Utilization of agricultural waste

Green development of Biomass derived glycolipids for antitumor

Zhejiang University

Organic pharmaceutical Chemistry institute

Dr. Yanli CUI

cuiyl@zju.edu.cn

Introduction: Establishment of new sustainable platform

Double pressures: shortage of fossil resources
environmental pollution

New sustainable platform

Agricultural wastes

Introduction: Involved Promising exploitations

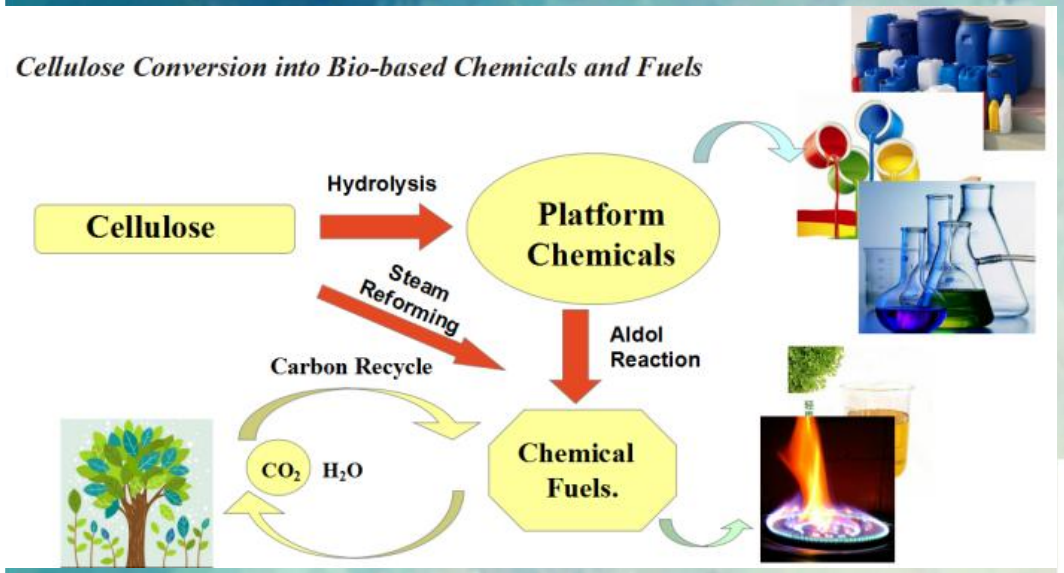
1. Lignocellulose for Energy and Chemical Platform

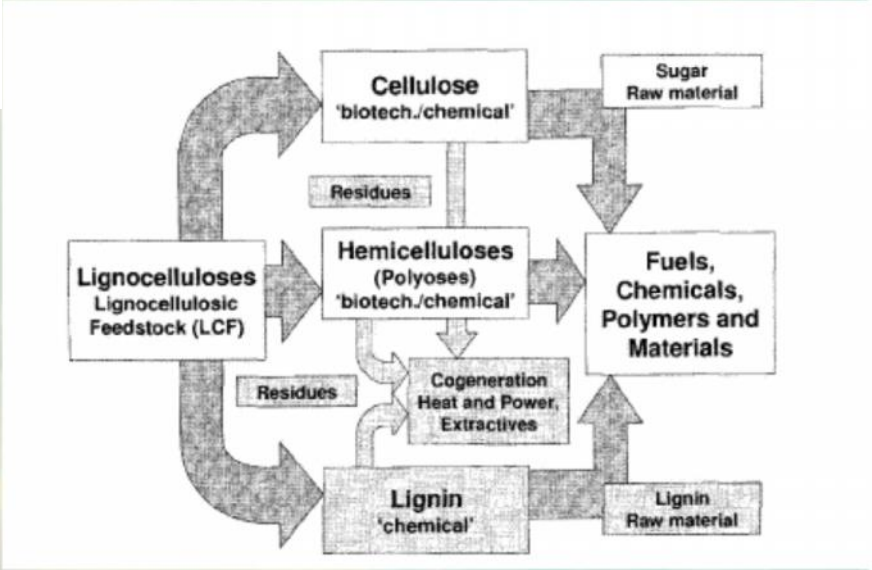
China ranks first in terms of bamboo species and yield.

60%~70% of bamboo harvests were removed as residues..

