

# Functional applications of rice bran oil in foods and pharmacy

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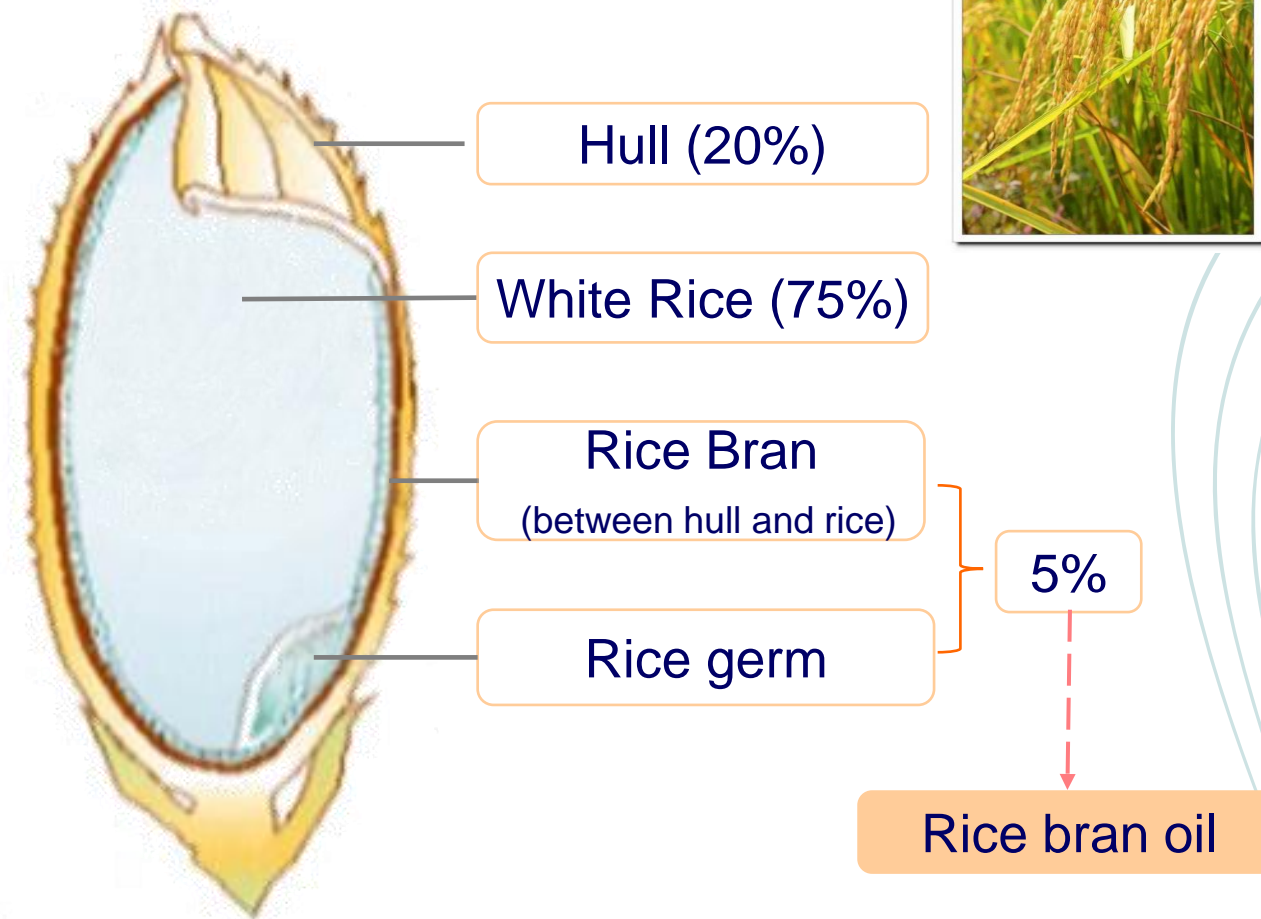
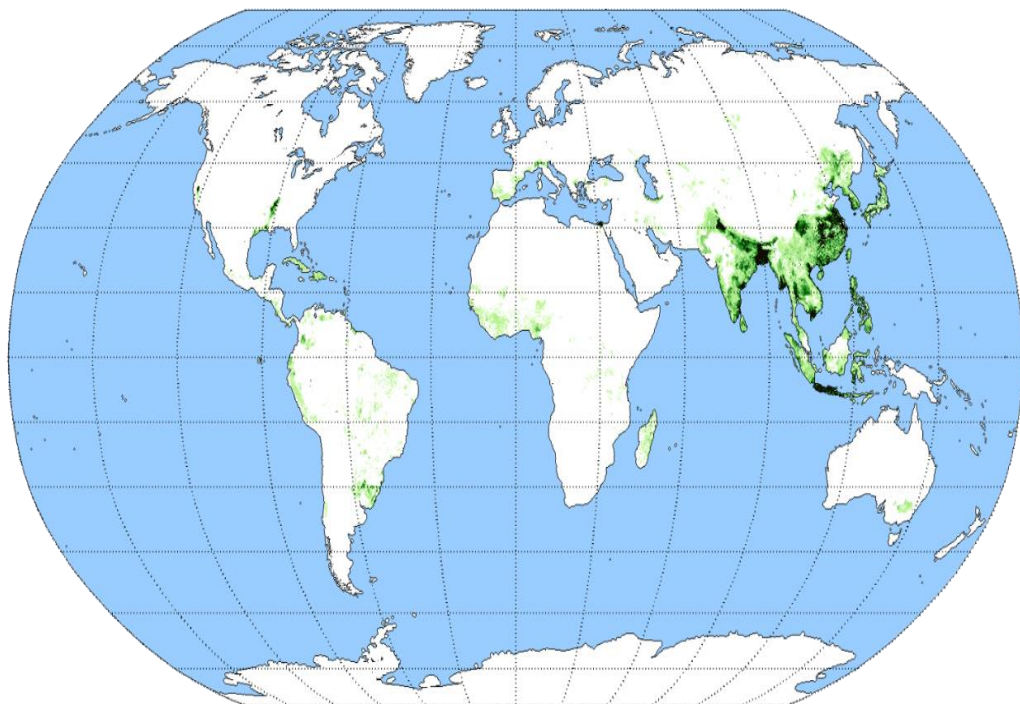
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# Rice structure and rice bran oil

