



# Technological progress in China's bio-diesel industry

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# Importance of Developing Renewable liquid fuel

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- Large import of Crude Oil  
(2004-1.227=2003\*35%,No.2)
- Environment protection
  - PM from diesel
- Strict Environment protection need clean fuel
- China's Crude oil becomes heavier and more content of N and S
- Lack of oil -----energy supply security and rational economy development



## Detailed introduction of Biodiesel

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**total production :  $\geq 50$  k tons ;**

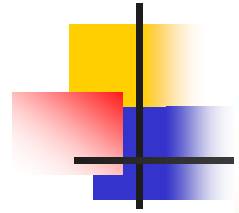
**Listed in RE law and state key scientific & technological development plan**

- **Technology :**
- **Conventional technology: acid and alkali catalyzed reaction in large production**
- **Lipase + supercritical flow reaction -----in lab and batch test**
- **Raw material : wild tree nut**
- **Waste grease**

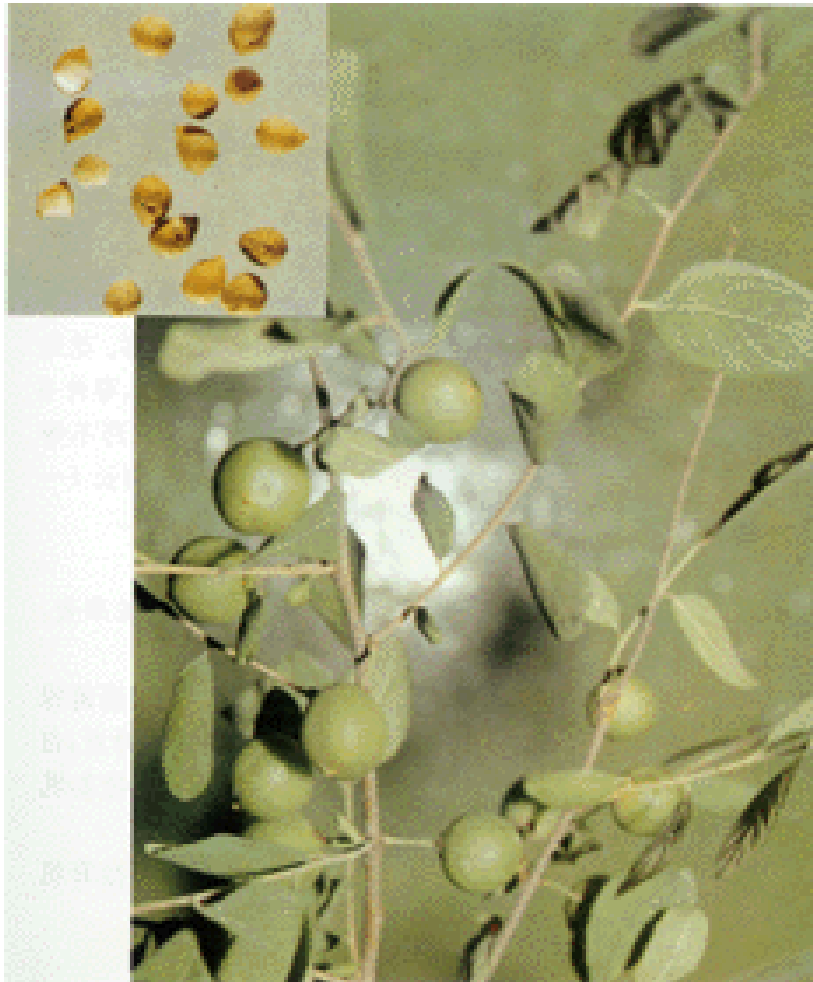
