

**A STUDY OF ELECTROMECHANICAL PROPERTIES ON GELATIN
AT VARIOUS GEL STRENGTH AS AN ACTUATOR OR AN ARTIFICIAL
MUSCLE**



Thawatchai Tungkavet

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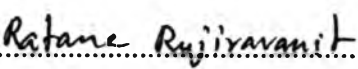
Thesis Title: A Study of Electromechanical Properties on Gelatin at Various Gel Strength as an Actuator or an Artificial muscle
By: Thawatchai Tungkavet
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Thesis Advisor: Assoc. Prof. Anuvat Sirivat


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..... College Dean
(Asst. Prof. Pomthong Malakul)

Thesis Committee:


.....
(Assoc. Prof. Anuvat Sirivat)


.....
(Assoc. Prof. Ratana Rujiravanit)


.....
(Dr. Datchanee Pattavarakorn)

ABSTRACT

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Gelatin is a protein produced by the partial hydrolysis of a collagen extracted from bones, connective tissues, organs, and some intestines of animals. Gelatin has been widely used in the pharmaceutical and medical fields as sealants for vascular, a carrier for drug delivery, wound dressings, and an artificial muscle. In our work, gelatin films were prepared by the film casting method using water as the solvent. The electromechanical properties, thermal properties, and the degree of swelling were measured as the function of gelatin crosslinking ratio or the gel strength, temperature, frequency, and electric field strength. The high, medium, low, and the 3% crosslinked high gel strength gelatin films possess the storage modulus sensitivity values of 2.30, 2.16, 1.26 and 0.49 respectively.

บทคัดย่อ

รวิชัย ดุงกะเวทย์ : การศึกษาสมบัติเชิงกลทางไฟฟ้าของการให้แรงแบบหมุนของวัสดุเจลลาติน (Electromechanical of oscillatory shear on gelatin of various gel strength) อ. ที่ปรึกษา : รศ. ดร. อนุวัฒน์ ศิริวัฒน์ 66 หน้า

เจลลาตินเป็น โปรตีนที่ถูกผลิตจากการสกัดคอลลาเจนด้วยการทำปฏิกิริยากับน้ำที่มาจากกระดูก, เนื้อเยื่อ, อวัยวะ, และบางส่วนของลำไส้สัตว์ เจลลาตินถูกนำไปใช้ประโยชน์ในทางเภสัชกรรมและการแพทย์เช่น วัสดุอุดกันรั่วของสายน้ำเลือด, แคปซูลบรรจุน้ำยา, แผ่นปิดแผล, และก๊อสมเนื้อเทียม ในงานนี้เราสนใจศึกษาเจลลาตินเพื่อประยุกต์เป็นวัสดุตอบสนองทางไฟฟ้า หรือก๊อสมเนื้อเทียม เจลลาตินถูกเตรียมวัสดุด้วยการทำเป็นแผ่นฟิล์ม โดยใช้น้ำเป็นตัวทำละลาย คุณสมบัติเชิงกลที่ตอบสนองทางไฟฟ้า, คุณสมบัติทางความร้อน, และ ระดับของการบวมน้ำจะถูกศึกษาจากปัจจัยต่างๆเช่น ปริมาณการเชื่อมต่อของสายโซ่, ระดับความแข็งทางธรรมชาติของเจลลาติน, อุณหภูมิ, ความถี่, และ ความเข้มข้นของสนามไฟฟ้า ซึ่งวัสดุเจลลาตินจะแสดงค่าของความแข็งที่เพิ่มขึ้นเป็น 2.30, 2.16, 1.26, และ 0.49 เท่าตามลำดับของแต่ละชนิดเจลลาตินคือ เจลลาตินที่มีความแข็งแรงในธรรมชาติระดับสูง, ความแข็งแรงในธรรมชาติระดับกลาง, ความแข็งแรงในธรรมชาติระดับต่ำ, และ ความแข็งแรงในธรรมชาติระดับสูงที่มีการเชื่อมต่อสายโซ่ 3%

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