**Main rice cultivation regions:**  
South Asia and East Asia

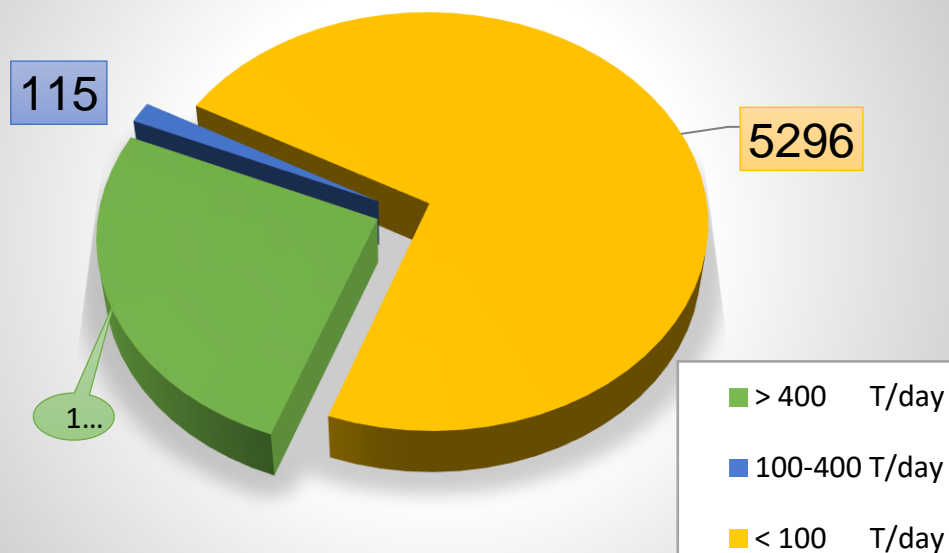


# Challenges of RBO industry

## Key issue 1

**Paddy processing scatered  
leading to high acid of crude RBO**

Paddy processing factories in China



## Over-refining of RBO

## Key issue 2

• Serious loss of nutrition

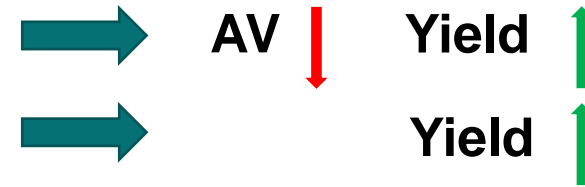
• Low yield < 50%

• High cost of production

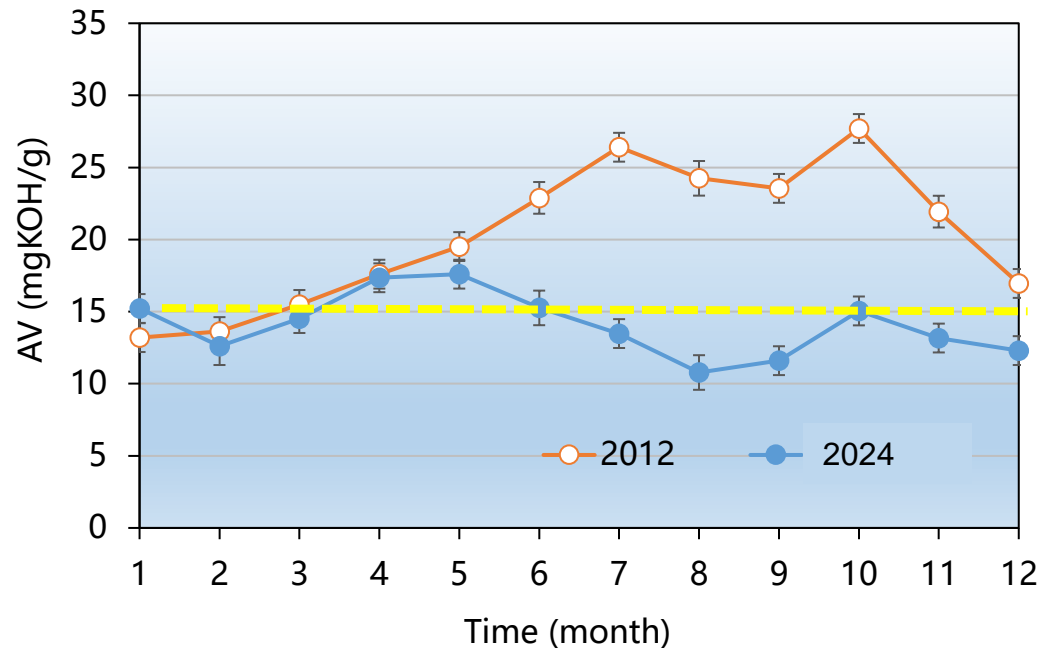
• High 3-MCPD & GE

# Improvement of oil extration & processing

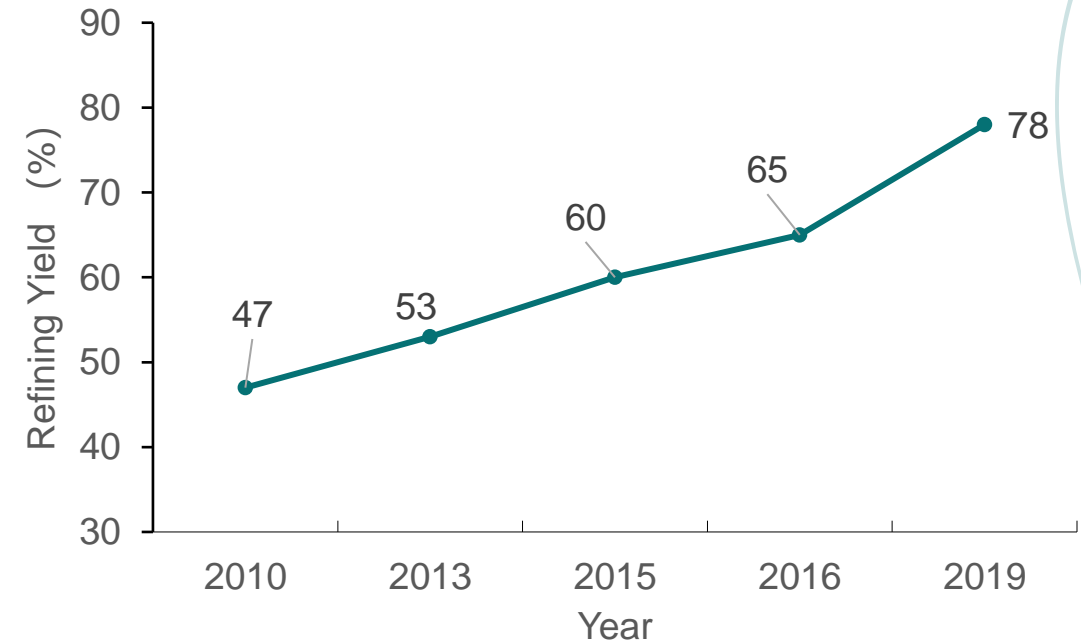
- Timely extrusion technology
- Improvement of refining technology



