

OPTIMIZATION OF AMOUNTS OF INGREDIENTS FOR *NATA DE COCO* FERMENTATION BY USING RSM (RESPONSE SURFACE METHODOLOGY): CASE STUDY AT CV. SEMPURNA BOGA MAKMUR

OPTIMALISASI JUMLAH BAHAN BAKU UNTUK FERMENTASI *NATA DE COCO* DENGAN METODOLOGI RESPON PERMUKAAN: STUDI KASUS DI CV. SEMPURNA BOGA MAKMUR

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By:

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SOEGIJAPRANATA CATHOLIC UNIVERSITY
SEMARANG**

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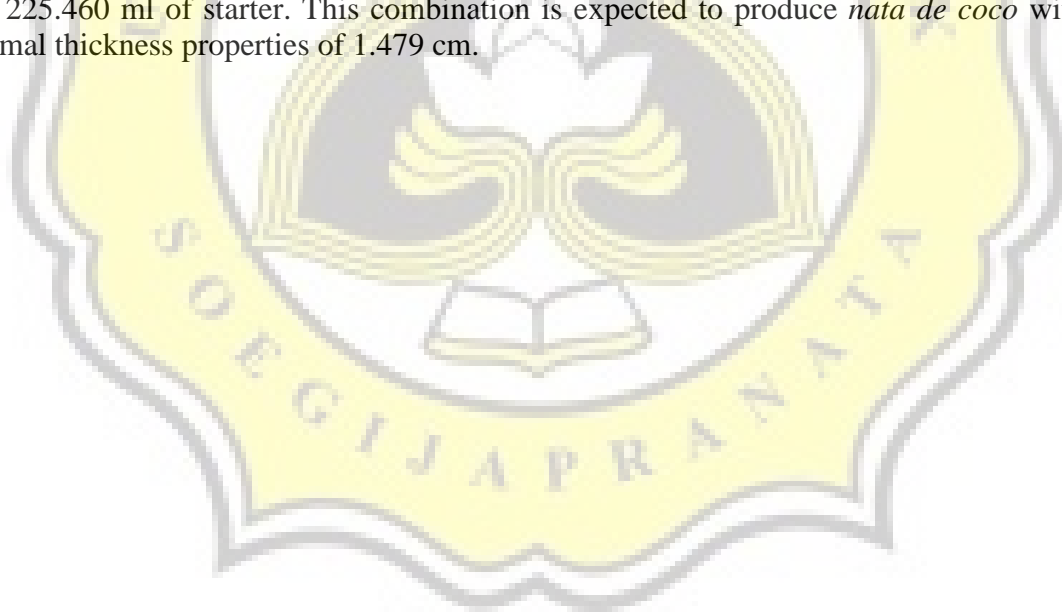
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SUMMARY

CV. Sempurna Boga Makmur is a food company in Semarang which produces *nata de coco* from coconut milk. The company has a problem related with less optimal physical qualities of the product. Therefore, scientific experiment was conducted to optimize the production process. The objective of the experiment was to figure out the optimum amount of ingredients to produce *nata de coco* with desirable thickness, lightness, and hardness by using Response Surface Methodology (RSM). Among RSM models, optimization process was conducted using Central Composite Design (CCD) with three factors, i.e. water, sugar and starter amount. In the optimization process, model equations were generated from significant variables and regressions. These model equations explain the interaction of variables in affecting the physical characteristics. However, all of the generated models showed the significant lack of fit and low R^2 values. Significant lack of fit value means that the changes of response value were not governed by the change of variables. In the other hands, low R^2 value means that only small proportion of response value changes which are contributed by the equation. These model inadequacies were caused by the lack of center experiments and starter variability. Then, the optimization process should be done for the model equation with the best compatibility. Thickness was chosen because its R^2 value was the highest, with 0.477. Canonical analysis of thickness model equation showed that the most optimal combination of variables were 2.182 liters of water, 169.810 grams of sugar, and 225.460 ml of starter. This combination is expected to produce *nata de coco* with an optimal thickness properties of 1.479 cm.



RINGKASAN

CV. Sempurna Boga Makmur adalah sebuah perusahaan pangan di Semarang yang memproduksi nata de coco dari santan. Perusahaan tersebut menghadapi permasalahan terkait dengan kurang optimalnya kualitas fisik produk. Maka dari itu, penelitian ilmiah dilakukan untuk mengoptimalkan proses produksi. Tujuan dari penelitian ini adalah untuk mencari titik optimal jumlah bahan baku untuk menghasilkan nata de coco dengan ketebalan, kecerahan, dan kekerasan yang disukai dengan menggunakan Metodologi Respon Permukaan (MRP). Diantara model MRP, proses optimisasi dilakukan dengan Desain Komposit Pusat (DKP) dengan tiga faktor, yaitu jumlah air, gula, dan starter. Pada proses optimisasi, persamaan model dihasilkan dari variabel dan regresi signifikan. Persamaan model tersebut menjelaskan hubungan antara variabel dalam mempengaruhi karakteristik fisik. Namun, semua persamaan model yang dihasilkan menunjukkan nilai ketidakesesuaian yang signifikan dan nilai R^2 yang rendah. Nilai ketidakesesuaian yang signifikan berarti bahwa perubahan nilai respon tidak diatur oleh perubahan nilai variabel. Di sisi lain, nilai R^2 yang rendah berarti bahwa hanya sebagian kecil dari perubahan nilai respon yang dapat dijelaskan dengan persamaan. Ketidakesesuaian dari model ini disebabkan oleh kurangnya percobaan nilai tengah yang dilakukan dan juga variabilitas starter. Maka, proses optimisasi harus dilakukan pada persamaan model dengan tingkat kecocokan yang paling tinggi. Ketebalan dipilih karena nilai R^2 yang paling tinggi, yaitu 0.477. Analisa kanonikal pada persamaan model untuk ketebalan menunjukkan bahwa kombinasi variabel yang paling optimal adalah 2.182 liter air, 169.810 gram gula, dan 225.460 ml starter. Kombinasi tersebut diperkirakan akan dapat menghasilkan nata de coco dengan ketebalan optimal, yaitu 1.479 cm.