Bamboo lignocellulose ⇒ { Hemicellulose ⇒ soluble sugars
Lignin
Cellulose ⇒ soluble sugars

General Scheme of a Lignocellulosic Biorefinery

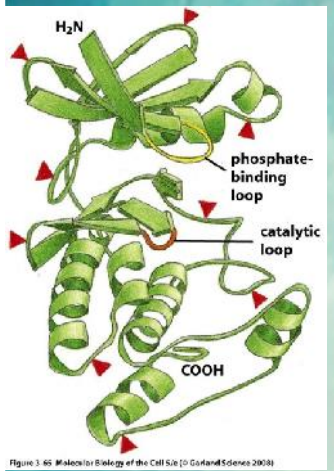




Through physical, chemical, biological and combined methods
The key : catalysts and biocatalysts for pretreatment and sugars conversion.

2. The production of garbage enzyme

Enzyme technology is a kind of combined microbial technology.The combined microbe consists of bacteria, yeast and actinomyces. Enzyme technology can convert fruits, vegetables wastes (in low cost) into organic fertilizer, feed, accelerant for clearing the water, the soil improvement, and so on.



3. Culture of Fly and Maggot

It not only solved the the pollution of poultry and animal feces and short supply of feed proteins, but also promoted the cycle of ecological agriculture. In China Culture Technology is developing and demand technical regulations. Aslo the extract of disease-resistant peptides needs to improve.

organic feed

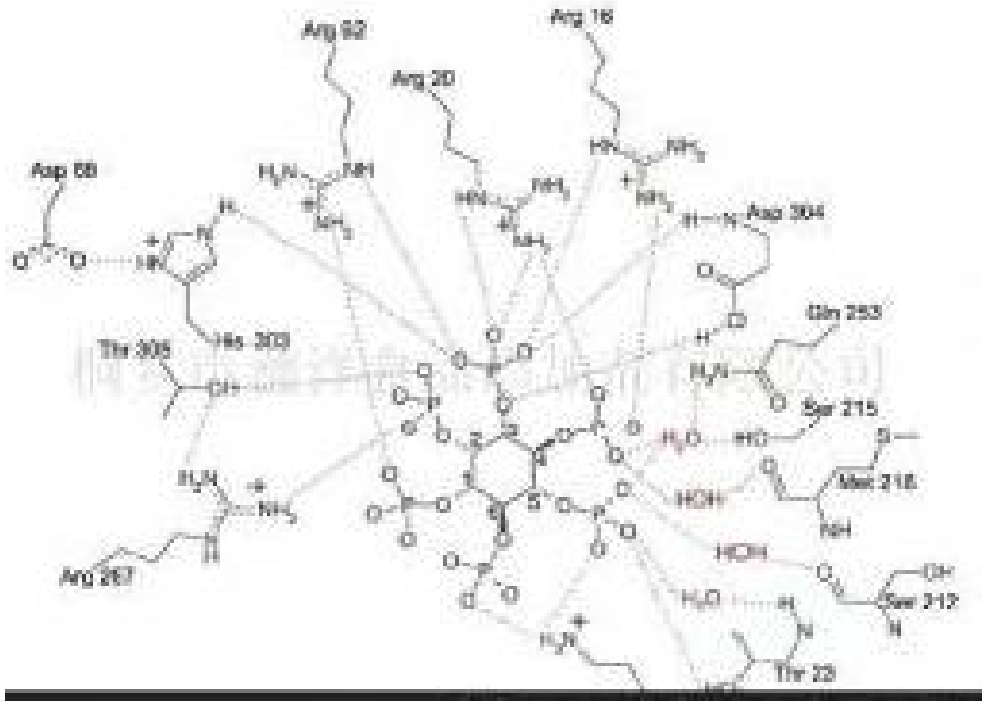
organic fertilizer

disease-resistant peptides

4. Higher value application of Rice bran

China is the largest producer of rice in the world. Accounted for only 10% of the rice, rice bran owns two-thirds of nutrient accumulation of rice, but 90% rice bran was discarded.

