

การจัดการความผันแปรทางด้านคุณภาพสำหรับกระบวนการอบแห้ง
ในอุตสาหกรรมเกษตรของประเทศไทย

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิศวกรรมศาสตรบัณฑิต
สาขาวิชาวิศวกรรมอุตสาหการ ภาควิชาวิศวกรรมอุตสาหการ
คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2551
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

QUALITY VARIATION MANAGEMENT FOR DRYING PROCESS
IN THAI AGRO-INDUSTRY

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A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in Industrial Engineering
Department of Industrial Engineering
Faculty of Engineering
Chulalongkorn University
Academic year 2008
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511768

สุรัชย์ สานติสุขวิรัตน์ : การจัดการความผันแปรทางด้านคุณภาพสำหรับกระบวนการ
 อบแห้งในอุตสาหกรรมเกษตรของประเทศไทย. (QUALITY VARIATION
 MANAGEMENT FOR DRYING PROCESS IN THAI AGRO-INDUSTRY) อ.ที่ปรึกษา
 วิทยานิพนธ์หลัก : รศ.ดร.จิตรา รุ้กกิจการพานิช, 276 หน้า.

กระบวนการอบแห้งเป็นกระบวนการถนอมผลิตภัณฑ์ทางการเกษตรที่มีความสำคัญ
 อย่างยิ่งต่ออุตสาหกรรมเกษตรของประเทศไทย เนื่องจากกระบวนการดังกล่าวสามารถช่วยยืด
 อายุของผลิตภัณฑ์ทางการเกษตรด้วยการลดความชื้นในผลิตภัณฑ์นั้นๆ แต่จากการศึกษาพบว่า
 กระบวนการอบแห้งในประเทศไทยนั้นยังประสบกับปัญหาทางด้านคุณภาพของผลิตภัณฑ์ คือ
 กระบวนการอบแห้งไม่สามารถลดความชื้นให้ได้ตามเป้าหมายที่กำหนดไว้ ซึ่งเป้าหมายนี้มีผลต่อ
 การยืดอายุของผลิตภัณฑ์ด้วย ดังนั้นวิทยานิพนธ์ฉบับนี้จึงมุ่งศึกษาเกี่ยวกับการจัดการความผัน
 แปรทางด้านคุณภาพสำหรับกระบวนการอบแห้งในอุตสาหกรรมเกษตรของประเทศไทย โดยเลือก
 กรณีศึกษา คือ ข้าวเปลือก มันสำปะหลังเส้น ไบยาสูบ และลำไย

ในการศึกษาเริ่มจากการพิจารณาระยะเวลาอบแห้งสำหรับแต่ละช่วงเวลาของ
 กระบวนการอบแห้ง หลังจากนั้นได้นำเทคนิค Fuzzy c-means clustering มาใช้สำหรับการ
 แบ่งกลุ่มวัตถุดิบ เพื่อลดความผันแปรทางด้านคุณภาพของผลิตภัณฑ์อบแห้งเนื่องจากความ
 หลากหลายของวัตถุดิบนั่นเอง พบว่าการแบ่งวัตถุดิบออกเป็น 3 กลุ่ม ตามช่วงของความชื้นต่ำ
 กลาง และสูงนั้นจะให้ความผันแปรทางด้านคุณภาพของผลิตภัณฑ์อบแห้งที่น้อยที่สุด เมื่อ
 วัตถุดิบถูกจัดกลุ่มจะถูกนำเข้าสู่กระบวนการอบแห้งซึ่งแบ่งออกเป็น 3 ช่วงเวลา ได้แก่ช่วงการอุ่น
 ร้อน ช่วงการอบแห้งด้วยอัตราอบแห้งคงที่ และช่วงการอบแห้งด้วยอัตราอบแห้งที่ลดลง ผลลัพธ์ที่
 ได้จากการศึกษาเกี่ยวกับกระบวนการอบแห้งเพื่อลดความผันแปรทางด้านคุณภาพของผลิตภัณฑ์
 อบแห้งนั้น คือ อุณหภูมิอบแห้งที่เหมาะสมในแต่ละช่วงเวลา และรูปแบบจำลองทางคณิตศาสตร์
 เพื่อแสดงถึงพฤติกรรมของความชื้นระหว่างช่วงเวลาอบแห้งนั้นๆ นอกจากนี้ วิทยานิพนธ์
 ฉบับนี้ยังได้เสนอช่วงเวลาการอบแห้งอีกหนึ่งช่วงเวลา ได้แก่ ช่วงเวลาการปรับอุณหภูมิอบแห้ง ซึ่ง
 ทำให้ผลิตภัณฑ์มีความผันแปรลดลงจากกระบวนการอบแห้งเพียง 3 ช่วงเวลาเท่านั้น

ภาควิชา วิศวกรรมอุตสาหกรรม

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477 18351 21 : MAJOR INDUSTRIAL ENGINEERING

KEYWORDS : DRYING PROCESS / QUALITY VARIATION MANAGEMENT

SURACHAI SANTISOOKRAT : QUALITY VARIATION

MANAGEMENT FOR DRYING PROCESS IN THAI AGRO-INDUSTRY.

ADVISOR : ASSOC. PROF. JITTRA RUKIJKANPANICH, D.ENG. ,

276 pp.

Drying process is a very important process for Thai agro-industry. It is used to preserve agricultural products in order to prolong their shelf lives by reducing their moisture content to the quality target. However, a major problem related to the quality of the dried product is still found. The dried product cannot be reduced the moisture content to its target. Therefore, this aim of this dissertation is to manage the quality variation for drying process in Thai agro-industry. This dissertation is conducted with four types of the dried product as paddy rice, cassava chip, tobacco, and longan. All of them are important commercial product for Thailand.

This dissertation begins with finding the drying time for each drying phase. After that, fuzzy c-means clustering is selected to organize the raw materials into the same clusters. It can help to reduce the dried product quality variation from the variety of the raw material. As a result, three clusters as low, medium, and high moisture content are the optimal number of clustering. After clustering, the raw materials are transferred to the drying process which can be divided into three phases as heating, drying with a constant drying rate, and drying with falling rate phases. The optimal drying temperature level and the mathematical model representing the behavior of the moisture content during the drying period are obtained. Moreover, adjustment drying temperature period is added and proposed by this dissertation to minimize the dried product quality variation.

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Field of Study : Industrial Engineering

Advisor's Signature JITTRA R.

Academic Year : 2008

ACKNOWLEDGEMENTS

This is a great opportunity to express my respect to my advisor, Associate Professor Jittra Rukijkanpanich, D.Eng., for her strong commitment to assisting me achieves my dissertation goals, continuous encouragement, and endless patience through my Ph.D. study. Thank you for your belief in me no matter what circumstances.

I am also grateful for the useful suggestions and invaluable comments that Associate Professor Damrong Thawesaengskulthai, Assistant Professor Boonwa Thampitakkul, Ph.D., Assistant Professor Somkiat Tangjitsitchareon, D.Eng., and Associate Professor Nivit Charoenchai, Ph.D. as examiners of the thesis committees provided me during my study.

I am also grateful for North-Chiang Mai University for allowing and supporting time and scholarship to pursue my studying. Moreover, I wish to thank Mr. Warit Silpsrikul who taught Matlab Program for me to calculate and construct mathematical models in my dissertation.

Finally, a very special thank goes to people who supported me more than anyone else, I wish to express my deepest gratitude to my parents, grandmother, aunts, and friends for their encouragement, warmness, and love that have driven me to become successful.

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