



STUDY ABROAD

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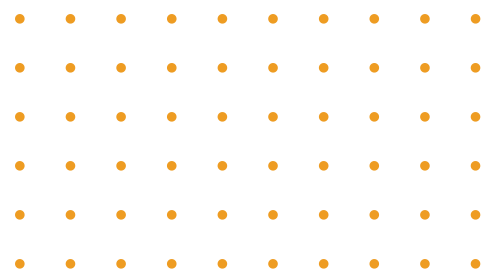
KANPHIROM LERTBUMROONCHAI

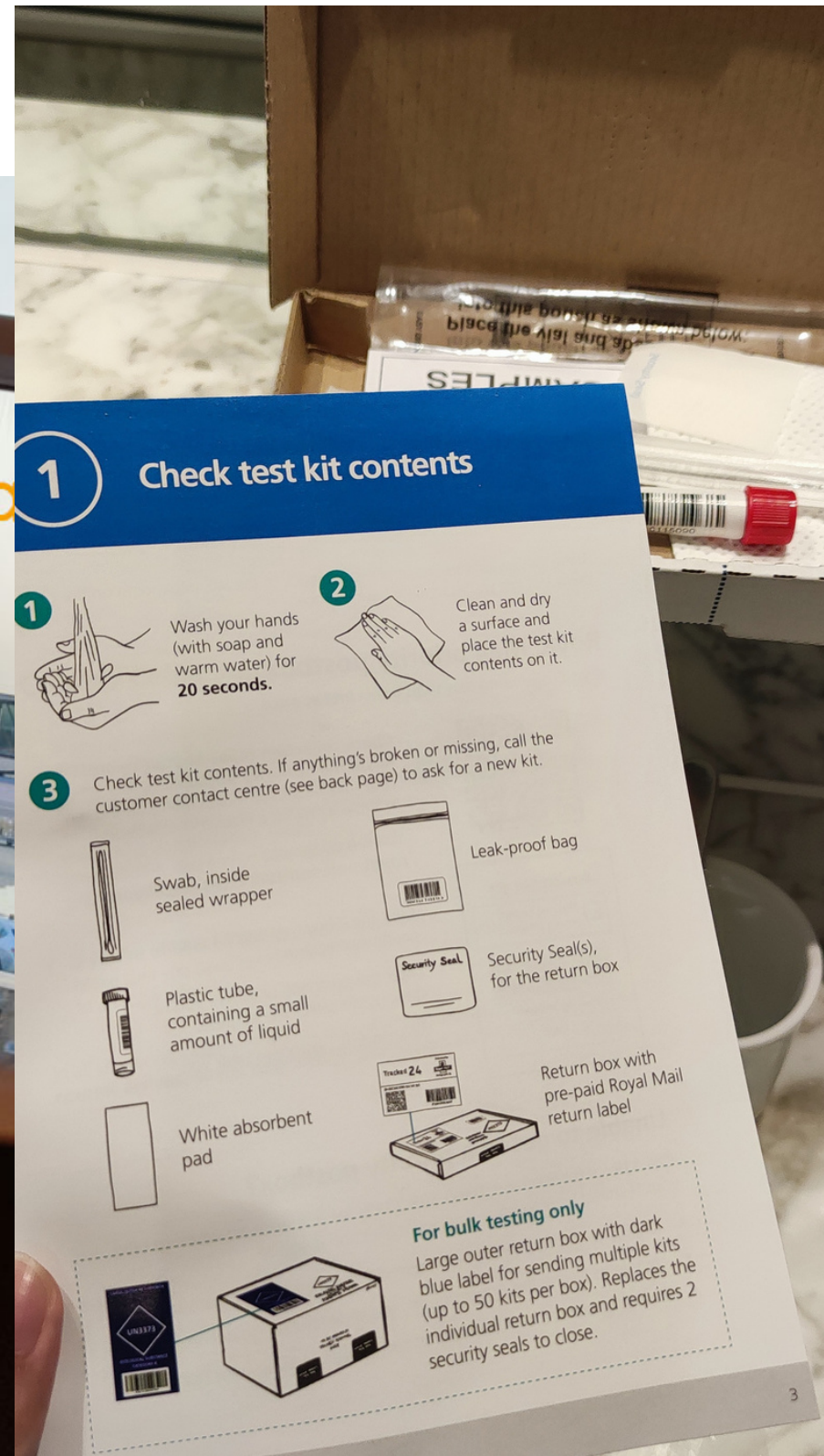


Welcome To **UNIVERSITY OF YORK**

MSc in Green chemistry &
Sustainable Industrial Technology

[Read More](#)





Register a test

BETA This is a new service – your [feedback](#) will help us to improve it.