Rice bran Oil
Phytic acid commercialized
Ferulic acid

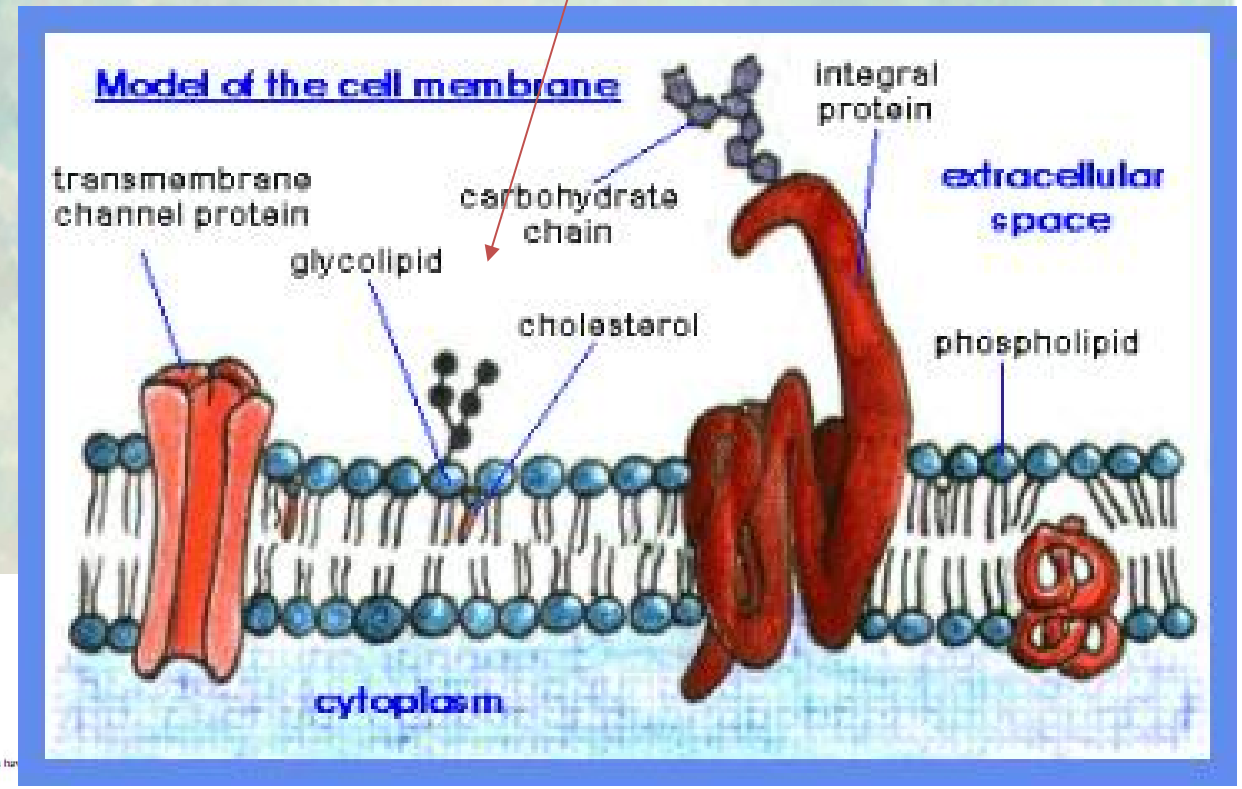


An underutilized raw material

Table 1.1 The content of rice bran nutrients

Sample	Dry matter (%)	Crude protein (%)	Ash content (%)	Crude fiber (%)	Crude fat (%)	Starch content (%)	Carbo-hydrate (%)	Heat (Cal/g)
Rice bran	91.29 ±0.03	15.82 ±0.29	10.02 ±0.06	8.69± 0.30	18.89 ±0.92	23.91 ±1.91	55.29	4739.45
Defatted rice bran	89.44 ±0.04	20.24 ±0.07	12.65 ±0.01	10.23 ±0.07	1.25± 0.55	31.57 ±2.06	65.51	3765.96
White rice bran	88.69 ±0.23	14.17 ±0.06	8.42± 0.22	0.58± 0.06	9.48± 0.17	57.33 ±0.60	68.35	4105.57

Glycolipids such as glycoceramides, glycosteroids play some important roles in the cell recognition, cell bonding, and regulating cellular immunity, etc. Their enrichment and separation are not valued seriously, that exist challenges. Glycolipids has potential in tumor immunotherapy.



