WORK PERMIT

Department of Chemical and Biological Engineering

化學及生物工程學系

Project Title : Testing of gelation point and mechanical property of chitosan hydrogel

Researcher(s) : Xiadong Pei

Supervisor(s) : Prof. Hongkai WU (MAE)

Work Plan No. : 17045

Date of Approval : 19/7

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Signature of Approval :

Prof. Marshal LIU
Acting DSO

COVER LETTER

Work plan number:	17045
Work plan title:	Testing of gelation point and mechanical property of chitosan hydrogel
Name of researchers:	Xiaodong Pei
Project supervisor:	Prof. Hongkai Wu
Date:	June 2017

1. General Information

Researchers: Xiaodong Pei

Project supervisor: Prof. Hongkai Wu

Project title:

Testing of gelation point and mechanical properties of chitosan hydrogel

Research area:

Characterization of the gelation point and mechanical properties of hydrogel

Proposed location and start date:

Room 7119, academic building

Since 06.22.2015

2. Experiment Description

In the modified chitosan solution, the gelation point is an abrupt change in the viscosity. During the reaction, the viscosity of solution will become higher and higher. We will prepare the modified chitosan solution with different concentrations and measure the gelation point and mechanical properties of different hydrogel.

3. Equipment List

ARES rheometer from TA Instruments in room 7119

4. Experimental Procedures

Mrs. Pauline Leung, who is in charge of ARES rheometer, will train me to use the instrument.

1 Turn on the rheometer.

2 Mount the clamps on the instrument.

3 Set the operating parameters for the experiment.

4 Fix the hydrogel sample on the clamps.

5 Drop few oil to maintain the water of the sample

6 Run the test.

7 Stop the test.

8 Remove the sample.

9 Dismount the clamps and clean them with tissue before putting them back into their box.

10 Turn off the rheometer.

11 Make a record on the logbook.

5. Procedure Template

6. Hazard and Operability Analysis (HAZOP)

Experimental Procedure No.	Experimental Procedure Description	Scale (Mass/Volume)	Location (Fumehood,benctop,etc)	Method New or Existing
1	Turn on the rheometer.	N/A	Benchtop	Existing
2	Mount the clamps on the instrument.	N/A	Benchtop	Existing
3	Set the operating parameters for the experiment.	N/A	Benchtop	Existing
4	Fix the hydrogel sample on the clamps.	60µL	Benchtop	Existing
5	Drop few oil to maintain the water of the sample	N/A	Benchtop	Existing
6	Run the test.	N/A	Benchtop	Existing
7	Stop the test.	N/A	Benchtop	Existing
8	Remove the sample.	60µL	Benchtop	Existing
9	Dismount the clamps and clean them with tissue before putting them back into their box.	N/A	Benchtop	Existing
10	Turn off the rheometer.	N/A	Benchtop	Existing
11	Make a record on the logbook.	N/A	Benchtop	Existing

6. HAZOP Template

Hazard and Operability Analysis

Activity:

NO	HAZARD	HAZARD EFFECT	SEVERITY	PROBABILITY	RISK	MINIMISE RISK BY	RESIDUAL RISK
1	No	No	N/A	N/A	N/A	N/A	N/A
2	Overload the transducer	Damage the transducer	M	L	M	Follow the instruction	L
3	Set the wrong parameters	Damage the transducer	M	L	M	Follow the instruction	L
4	Sample not properly fixed	Damage the transducer	M	L	M	Follow the instruction	L
5	No	No	N/A	N/A	N/A	N/A	N/A
6	No	No	N/A	N/A	N/A	N/A	N/A
7	No	No	N/A	N/A	N/A	N/A	N/A
8	No	No	N/A	N/A	N/A	N/A	N/A
9	Overload the transducer	Damage the transducer	M	L	M	Follow the instruction	L
10	No	No	N/A	N/A	N/A	N/A	L
11	No	No	N/A	N/A	N/A	N/A	L
FINAL ASSESSMENT:						OVERALL RISK:	L

Remark: Severity - L=Low (Minor injuries, first aid); M=Medium (Hospitalization, medical leave); H=High (Serious injuries, fatality)

Probability - L=Low (Unlikely); M=Medium (Possible); H=High (Very Likely)

Note: Severity x Probability = Risk [eg. LxL=L; LxM=M;LxH=H; HxM=H; the product follows the higher severity or probability]

Higher Risk requires extensive risk minimization procedures

7. Operating Conditions

Operating temperature: 37 °C

Operating pressure: atmospheric pressure

Reagent concentrations: 2%-6%

Operating pH: 7.4

8. Services List

Fume extraction: No

Electricity: Normal

Compressed air: No

Water: No

9. Chemical List

Chemical name	CAS No.	% (w/v)
Chitosan	44886-9	2-5

10. Biological Agents List

No biological agents to be used

11. Summary of Relevant Hazards and Incompatibilities

Material	Summary of hazards	Incompatibilities	Flash Point
Chitosan	Not a hazardous substance or mixture. This substance is not classified as dangerous.	N/A	N/A

12. Waste List

Waste name	Composition	Amount	Disposal
Chitosan-based hydrogel	Modified chitosan water	180mg	Disposal in dustbin

13. Assessment of Significant Risks

During the viscosity testing process, some sample liquid may be sprayed. So using goggles to avoid the irritation to the eye.

Harmful if swallowed.

Causes eye irritation.

14. Safety Precautions

Wear gloves and safety glasses while doing the experiment.

15. Action in Case of Abnormal or Emergent Situations

Power supply cut-off:

Press the power-off button on the equipment and report it to Mrs. Pauline Leung.

Fire or explosion: No such risks

Loss of containment or spillage: No such risks

Other possible abnormal situations: Unlikely to happen. If happens, report them to Mrs. Pauline Leung.

16. CBME Risk Assessment Audit Declaration

Enclosed independently