Registration confirmed

Kanphirom Lertbumroongchai
 dkanphirom@gmail.com
 447824537048
 test kit barcode reference: KNB09115090
 test date: 25 September 2021
 test time: 10am

Next steps

- if you've registered multiple test kits, it's very important that each person takes the test registered to them to make sure they receive the correct results.
- if you're doing the swab test yourself, you can watch [this instructional video](#).





UNIVERSITY
of York



COVID QUARANTINE POLICY



- Quarantine for 11 days in a designated hotel
- Must had PCR test for COVID 19
- Must do the research about the York e.g. number of COVID 19 case, criminal

Let's Start
MY JOURNEY



Why this course

LEARNING EXPERIENCE



Home > Study at York > Postgraduate taught > Courses 2024/25 > Green Chemistry and Sustainable Industrial Technology (MSc)

MSc Green Chemistry and Sustainable Industrial Technology

Discover how green chemistry can help with the industrial challenges faced by increasing demand for sustainable products and processes

Year of entry: 2024 (September)

[Overview](#) [Course content](#) [Fees and funding](#) [Teaching and assessment](#) [Careers](#) [Entry requirements](#)

Length
1 year full-time

Department
[Department of Chemistry](#)

Start date
September 2024 ([semester dates](#))

[Apply for this course](#)

Masters Taster Day

Join us on 13 March to get a taste of why so many people love living and learning at the University of York.

[Learn more](#)

1st for learning opportunities satisfaction in Chemistry among the Russell Group universities
National Student Survey 2022

2nd for 'teaching on my course' among the Russell Group universities
National Student Survey 2022

7th for Chemistry in the UK according to the Complete University Guide 2024

New ideas and innovations are essential to meeting

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About the course
**MUST READ THE
HANDBOOK**



Department of Chemistry

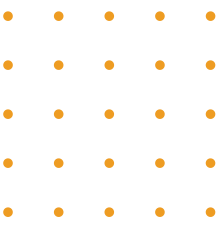
**MSc Green Chemistry
and Sustainable
Industrial Technology**

**Handbook and
Assessment Guide
2021-2022**

Module



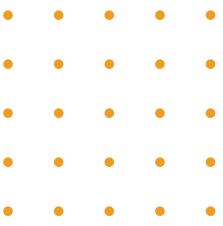
- **PRININCIPLES OF GREEN CHEMISTRY**
- **APPLICATION OF GREEN CHEMISTRY**
- **TRANSFERABLE SKILLS**
- **COMMERCIALISATION OF GREEN CHEMISTRY**
- **GREEN CHEMISTRY RESEARCH PROJECT**



Assessment

GRADUATE MARK SCALE

- 70-100 DISTINGUISHED PERFORMANCE
- 50-69 GOOD PERFORMANCE
- 40-49 SATISFACTORY PERFORMANCE
- 0-39 FAIL



Took course

LECTURE

COMMUNICATION

Green evaluation of 4-methoxyacetophenone via Friedel-Crafts Acylation of Anisole by heterogeneous-Aluminium catalyst (MOR) with microwave-assisted technique