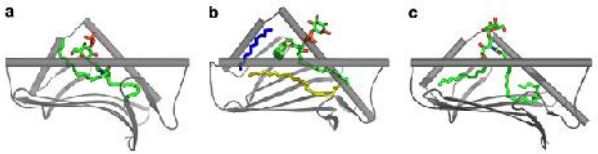
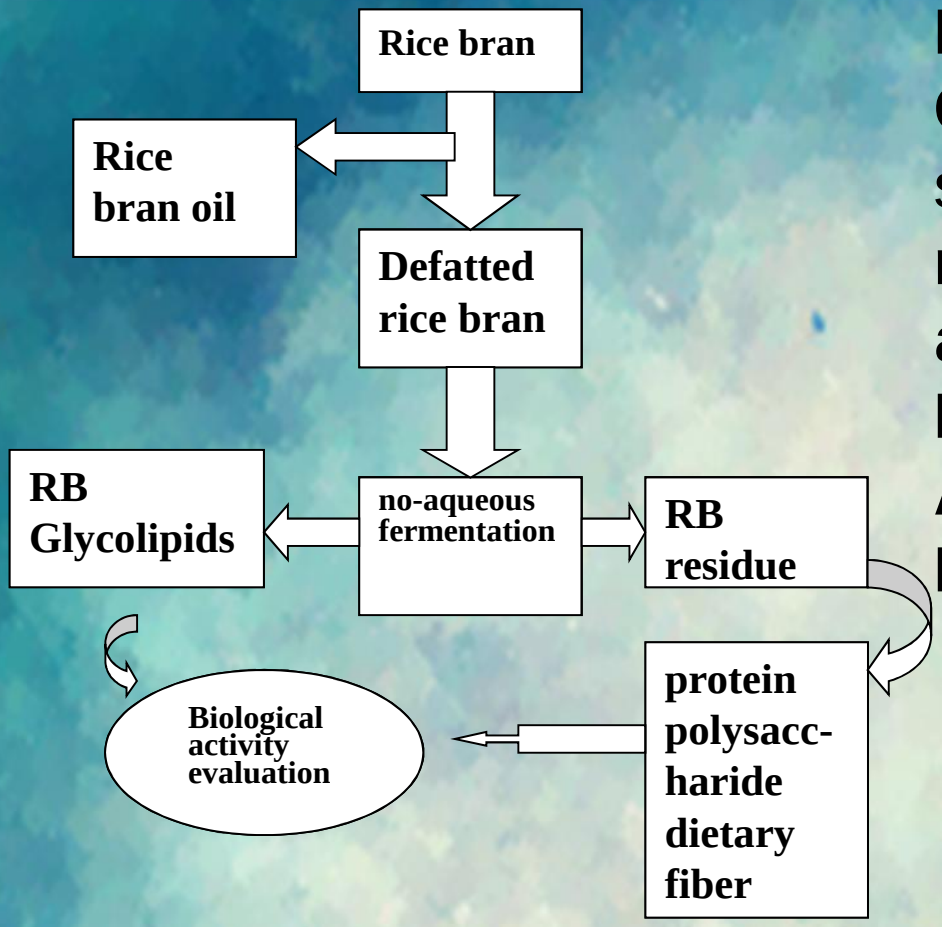


Figure 1. CD1 complexes. Crystal structures of CD1a, CD1b, and CD1d bound to their respective ligands. The α3 and β2m ectodomain domains have been omitted for clarity. (a) CD1a-Sulfatide. (b) CD1b-Phosphatidylinositol. (c) CD1d-αGalCer.

