkan bahwa semua model tidak sesuai secara signifikan pada kriteria $P>0.05$. Model kekerasan nata de coco tidak signifikan untuk uji ketidaksesuaian pada kriteria $P>0.1$. Sehingga dalam penelitian ini dapat disimpulkan bahwa kondisi paska-fermentasi yang optimal dalam konteks meminimalkan tingkat kekerasan nata de coco adalah kondisi perebusan pada perbandingan nata dan air $\approx$1:5, waktu perebusan $\approx$6.5 menit, dan ulangan perebusan $\approx$1 kali. Kondisi perebusan optimal yang diperoleh dalam penelitian ini memberikan saran perbaikan bagi perusahaan dalam menentukan standar rasio air dan waktu perebusan. Selain itu, hasil penelitian ini juga memberikan saran bahwa perusahaan dapat mengurangi ulangan perebusan dari 5-6 ulangan perebutan hingga 1 kali ulangan perebusan.
FOREWORD

Author would like to thank the only one God for His blessing so author can finish this thesis entitled OPTIMIZATION OF BOILING CONDITION OF POST-FERMENTATION NATA DE COCO BY RESPONSE SURFACE METHODOLOGY (RSM): A CASE STUDY AT CV. SEMPURNA BOGA MAKMUR as one of the requirement for obtaining bachelor degree in Agricultural Technology Faculty. Author realizes that many parties were involved in the completion of this thesis. Thus, author would like to say thank you to:

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Semarang, June 2012

Author,

Nawang Sari Adhiyanti Muljo Kusumo
TABLE OF CONTENT

SUMMARY .................................................................................................................. i
RINGKASAN................................................................................................................. ii
FOREWORD............................................................................................................. iii
TABLE OF CONTENT .............................................................................................. v
LIST OF TABLES ...................................................................................................... vi
LIST OF FIGURES ................................................................................................... vii
INDEX OF APPENDICES ....................................................................................... viii

1. INTRODUCTION ................................................................................................. 1
   1.1. Background ................................................................................................. 1
   1.2. Literature Review ....................................................................................... 2
       1.2.1. Nata de coco ...................................................................................... 2
       1.2.2. Nata de coco Production ................................................................. 3
       1.2.3. Response Surface Methodology (RSM) .......................................... 9
   1.3. Objective ..................................................................................................... 12

2. MATERIALS AND METHODS .......................................................................... 13
   2.1. Materials ..................................................................................................... 13
   2.2. Methods ...................................................................................................... 13
       2.2.1. Nata de coco Production ................................................................. 13
       2.2.2. Experimental Design ...................................................................... 15
       2.2.3. Quality Measurement of Nata de coco ........................................... 17
       2.2.4. Data Analysis .................................................................................. 17

3. RESULTS ............................................................................................................ 18

4. DISCUSSION ...................................................................................................... 31
   4.1. Effect of Boiling to Quality of Nata de Coco ........................................... 31
   4.2. Model Estimation for Thickness of Nata de Coco .................................. 33
   4.3. Model Estimation for Color of Nata de Coco ........................................ 33
   4.4. Model Estimation for Hardness of Nata de Coco ...................................... 34
   4.5. Response Surface Plot .............................................................................. 34
   4.6. Selection of Optimal Boiling Condition .................................................. 35

5. CONCLUSION AND SUGGESTION ............................................................ 38
   5.1. Conclusion .................................................................................................. 38
   5.2. Suggestion .................................................................................................. 38

6. REFERENCES ................................................................................................... 39

7. APPENDIX......................................................................................................... 41
LIST OF TABLES

Table 1. Coded Values and Corresponding Actual Values of Independent Variables ... 16
Table 2. Experimental Design of RSM for Boiling Condition of Nata de Coco .......... 16
Table 3. Physical Properties of Nata de coco at Different Boiling Condition .......... 19
Table 4. Regression Coefficients and $R^2$ values............................................. 22
Table 5. Analysis of Variance and Lack of Fit Result........................................ 23
Table 6. Canonical Analysis of Response Surface............................................... 24
**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Biochemical Pathway of Cellulose synthesis by <em>Acetobacter xylinum</em></td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Mechanisms of Cellulose Fiber Swelling</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Two Variable Face Centered CCD, Rotatable CCD, Inscribed CCD</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Flow Diagram of <em>Nata de coco</em> Production</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td><em>Nata de coco</em> Cube</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>The Flame Used for Boiling</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td><em>Nata de coco</em> Sheet</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>Thickness of <em>Nata de Coco</em> after Various Boiling Condition</td>
<td>20</td>
</tr>
<tr>
<td>9</td>
<td>L* Value of <em>Nata de Coco</em> after Various Boiling Condition</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>a* and b* value of <em>Nata de Coco</em> after Various Boiling Condition</td>
<td>21</td>
</tr>
<tr>
<td>11</td>
<td>Hardness of <em>Nata de Coco</em> after Various Boiling Condition</td>
<td>22</td>
</tr>
<tr>
<td>12</td>
<td>Surface Plot of a* at Different Water Ratio and Boiling Time</td>
<td>25</td>
</tr>
<tr>
<td>13</td>
<td>Surface Plot of a* at Different Water Ratio and Boiling Repetition</td>
<td>26</td>
</tr>
<tr>
<td>14</td>
<td>Surface Plot of a* at Different Boiling Time and Boiling Repetition</td>
<td>27</td>
</tr>
<tr>
<td>15</td>
<td>Surface Plot of Hardness at Different Water Ratio and Boiling Time</td>
<td>28</td>
</tr>
<tr>
<td>16</td>
<td>Surface Plot of Hardness at Different Water Ratio and Boiling Repetition</td>
<td>29</td>
</tr>
<tr>
<td>17</td>
<td>Surface Plot of Hardness at Different Boiling Time and Boiling Repetition</td>
<td>30</td>
</tr>
</tbody>
</table>
## INDEX OF APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Generating Central Composite Experimental Design Using SYSTAT</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>Model Estimation by Response Surface Methods Using SYSTAT</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>Canonical Analysis Using SYSTAT</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>Generating Surface Plot Using SYSTAT</td>
<td>47</td>
</tr>
<tr>
<td>5</td>
<td>Estimation Model and Canonical Analysis Result for Thickness</td>
<td>48</td>
</tr>
<tr>
<td>6</td>
<td>Estimation Model and Canonical Analysis Result for L*</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Estimation Model and Canonical Analysis Result for a*</td>
<td>52</td>
</tr>
<tr>
<td>8</td>
<td>Estimation Model and Canonical Analysis Result for b*</td>
<td>54</td>
</tr>
<tr>
<td>9</td>
<td>Estimation Model and Canonical Analysis Result for Hardness</td>
<td>56</td>
</tr>
<tr>
<td>10</td>
<td>Surface Plot of Thickness</td>
<td>58</td>
</tr>
<tr>
<td>11</td>
<td>Surface Plot of L* Value</td>
<td>59</td>
</tr>
<tr>
<td>12</td>
<td>Surface Plot of b* Value</td>
<td>60</td>
</tr>
<tr>
<td>13</td>
<td>Summary of Central Composite Design (Carlson, 1992)</td>
<td>61</td>
</tr>
</tbody>
</table>