FOREWORD

Praise in the name of Almighty God, because by only His plan and guidance, the author has finished the bachelor thesis entitled *OPTIMIZATION OF PHYSICAL PROPERTIES OF NATA DE COCO BY USING RSM (RESPONSE SURFACE METHODOLOGY): CASE STUDY IN CV. SEMPURNA BOGA*. The author would not be able to finish all of these tasks alone, as the guidance, support, and encouragement from great people around the author have made it possible for the author to complete this bachelor thesis. Therefore, the author would like to say special thanks to:

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The author realized that the writing of this report is still far from perfect and there are still many shortcomings due to the limitations of the author. However, the author hoped that this report can still be an inspiration and provide useful information for the reader.

Semarang, June, 2013

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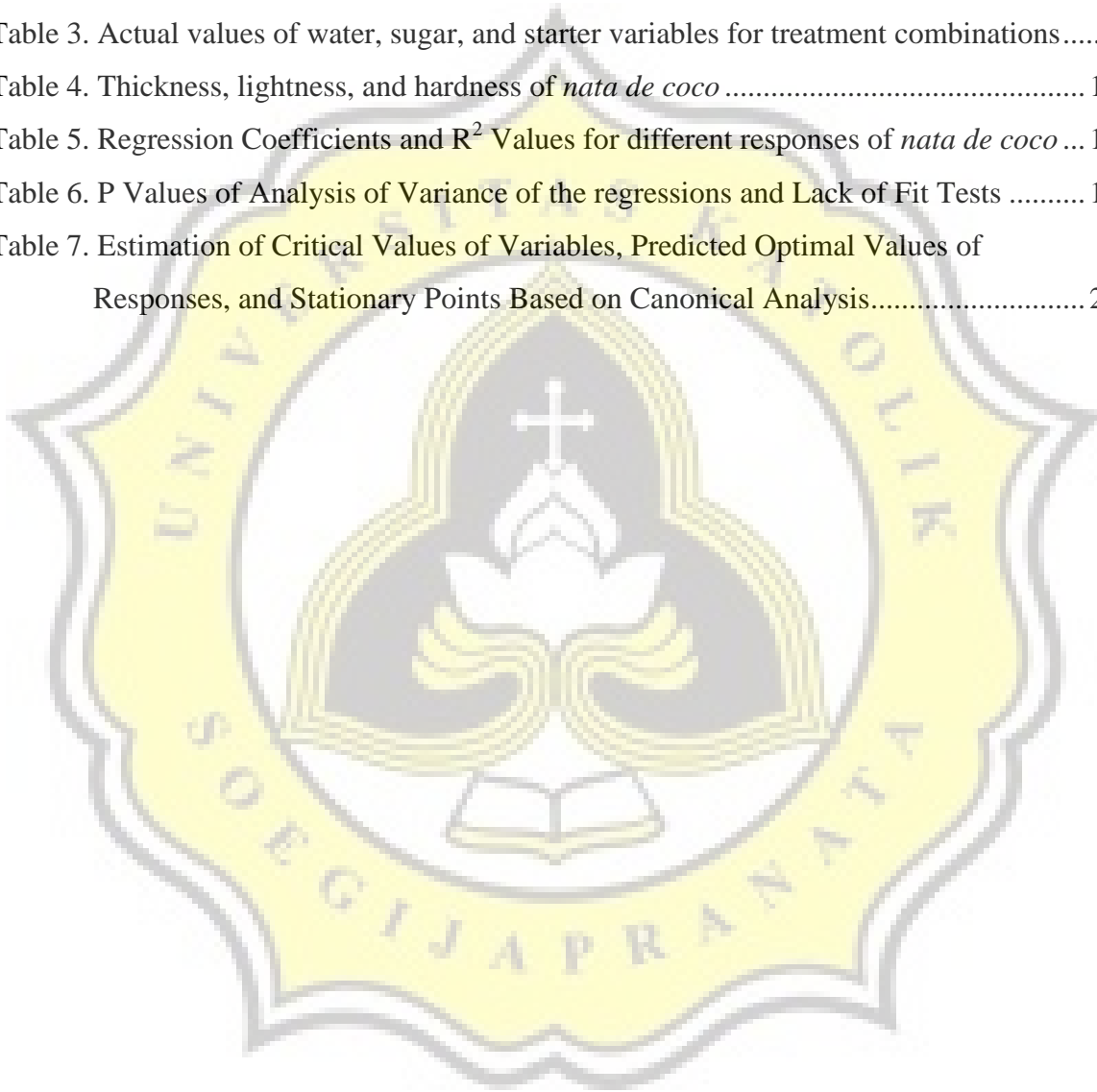
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