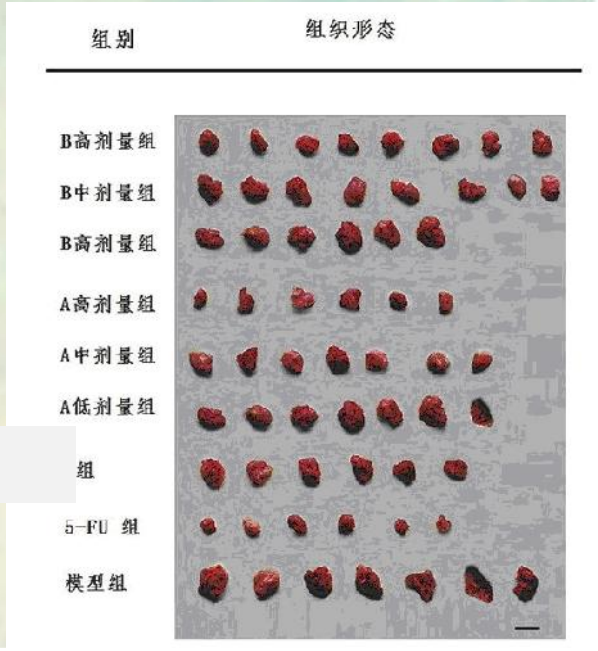


Enzyme process
Green recovery process
supercritical fluid extraction
membrane separation
aqueous two-phase extraction
Process diagnosis (base)
Analysis of structures(base)
Evaluation(base)