# Zhenghe Co.Ltd



# Gu shan Co Ltd



# wild tree nut--欧李



## wild tree nut--黄连木



# wild nut – 文冠果





# Wild nut---麻风树



# Acid Oil foot----residue of refining process in oil and grease plant



# Waste grease-----kitchen leftover





# Sewage garbage---from grease trap in restaurant



# Gel like Sewage garbage



# Refining process



# extraction process –waste grease sample



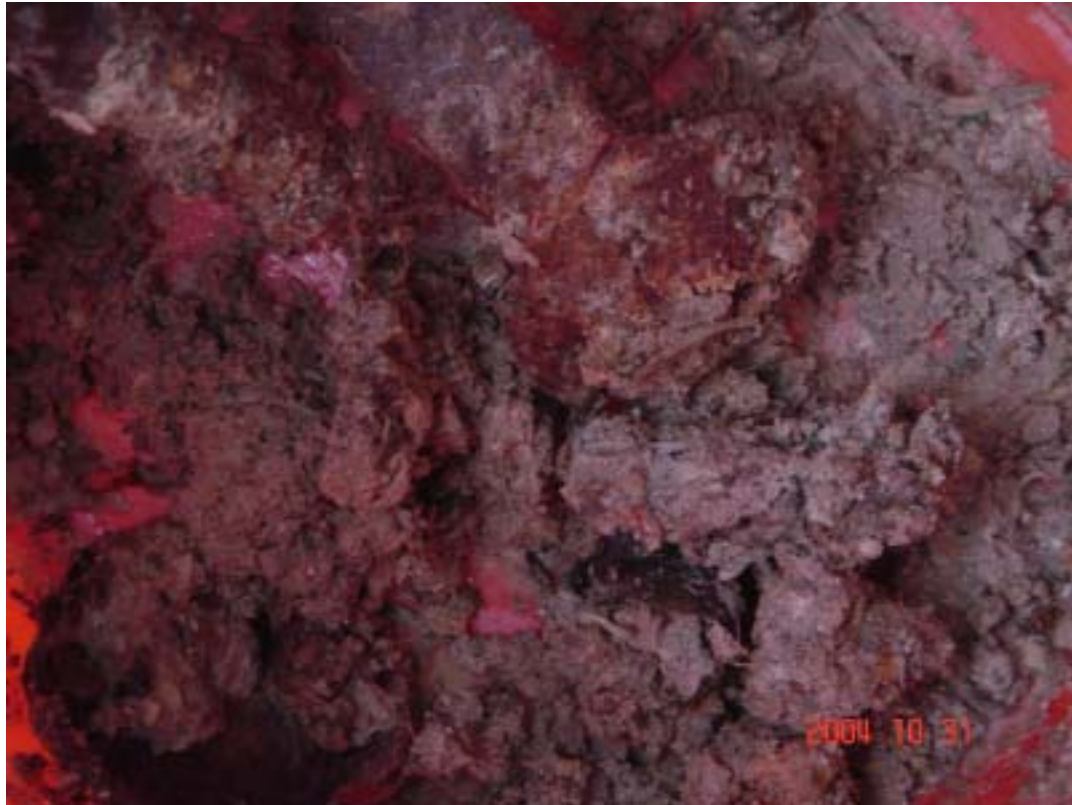


# Residue from grease trap





# extraction process ---residue





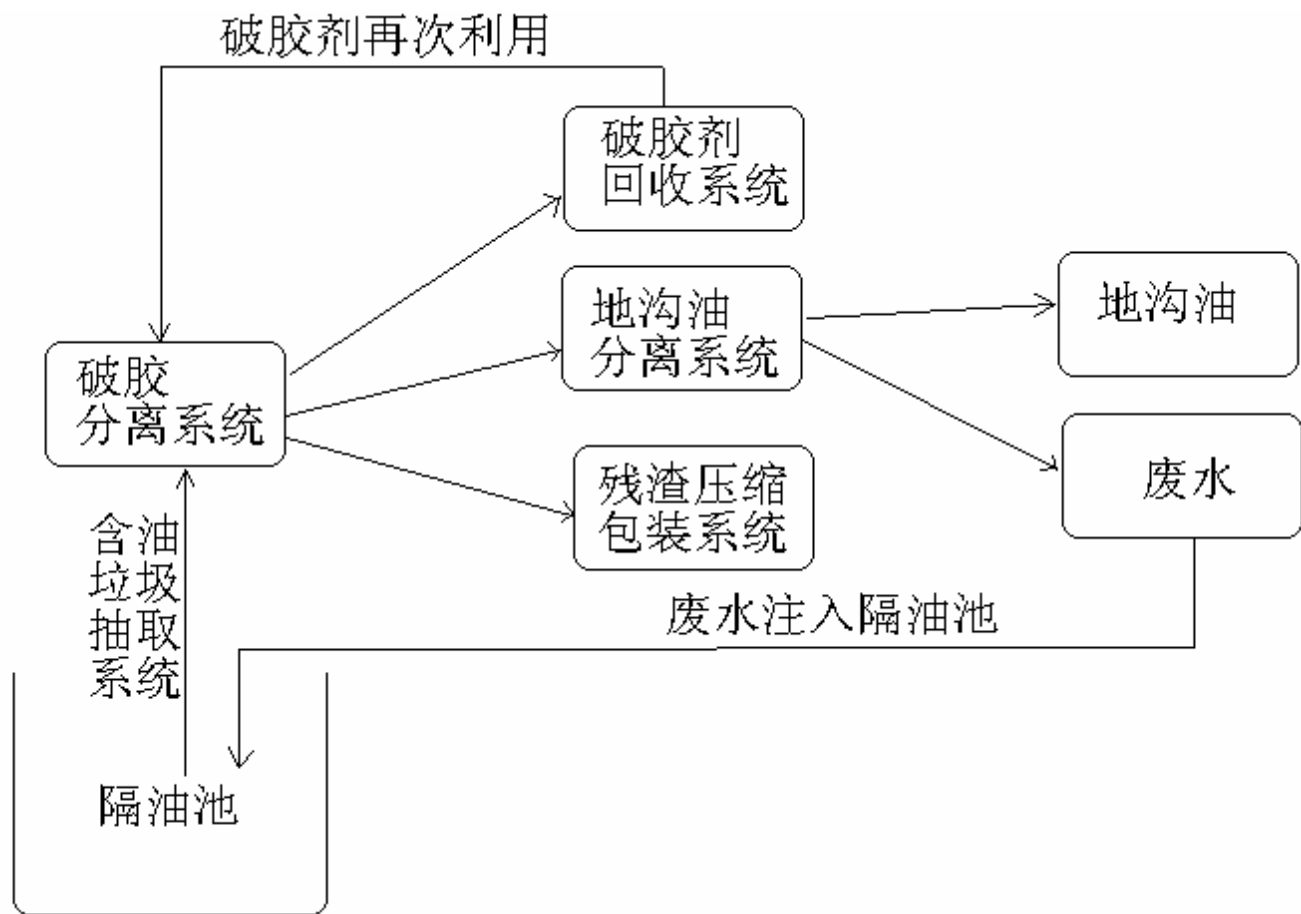
# pyrolysis oil ---- fuel for water boiler



