



# Natural Fibers in China

Prof. Ph.D ZHANG Jianchun

The Research Center of China-hemp

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## Natural Fibres in China

- 1. General**
- 2. R&D in hemp fibres processing techs**
- 3. hemp agriculture + hemp industries=  
contribution to Food Security**



## Natural Fibres in China

# 1. General



## Natural Fibers in China

In China, we have almost all raw natural fibres for textile industry. Textile people in China not only produce fabrics of natural fibres but also blend different natural fibres, as well as blend natural fibres with manmade fibres to produce textiles with different performance.



# Cotton

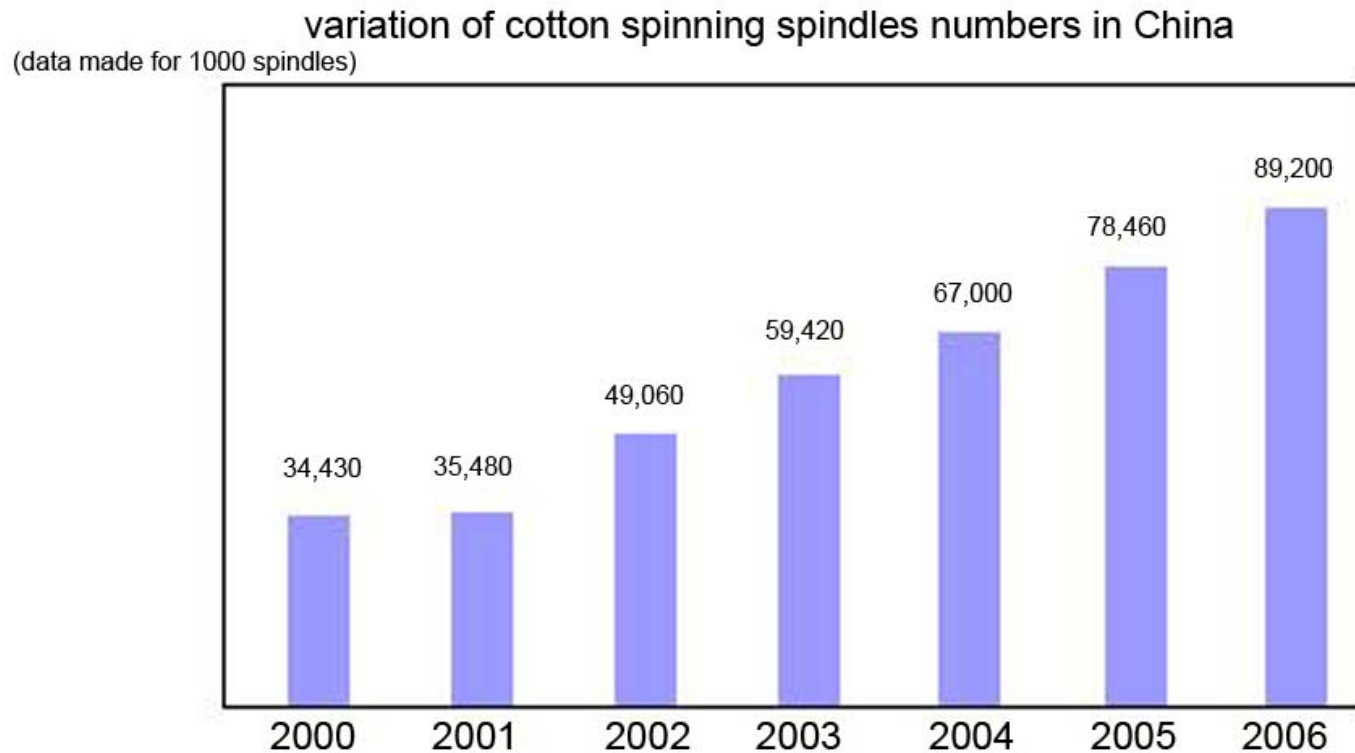
- Acreage of growing: 5,666,666ha(2006)
- Lint production: 6,646,000tons(2006)
- In China: about 40,000,000 farmers involved in cotton growing
- In China: 20,000,000 textile workers involved in cotton textile industry
- Cotton importation: 2,560,000tons to 3,640,000tons in past 3 years



## Natural Fibers in China

# Cotton

with a number of 110 millions of cotton spinning spindles (according to information at beginning of 2008), we have a very clear picture on the capacity of Chinese cotton textile industry.