Received 00th January 20xx,
Accepted 00th January 20xx

Kanphriom Lertbumroongchai*

DOI: 10.1039/x0xx00000x

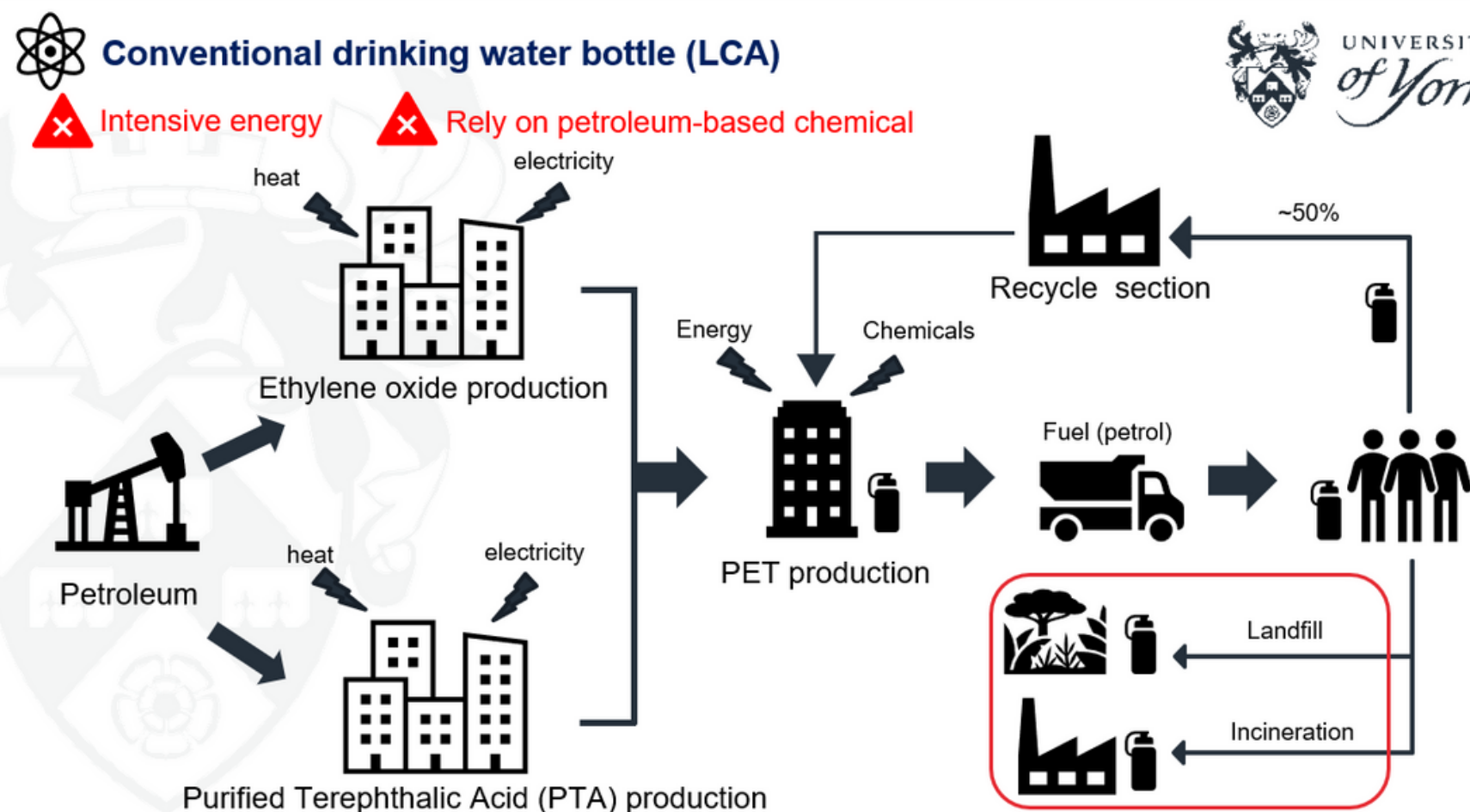
Friedel-Crafts acylation of anisole with acetic anhydrous to produce 4-methoxyacetophenone has been studied in comparison between aluminium homogeneous catalyst as $AlCl_3$ and heterogeneous catalyst as Mordenite zeolite (MOR). The efficiency heating for the experiment of heterogeneous catalyst has been tested to compare the greenness of MOR usage. The result from MOR indicates that

alumina, silica, titania, zirconia, zeolites, and clays. Furthermore, this type of catalyst could provide the advantages such as more selectivity, milder condition, reduced waste and being cheap.¹⁰ Recently, Mordenite Zeolite (MOR) an aluminium heterogeneous catalyst has been studied and the result shows of a high %yield and %conversion in conventional

ion.¹¹ Therefore, heating is necessary for reaction for MOR. Microwave radiation as a heat alternative way to perform FC reaction under conditions. In addition, microwave radiation could overcome the disadvantages of conventional heating that a slower, long reaction time, energy inefficient and formation of side products.¹²⁻¹³ Consequently, this technique is greener according to the 6th principle of Design for Energy Efficiency. Consequently, to evaluate how green of FC using MOR assisted heating.

How green of homogeneous and heterogeneous study, synthesis of 4-methoxyacetophenone formed via Friedel-Crafts acylation by using anisole with acetic anhydride (2) with aluminium catalysis (Table 1) in DCM and toluene. This is confirmed by GC and FT-IR.

Reaction result of using aluminium homogeneous catalyst in different solvent.