# Pyrolysis residue –waste water filtration



# Extractor :schematic diagram





# waste grease extractor



# Conversion to bio-diesel

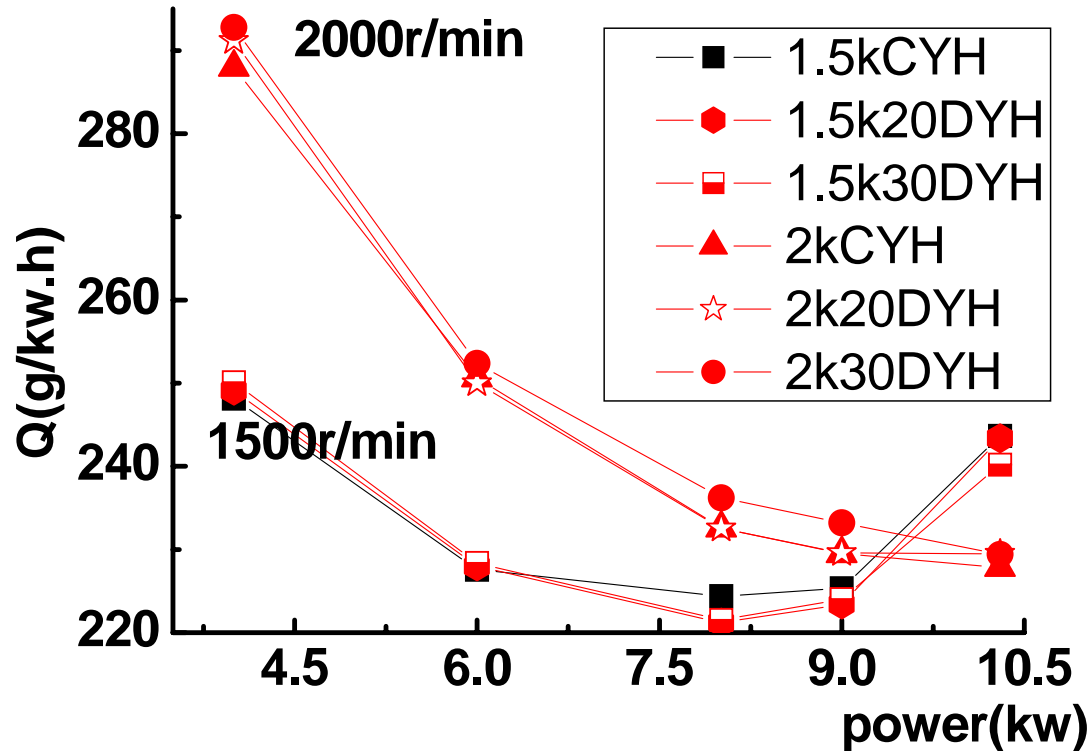




# glycerol

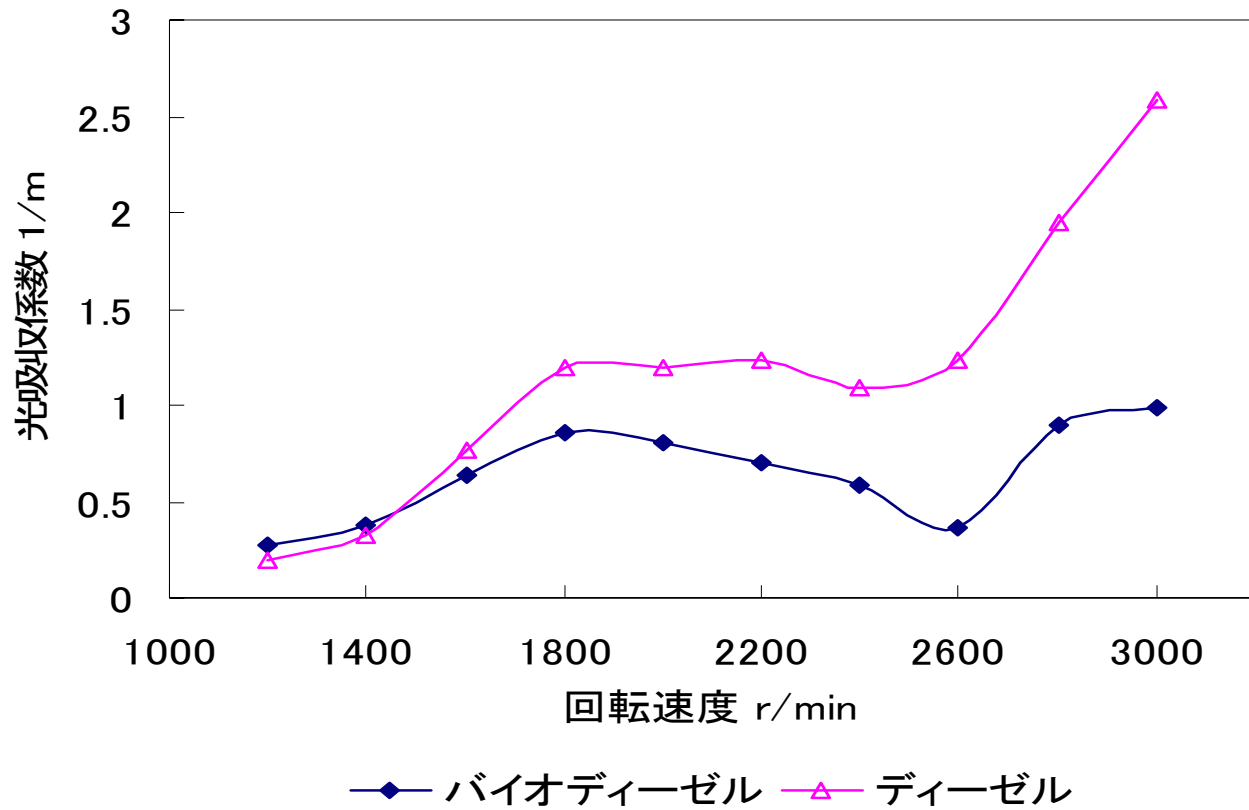


# Oil consumption

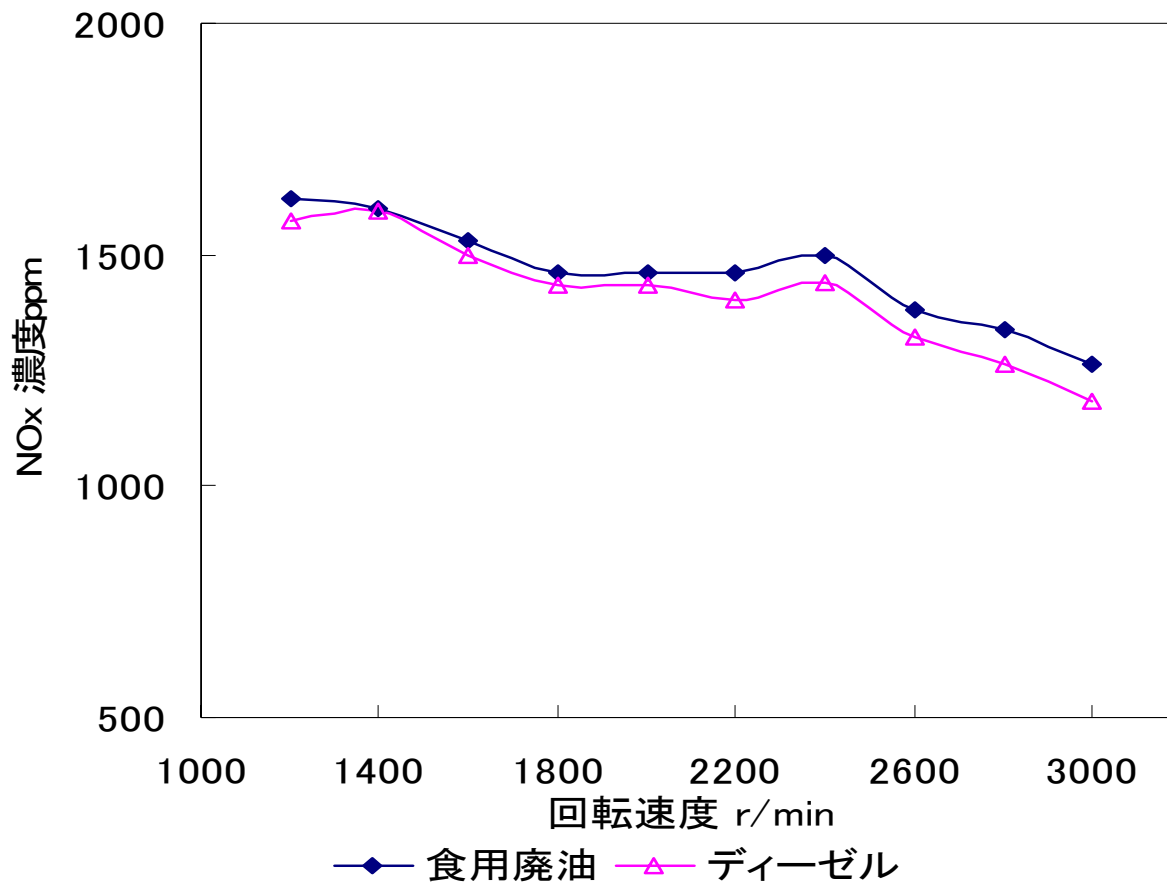




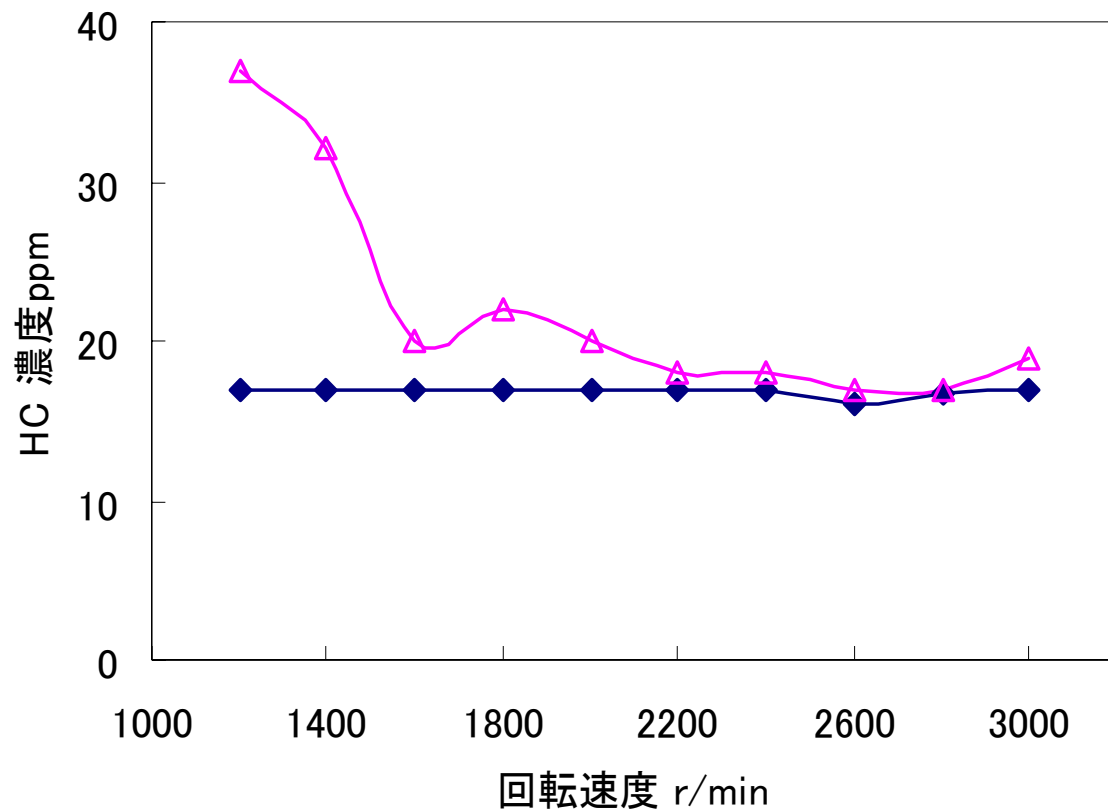
# emission



# NOX emission



# HC emission



—◆— 食用廃油 —△— ディーゼル



## Engine test result

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Same as the bio-diesel obtained  
from rape seed oil



## Economics & Prospect :

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Waster oil ----600-800 RMB/ton;

Biodiesel :<2200RMB/ton;

Short term:

Beijing+ shanghai +Tianjin+ Chongqing=  
200,Kt/a

30\* provincial capital \*2=600,Kt/a

Long term :2M-4Mt/a

**Bio-diesel power the 2008 Beijing Olympics**



## **Future orienting production line**

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- **Grease trap waste ---- biodiesel+ glycerol**
- **Wild tree seed---- biodiesel+ glycerol**



# Cooperation

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- **Bio-diesel**
- **Grease trap waste ----biodiesel+ glycerol**
- **Wild tree seed---- biodiesel+ glycerol**
- **Demonstration project**
- **Policy research: share experience**
- **pyrolysis liquid fuel from biomass**
- technological research : quick heating    slow heating and super-critical    pyrolysis    batch test and vehicle test
- **synthesized oil from biomass**
- common weakpoints ?    How to do then?