zero emissions

The preliminary biological evaluation

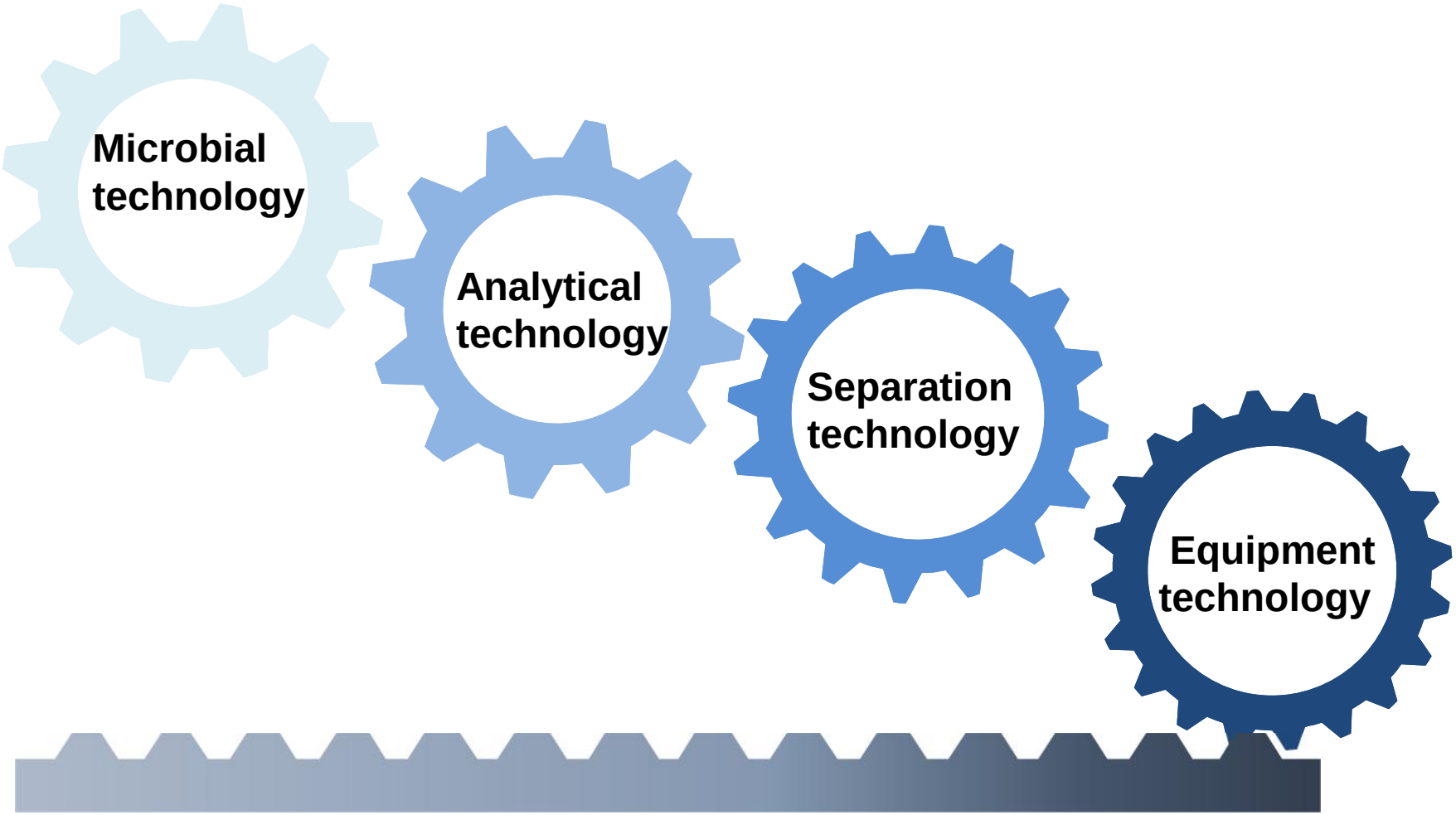
MCF-7 human breast cancer cell



Challenging

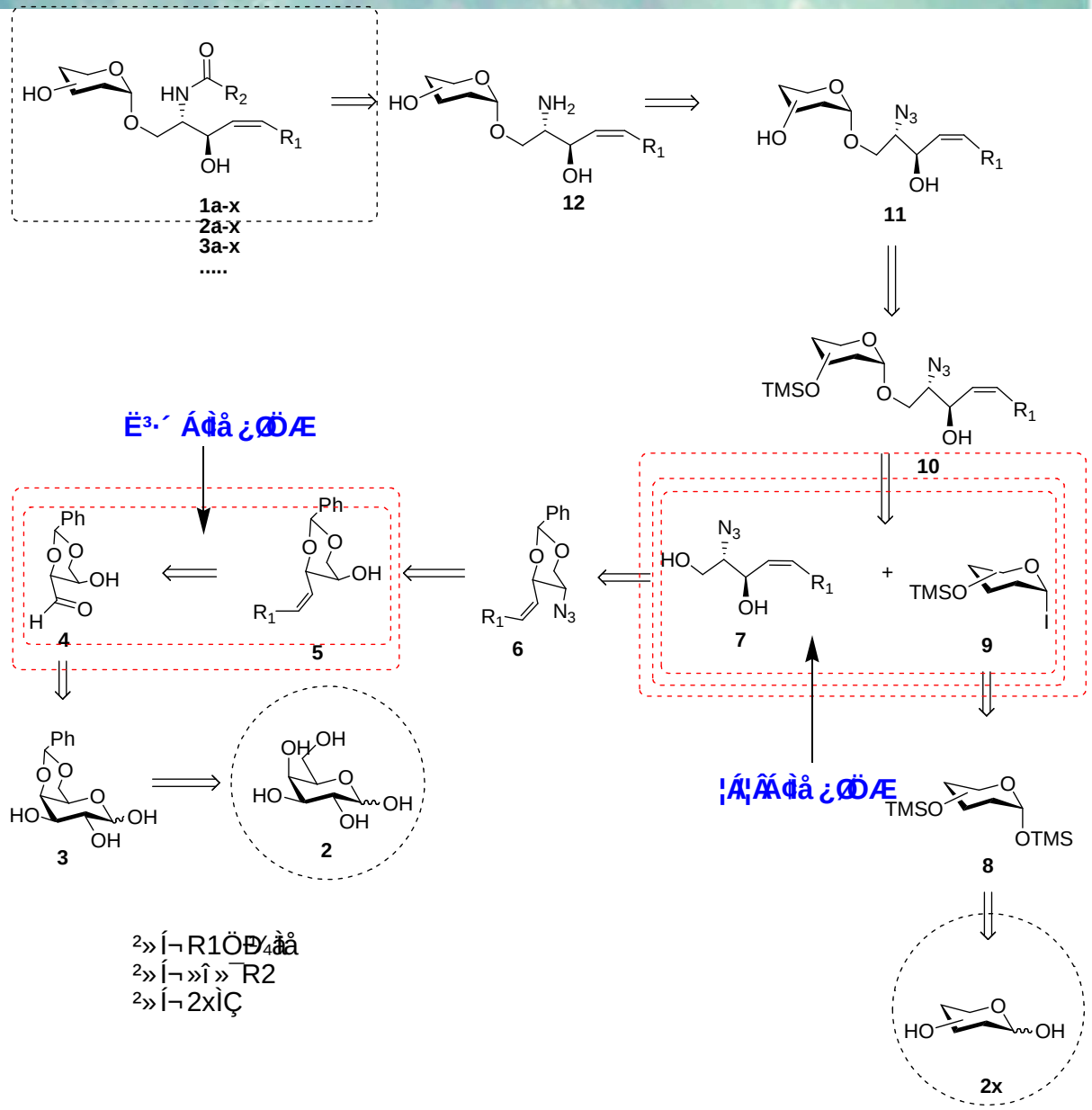
Co-operation

Ensuring the stability of product quality
Exploring the product function mechanism