AV changes of CRBO in plant



Refining yield increase of RBO



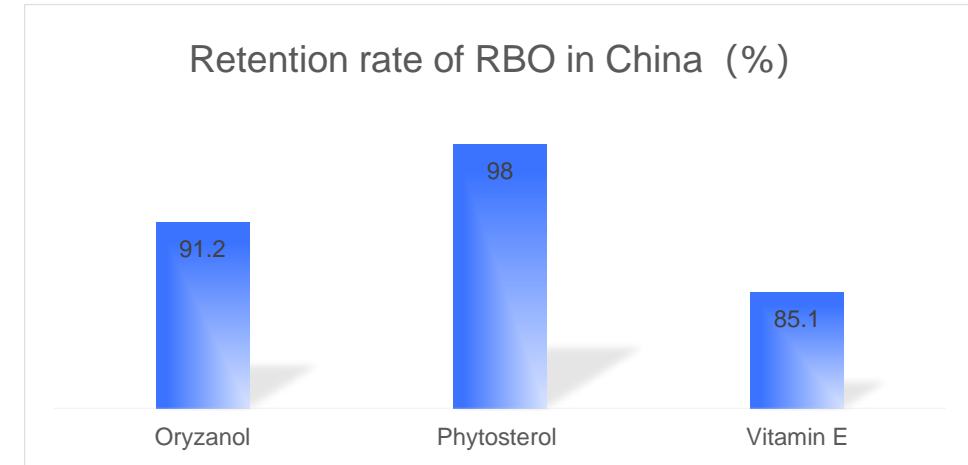
# Improvement of quality

## Moderate processing:

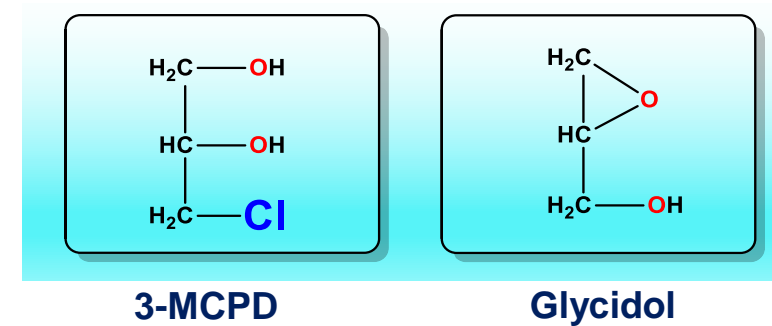
- Better crude oil
- Moderate refining

## Benefit:

- More functional components
- Less hazardous compounds



✓ Oryzanol, phytosterol and vitamin E retention rate > 85%

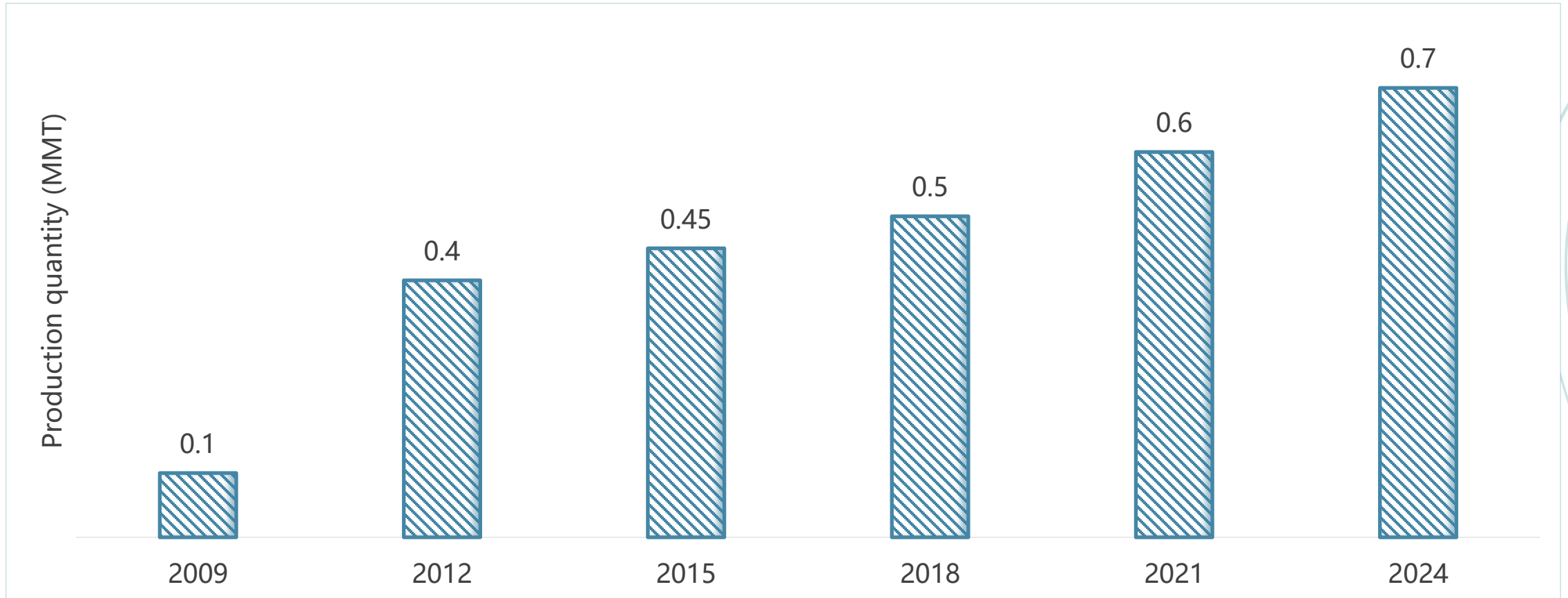


**2B & 2A carcinogen**

✓ 3-MCPD & GE in Arawana RBO conform to EU standard

# Improvement of RBO production

Quantity of oil extracted from rice bran in China  
(2009-2024)