Activity 3: New chemical reactor types

Introduction

In modern chemistry generation, there are more focusing on flow reactors, which aim to replace using batch reactors which is conventional reactors widely used in industries. The conventional batch reactors have many common limitations such as safety, reaction time, selectivity, and reactor size.^{1,2} Thus, flow chemistry plays an important role to overcome these issues offering many advantages such as accurate reaction parameter control, reduced reaction times and waste, excellent yields and selectivity, process intensification, enhanced process safety, reaction screening, optimization and automation, integration of in-line analytics for real time analysis, and high reaction throughput even though there are some challenges in solids as starting materials, products and or by-products, integration of in-line purification techniques, changing the batch mind set and the cost and availability of flow equipment.^{2,3} This report aims to point the advantages of recent chemical reactor types such as microreactors.

Flow microreactors

Recently, modernized reactors are developed remarkably in microreactors which offers many advantages over large-scale reactors, as related to energy efficiency, the velocity of reactions, and the total output of products in micro space.⁴ Consequently, flow microreactor plays an important role to combine the advantages of flow chemistry and microreactor leading to more benign environment. In addition, there are different materials used to construct microreactor which provide different advantages and disadvantages in term of material's limitation.⁵ (Table 1)

Table 1 Advantages and disadvantages of material used to construct microreactors⁵

Materials	Advantages	Disadvantages
Metals	<ol style="list-style-type: none"> Cleaned room is not needed Design for long last using Unshakable fabrication performances 	<ol style="list-style-type: none"> Auxiliary through noble metals material Concerns with variable pressure

Assessment

FEEDBACK

MSc Green Chemistry and Sustainable Industrial Technology: Assessment Feedback: Agreed Marks

Application of Green Chemistry CHE00002M	
Renewable Resources practical	
Student name	Kanphirom Lertbumroongchai
First marker	Rob McElroy
Second marker	Tom Dugmore

Markers: please provide the agreed marks for each component and the overall agreed mark for the assignment. This agreed mark sheet, and the comments and feedback will be provided to the student.

	Agreed marks between markers	Maximum mark
Performance during practical	8	10
Answers to microwave questions	8	10
Answers to soxhlet based questions	22	25
Answers to steam distillation based questions	15	20
Answers to supercritical CO2 based questions	12	15
Answers to critical analysis questions	17.5	20
Total Agreed mark for this assignment	82.5	100

All marks are provisional and are subject to approval by the external examiner and ratification by University Senate.



MSc Green Chemistry and Sustainable Industrial Technology: Assessment Feedback: Agreed Marks

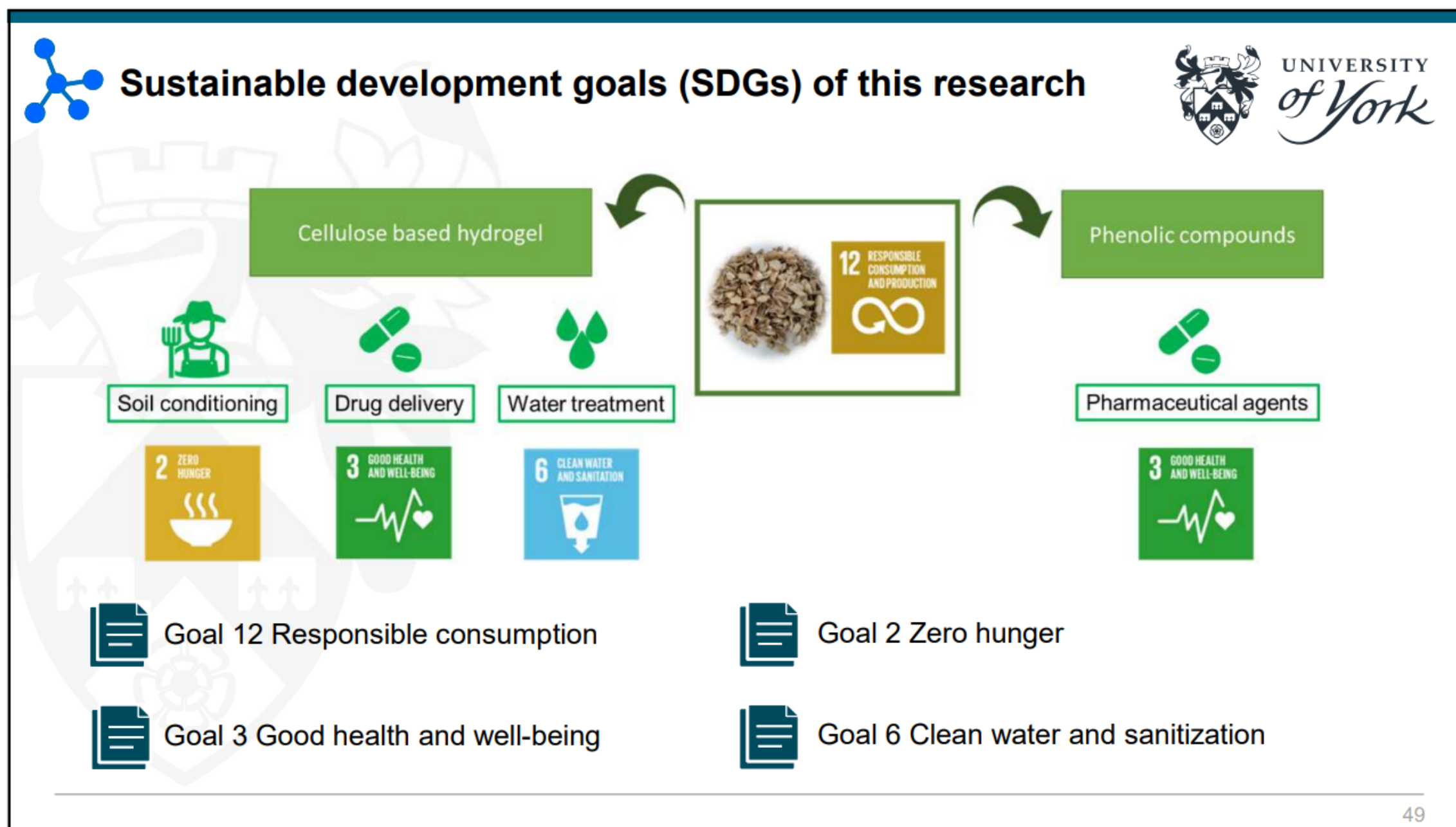
Application of Green Chemistry CHE00002M	
Clean Synthesis Practical	
Student name	Kanphirom Lertbumroongchai
First marker	Avtar Matharu
Second marker	Duncan Macquarrie