"resources - production - consumption - renewable resources" process

Synthesis of natural carbohydrate



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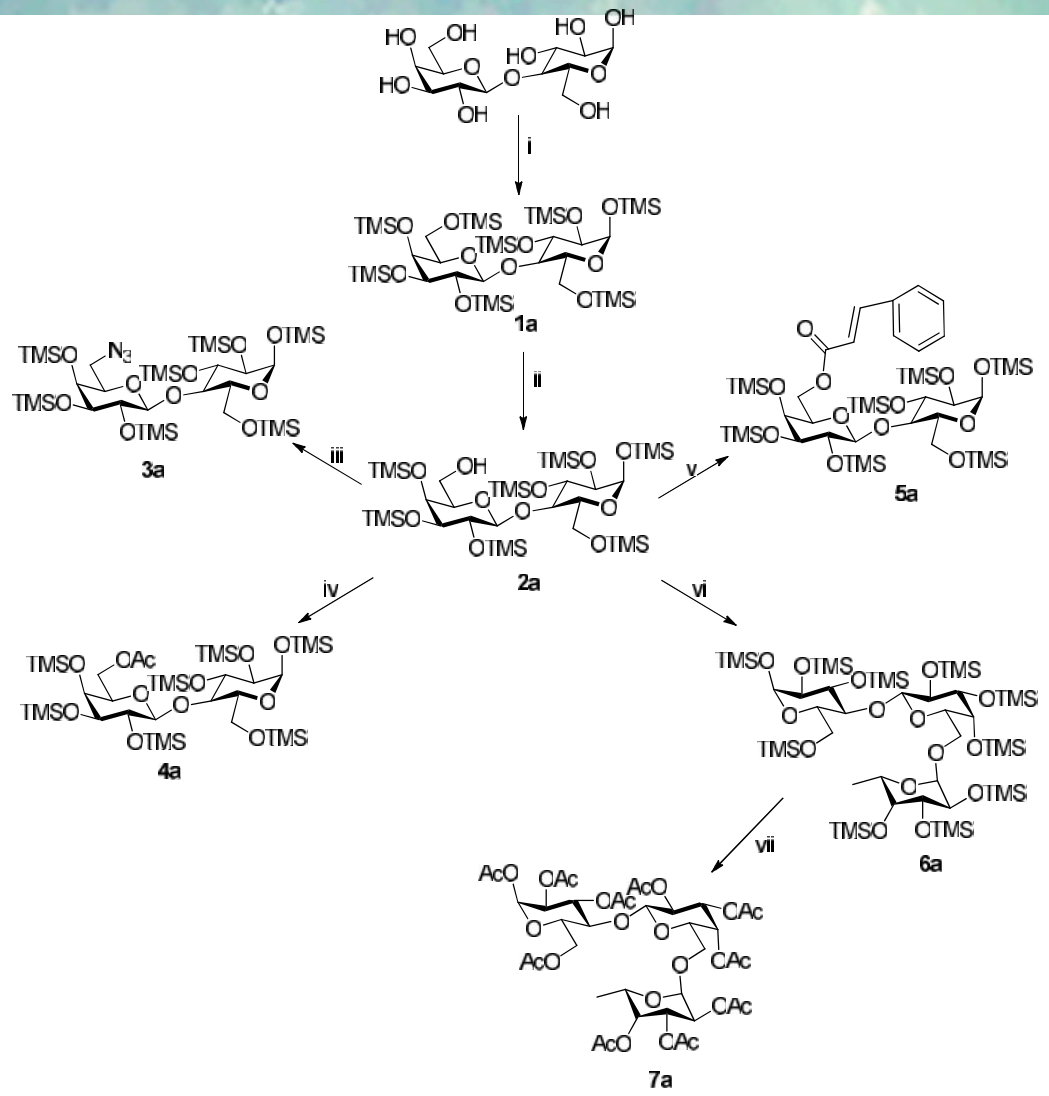
Synthesis of natural carbohydrate



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Thanks for your attention

谢谢关注

Dr. Yanli CUI
cuiyl@zju.edu.cn