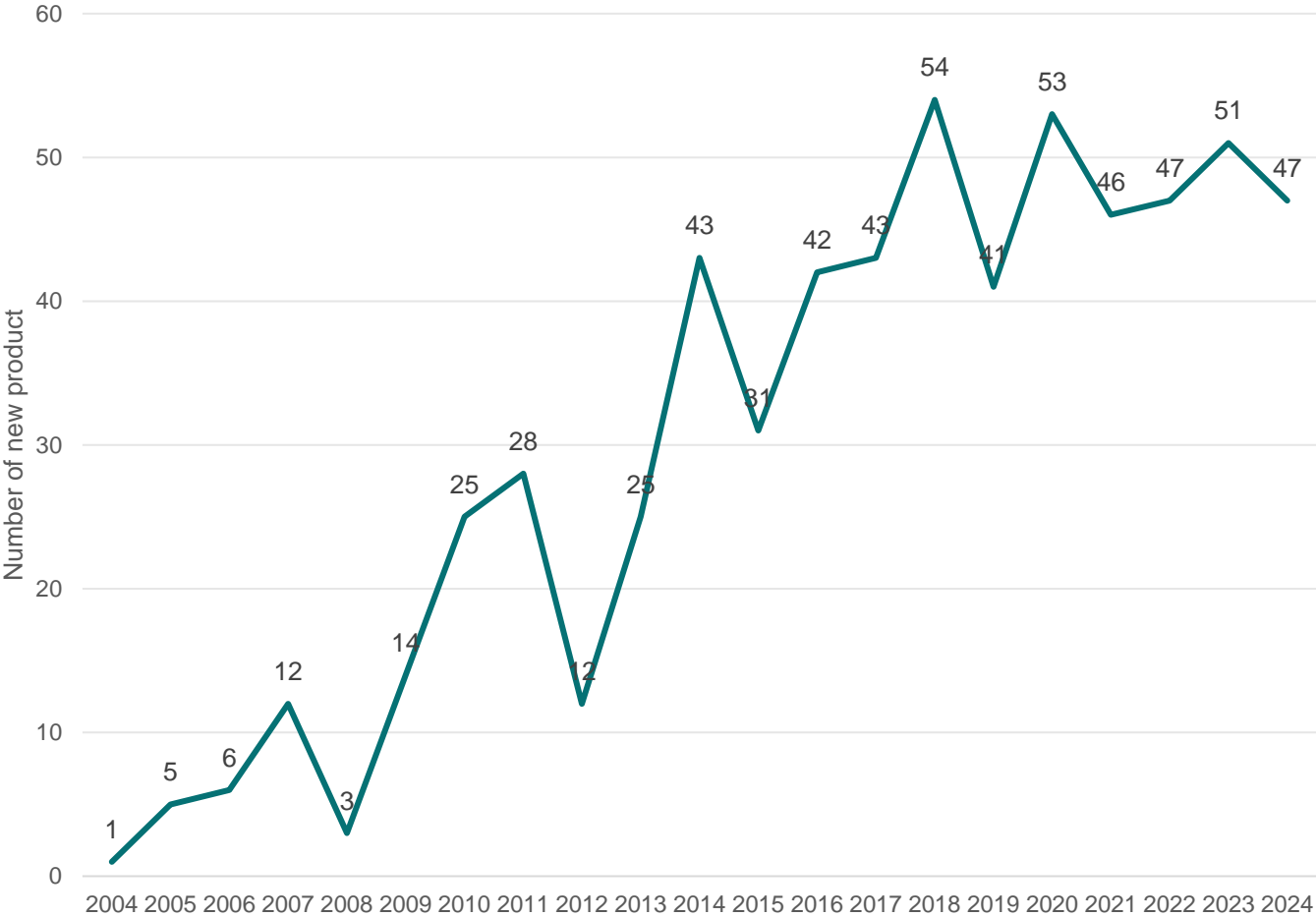




# Market Recognition

The rapidly development of RBO market

Number of new RBO products launched in global market



20+RBO brands in China market



Arawana



Delekang



Longevity  
Flower



COFCO  
Fulinmen



Standard  
Food



Jianghuai