Markers: please provide the agreed marks for each component and the overall agreed mark for the assignment. This agreed mark sheet, and the comments and feedback will be provided to the student.

	Agreed marks between markers	Maximum mark
Scientific standard of publication (Chem Comm) Introduction and aims	26	30
General style of publication, in particular appropriate use of tables, illustrations, references etc	15.5	20
Results and discussion	40	50
Total Agreed mark for this assignment	81.5	100

All marks are provisional and are subject to approval by the external examiner and ratification by University Senate.

Project RESEARCH



The 12 Principles of GREEN CHEMISTRY

Green chemistry is an approach to chemistry that aims to maximize efficiency and minimize hazardous effects on human health and the environment. While no reaction can be perfectly 'green', the overall negative impact of chemistry research and the chemical industry can be reduced by implementing the 12 Principles of Green Chemistry wherever possible.

- 1. WASTE PREVENTION**
Prioritize the prevention of waste, rather than cleaning up and treating waste after it has been created. Plan ahead to minimize waste at every step.
- 2. ATOM ECONOMY**
Reduce waste at the molecular level by maximizing the number of atoms from all reagents that are incorporated into the final product. Use atom economy to evaluate reaction efficiency.
- 3. LESS HAZARDOUS CHEMICAL SYNTHESIS**
Design chemical reactions and synthetic routes to be as safe as possible. Consider the hazards of all substances handled during the reaction, including waste.
- 4. DESIGNING SAFER CHEMICALS**
Minimize toxicity directly by molecular design. Predict and evaluate aspects such as physical properties, toxicity, and environmental fate throughout the design process.
- 5. SAFER SOLVENTS & AUXILIARIES**
Choose the safest solvent available for any given step. Minimize the total amount of solvents and auxiliary substances used, as these make up a large percentage of the total waste created.
- 6. DESIGN FOR ENERGY EFFICIENCY**
Choose the least energy-intensive chemical route. Avoid heating and cooling, as well as pressurized and vacuum conditions (i.e. ambient temperature & pressure are optimal).
- 7. USE OF RENEWABLE FEEDSTOCKS**
Use chemicals which are made from renewable (i.e. plant-based) sources, rather than other, equivalent chemicals originating from petrochemical sources.
- 8. REDUCE DERIVATIVES**
Minimize the use of temporary derivatives such as protecting groups. Avoid derivatives to reduce reaction steps, resources required, and waste created.
- 9. CATALYSIS**
Use catalytic instead of stoichiometric reagents in reactions. Choose catalysts to help increase selectivity, minimize waste, and reduce reaction times and energy demands.
- 10. DESIGN FOR DEGRADATION**
Design chemicals that degrade and can be discarded easily. Ensure that both chemicals and their degradation products are not toxic, bioaccumulative, or environmentally persistent.
- 11. REAL-TIME POLLUTION PREVENTION**
Monitor chemical reactions in real-time as they occur to prevent the formation and release of any potentially hazardous and polluting substances.
- 12. SAFER CHEMISTRY FOR ACCIDENT PREVENTION**
Choose and develop chemical procedures that are safer and inherently minimize the risk of accidents. Know the possible risks and assess them beforehand.