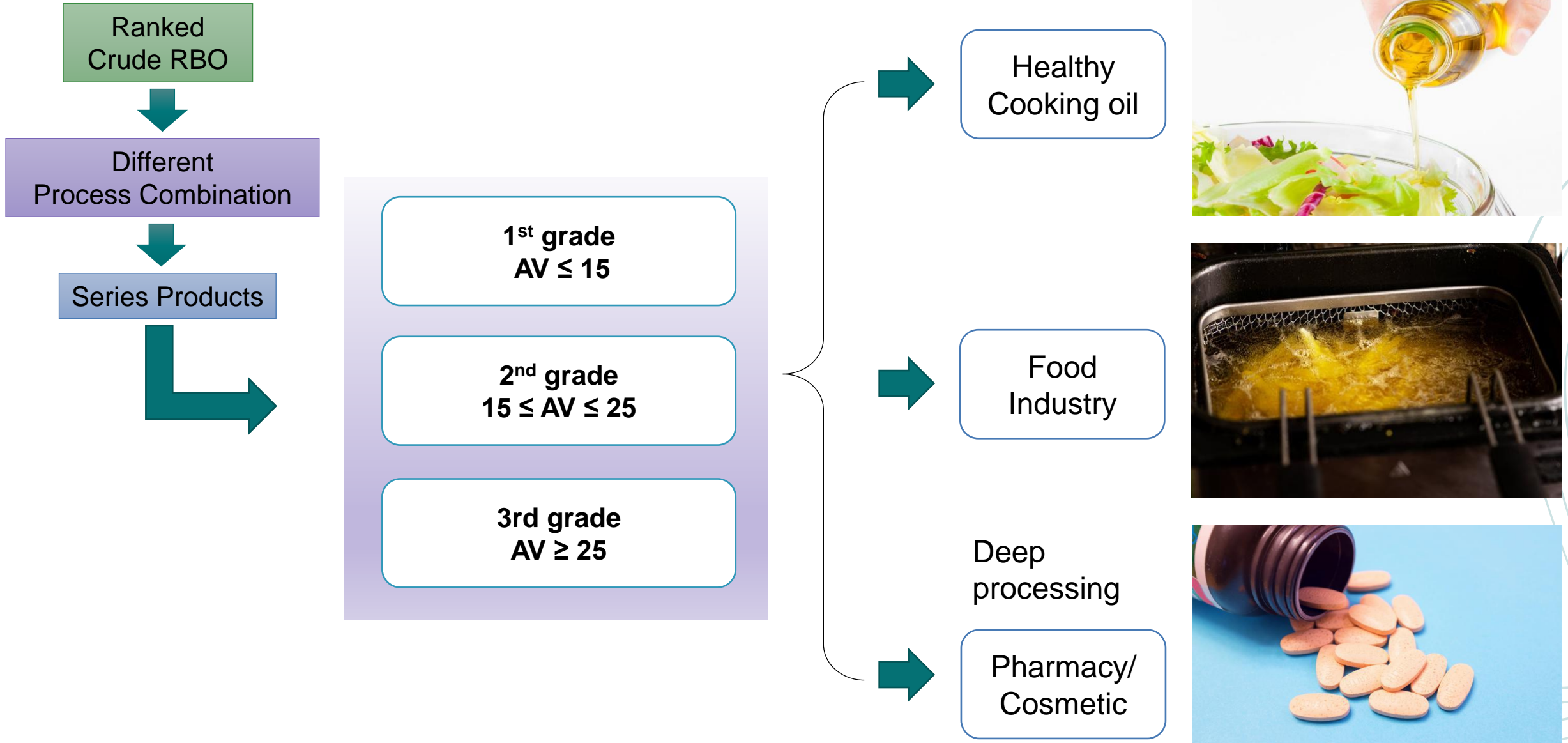
Tianyu



Shenyuan

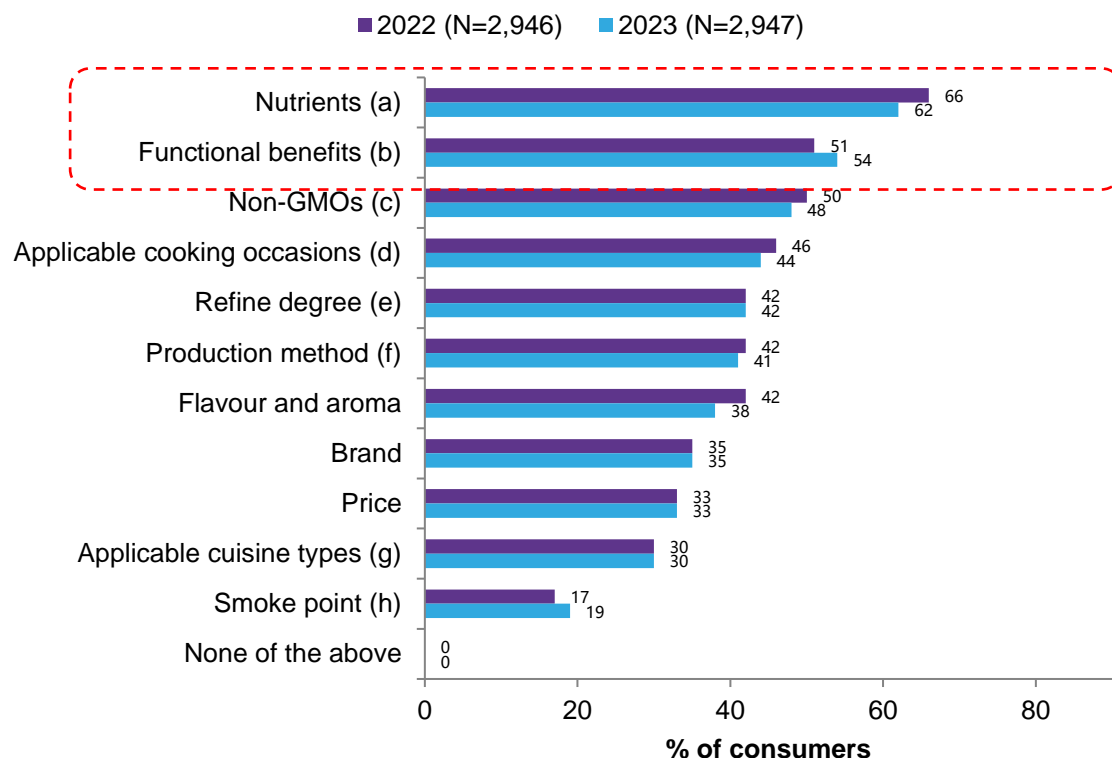


# Ranked system for different application



# RBO as cooking oil in consumer market

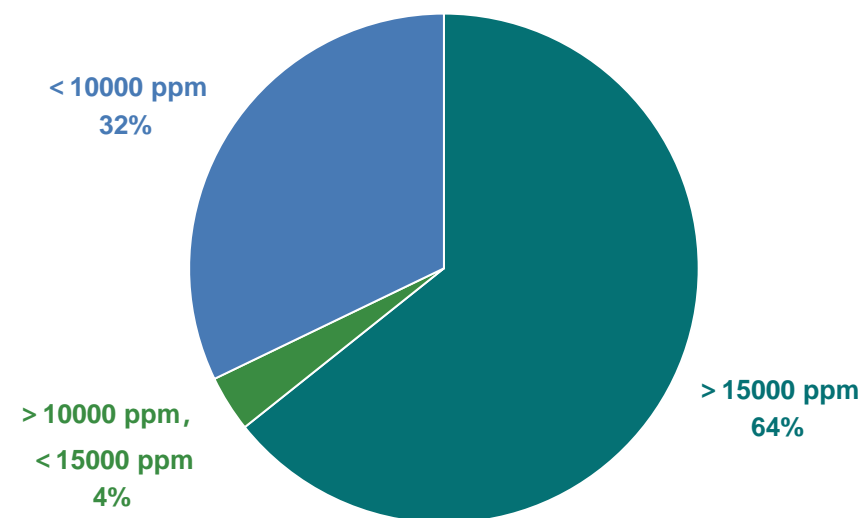
China: choice factors, 2022 & 2023



Consumers are paying more attention on the nutritional benefits for cooking oil applications

*Source: Cooking oil-China, Mintel, 2023*

The proportion of RBO products with different oryzanol contents



In 2024, 64% of products in the Chinese market had a oryzanol content exceeding 15,000 ppm

*Source: Internal qauality report, Wilmar R&D, 2024*

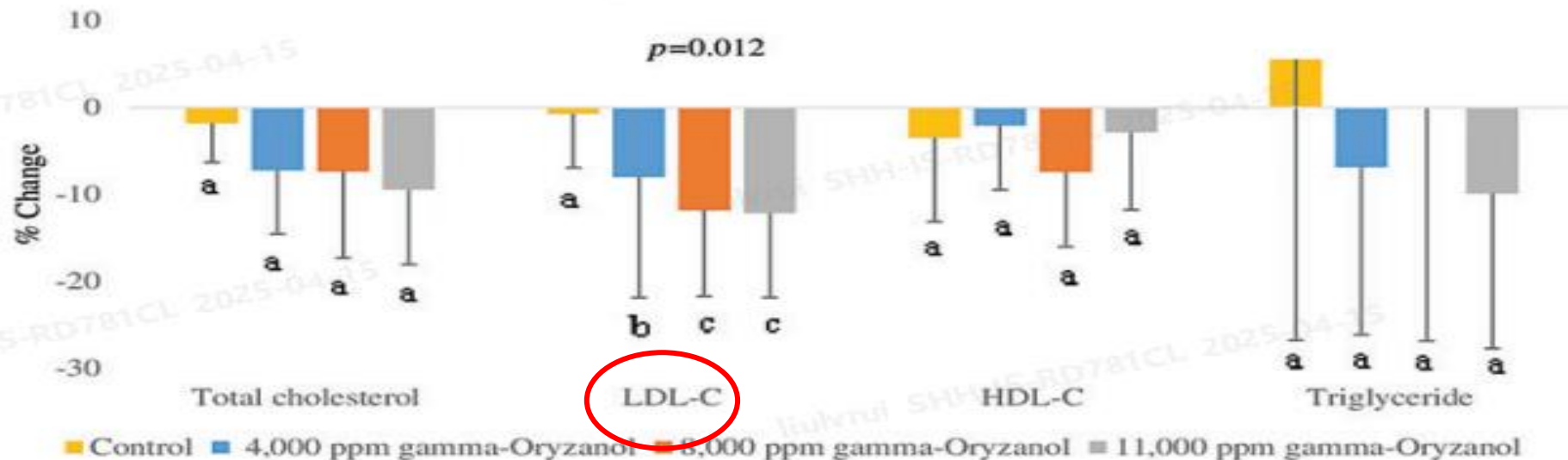
# Health benefits of high oryzanol RBO

## Randomized controlled intervention

- 59 patients with hyperlipidemia
- RBO with 3 different oryzanol levels and soybean oil (control group)

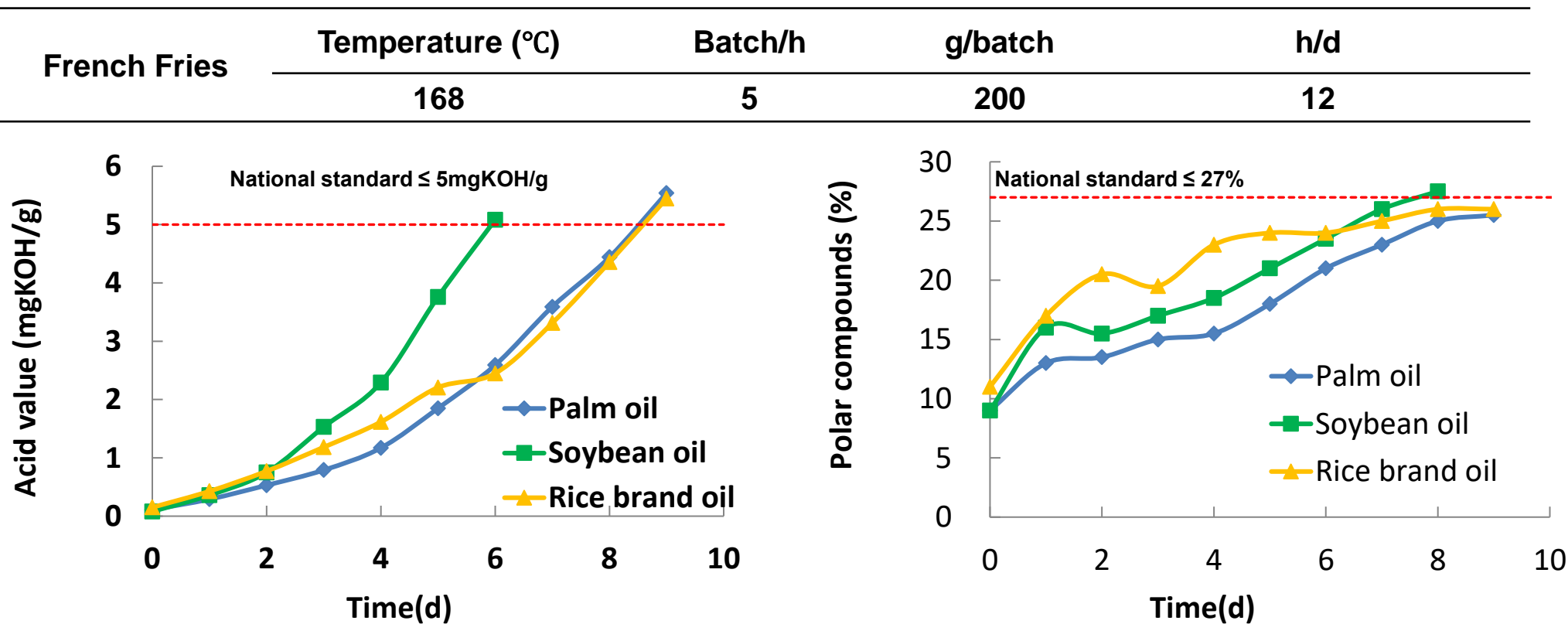
## Intervention method:

- Provide full meals, 30 ml of oil per day for 4 weeks



# RBO used in Food industry

Low oryzanol content RBO is used in the food industry for better frying performance

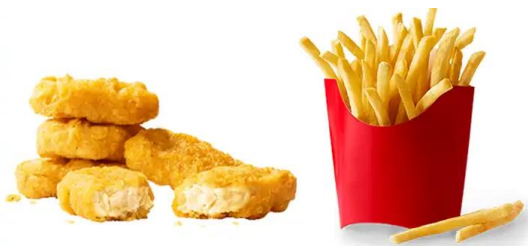


Rice bran oil: pot life similar to palm oil, better than soybean oil

# RBO advantage for blended frying oil

- Challenge of liquid frying oil: stability (related to PUFA) and flavor (18:3 related to fish flavor during frying)

Typical FA profile	%SFA	%MUFA	%PUFA (18:2)	%Lin (18:3)	Problem for frying oil
Rice bran oil	19	42	38	0.8	
Canola	8	65	27	9	18:3 High
Soybean oil	14	24	56	6	PUFA high, 18:3 high
Sunflower oil	11	24	65	0.1	PUFA high
Corn oil	13	30	56	1	PUFA high
High oleic sunflower oil	9	84%	7	0.8	Cost high



RBO: ideal choice to make blended liquid frying oil formula in fast food store

# Various application of RBO in food industry

- Fried potato, rice cracker, whey and corn snacks are the tops of all snacks



Potato chips



Rice snacks



Corn snacks



Rice puffs



Cereal bars



Sweet cookies



Nongshim Shrimp Chips



Pringles chips



Calbee Cup-chips



Kellogg's corn flake



# Rice bran industrial chain

## Rice Bran Byproduct Family

Rice bran wax, soapstock, fatty acids, etc.

Deep processing

For pharmacy/cosmetics



$\gamma$ -oryzanol



Phytosterols



Octacosanol



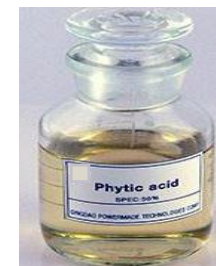
Ferulic acid



Rice bran  
Polysaccharide



Vitamins



Phytic acid



# Applications in dietary supplement/pharmacy

- Bioactive components of RBO are widely used in the pharmaceutical and medical fields



Oryzanol as dietary supplements in USA



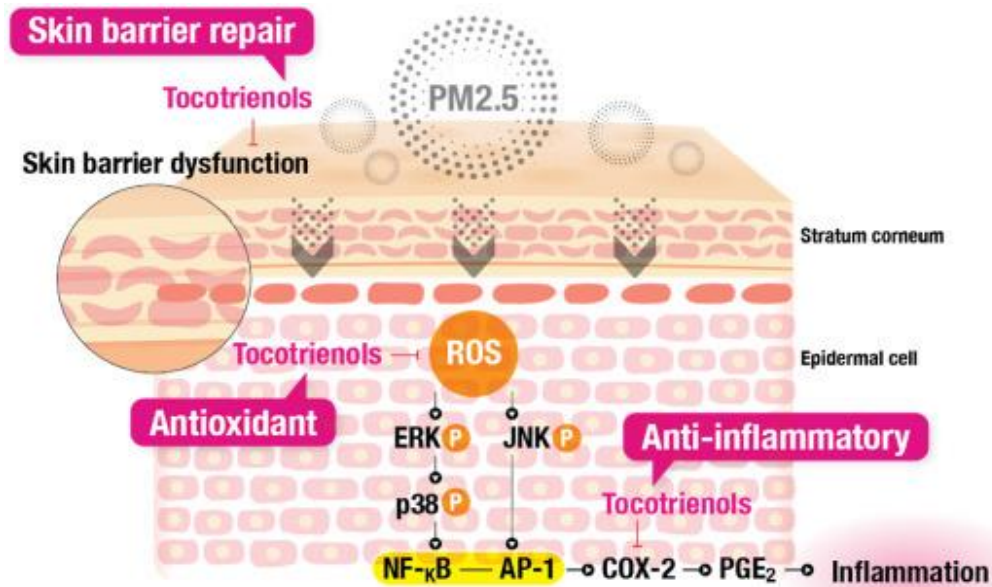
Oryzanol as OTC drug in china



Tocotrienol supplements tablet in Finland

# Applications in cosmetics

- RBO is rich in antioxidants such as tocotrienols, it is used in skin creams and soaps, which claim to slow down aging and the appearance of facial wrinkles.



Tocotrienols reduced PM-induced free radical generation in keratinocytes, as an antioxidant, anti-inflammatory and gene modulator for skin



Oryzanol/RBO as cosmetics in Japan





# Summary

- China's RBO industry has achieved significant expansion in last 20 years.
- RBO has gained widespread adoption across multiple food industry segments
- Rice bran industrial chain delivers enhanced profitability through comprehensive utilization





# THANKS!

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