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Project RESEARCH

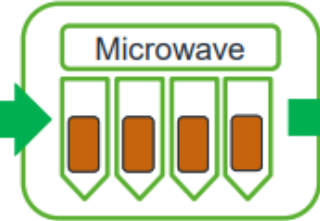
The valorization of unavoidable peanut shells as phenolic compounds and cellulose-based hydrogels with green methodologies



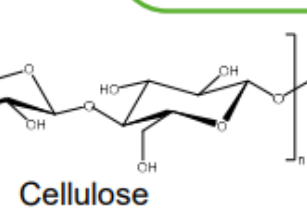
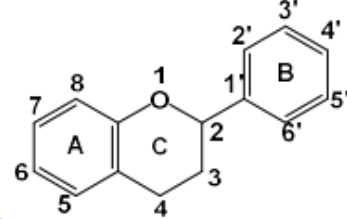
Kanphirom Lertbumroongchai



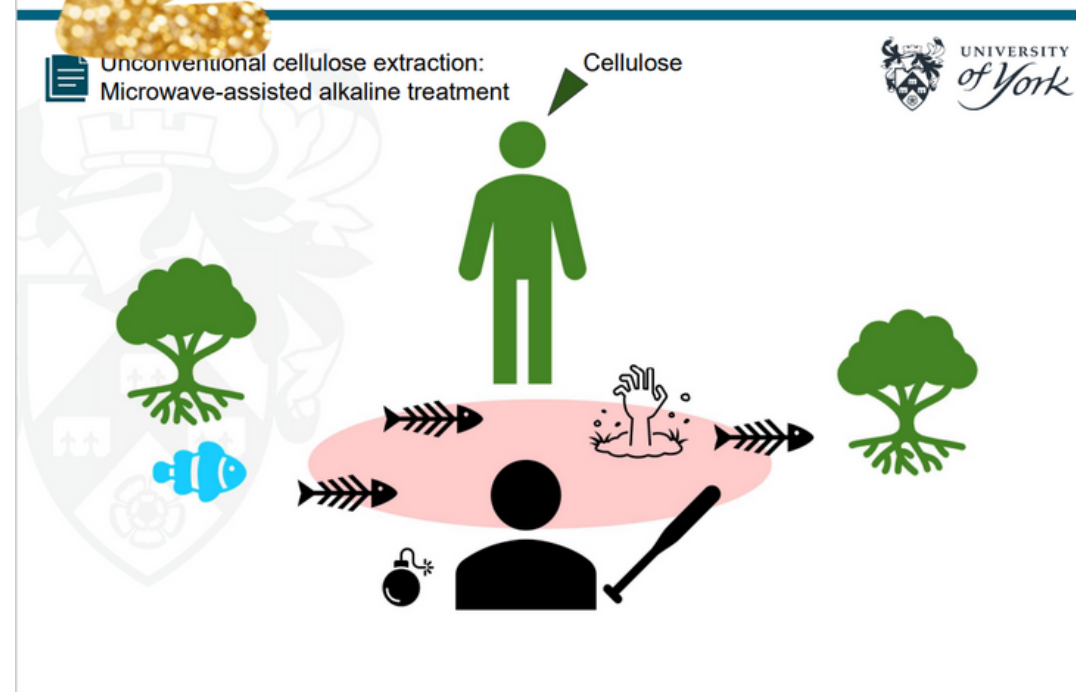
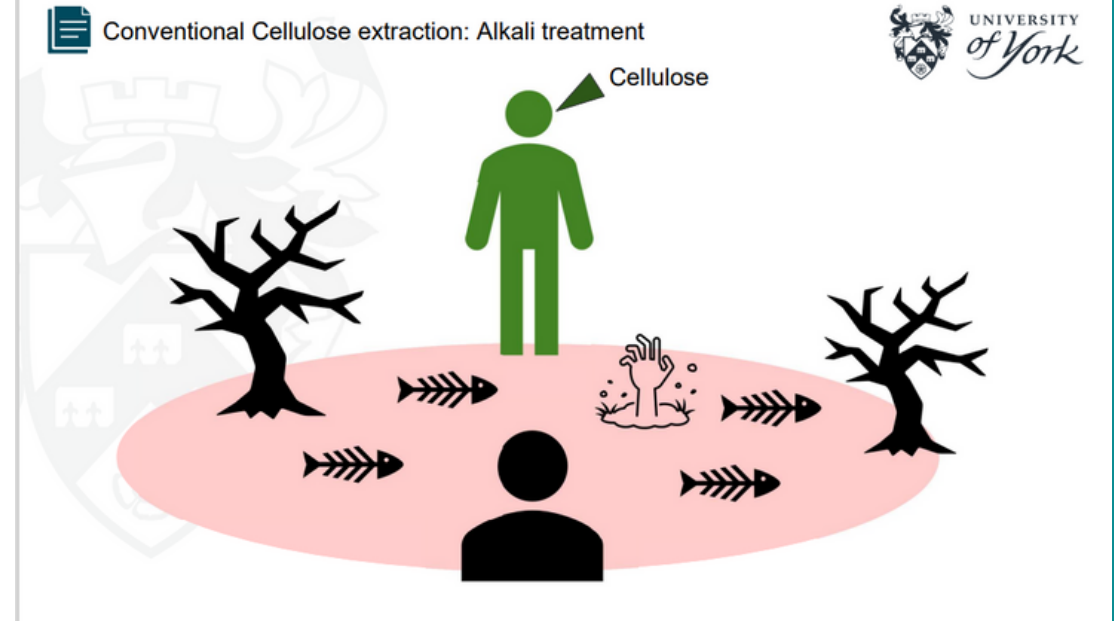
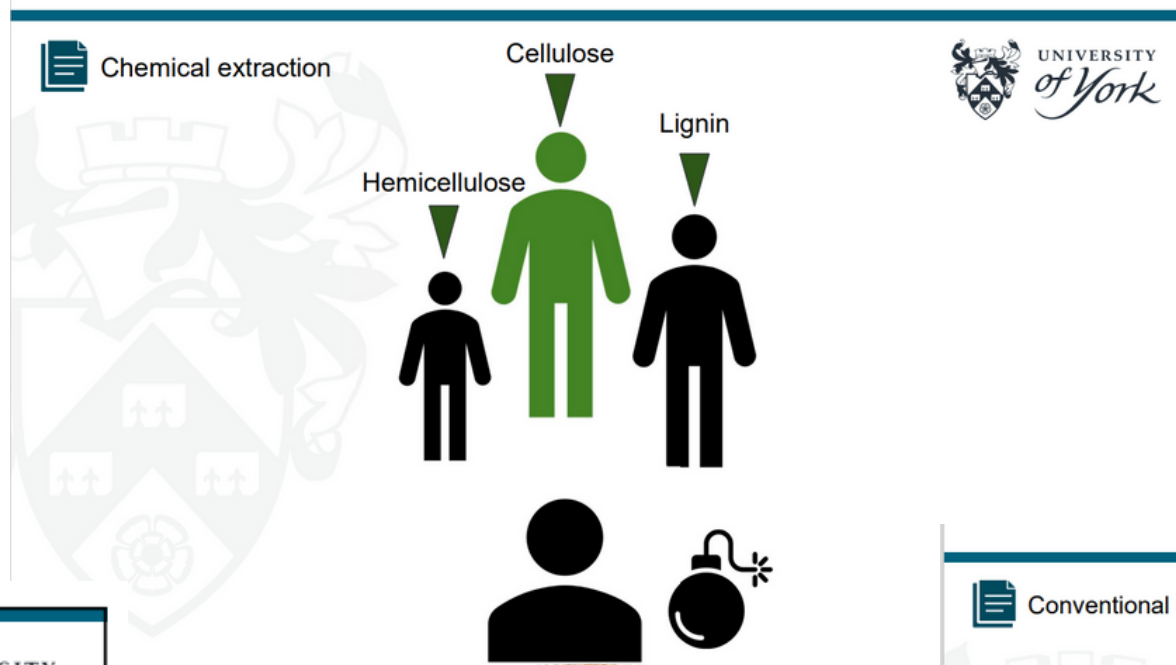
Extraction with green solvent



Phenolic compounds



Cellulose-based hydrogels





York city

**DIAGON ALLEY FROM
THE MOVIE
ADAPTATION OF THE
HARRY POTTER SERIES**



Shamble



Thai people
THAI SOCIETY OF YORK



Shamble

Thai cooking

KANPHIROM LERTBUMROONCHAI



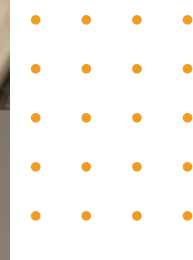
ไก่ย่างพร้อม

Fried rice with TomYum



AROYYYYY

Teriyaki



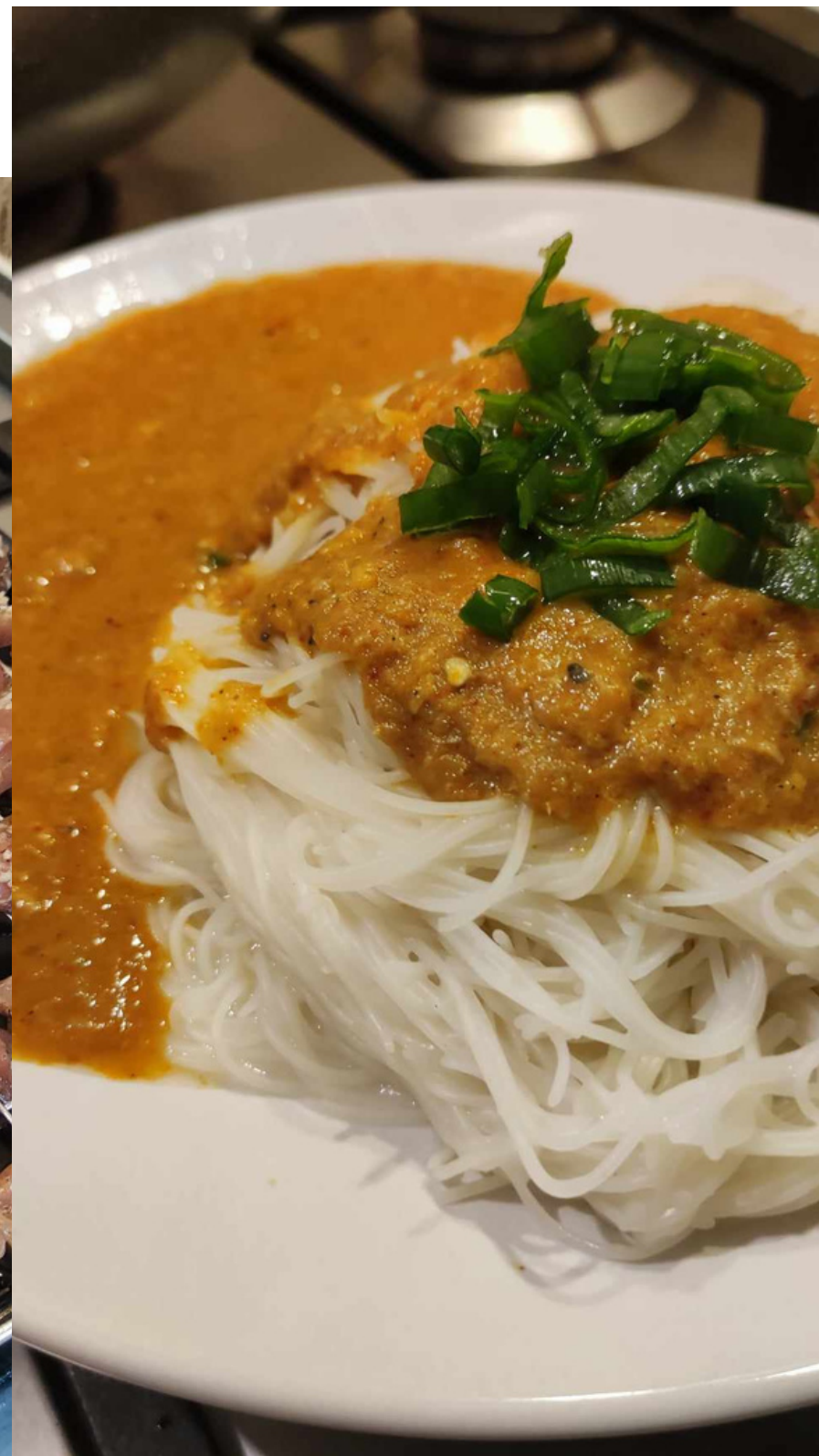
Thai cooking

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Thai cooking

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Travelled in UK

KANPHIROM LERTBUMROONCHAI 





THANK *You*

F O R Y O U R A T T E N T I O N