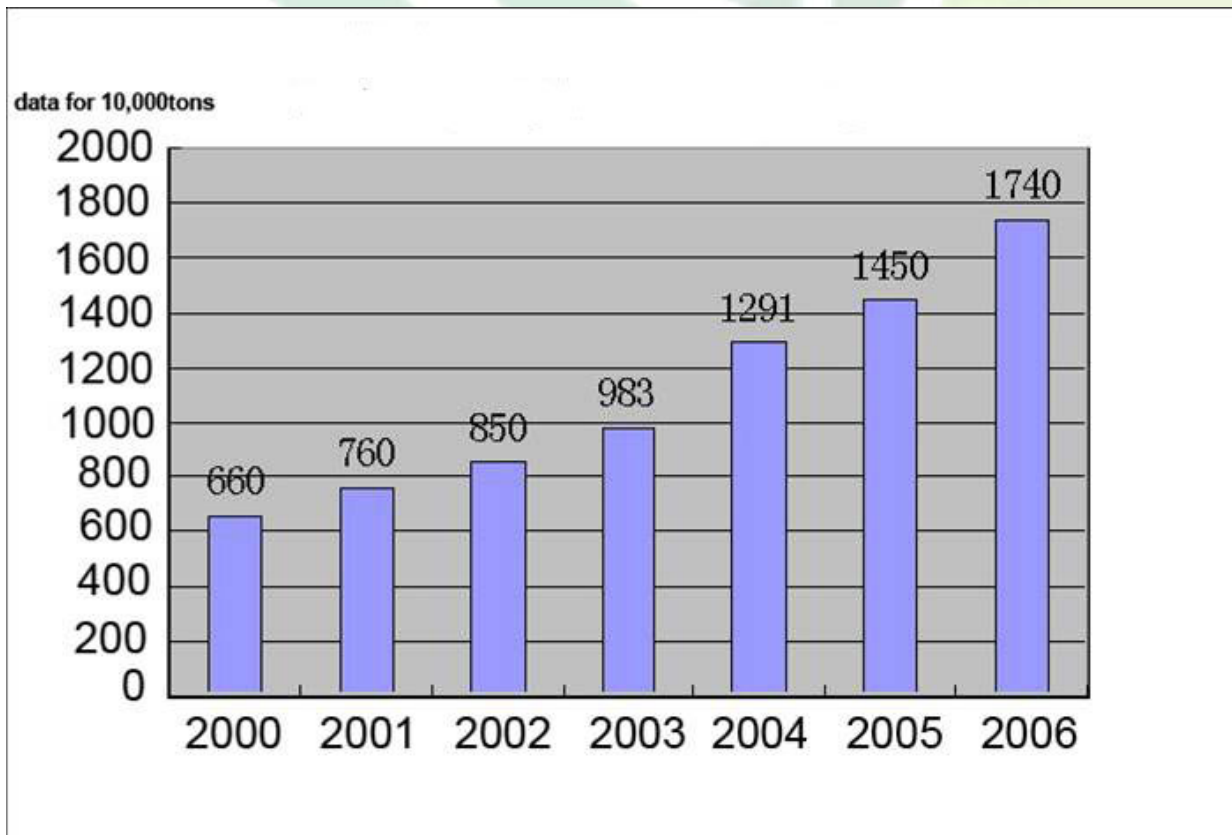




## Natural Fibers in China

# Cotton

Production of cotton yarns in China has been greatly increasing in recent years and its average increase is about 18% since 2000.





# Bast fibres

Type Bast fibres	Production in China(tons)	Processing amount(tons)
Ramie(refined)	113,500	110,000
Flax(scutched)	103,000	258,600
Hemp(refined)	4,000	4,000
Kenaf(retted)	158,000	158,000
Jute(retted)	0	29,000

the data show the processing capacity of flax is larger, but agricultural production of flax in China can only supply 40% raw materials to factories.





## Natural Fibers in China

# Wool, Silk, Cashmere

Type of fibres	Production in China(tons)	Processing amount(tons)
Wool(scoured)	83,000	359,700
Cashmere	8,900	6,100
Raw silk	141,500	109,000

Above data shows China can only supply 24% wool to factories and rest (76%) is to be imported.



## Natural Fibers in China

We shall say: do not put Using Natural Fibres at a contradictory position against Manmade Fibres, because both natural fibres and manmade fibres have their indispensable contribution to the quality of textiles. But it is very important to make consumers to understand: **using more natural fibres in clothing means not only Comfortable but also a Great Contribution to our Mother Nature.**



**2.R&D in hemp fibres  
processing techs**



## Natural Fibers in China

- We cottonise traditional hard fibres from hemp into quite fine, soft and workable textile fibres nearly like cotton

**2kgs of hemp bark → 1kgs textile fibres**

- We also successfully make viscose fibres by hemp core hurd. Hemp rayon staple is ideal for cotton textiles

**3kgs of hemp core hurd → 1kg viscose fibres**



## Natural fibers in China

### Characters of hemp fibres

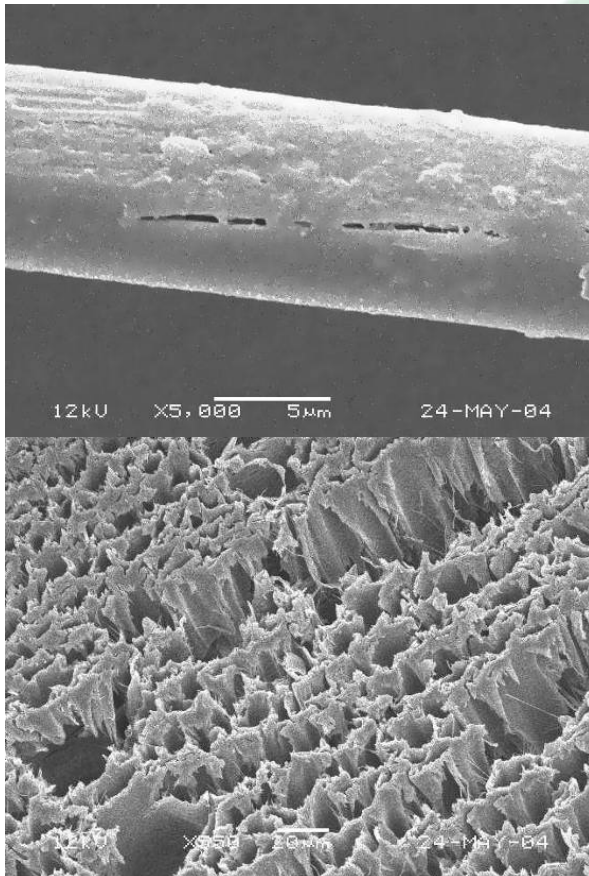
- moisture absorbent,
- Natural anti-bacteria,
- UV-proof,
- excellent adsorbing to toxic gases,
- acoustic silent etc

The characters make very large space for inspiration and commercial selling points



## Natural fibers in China

In Contrast with cotton, hemp has the best quality of moisture (sweating) absorption and dispersancy

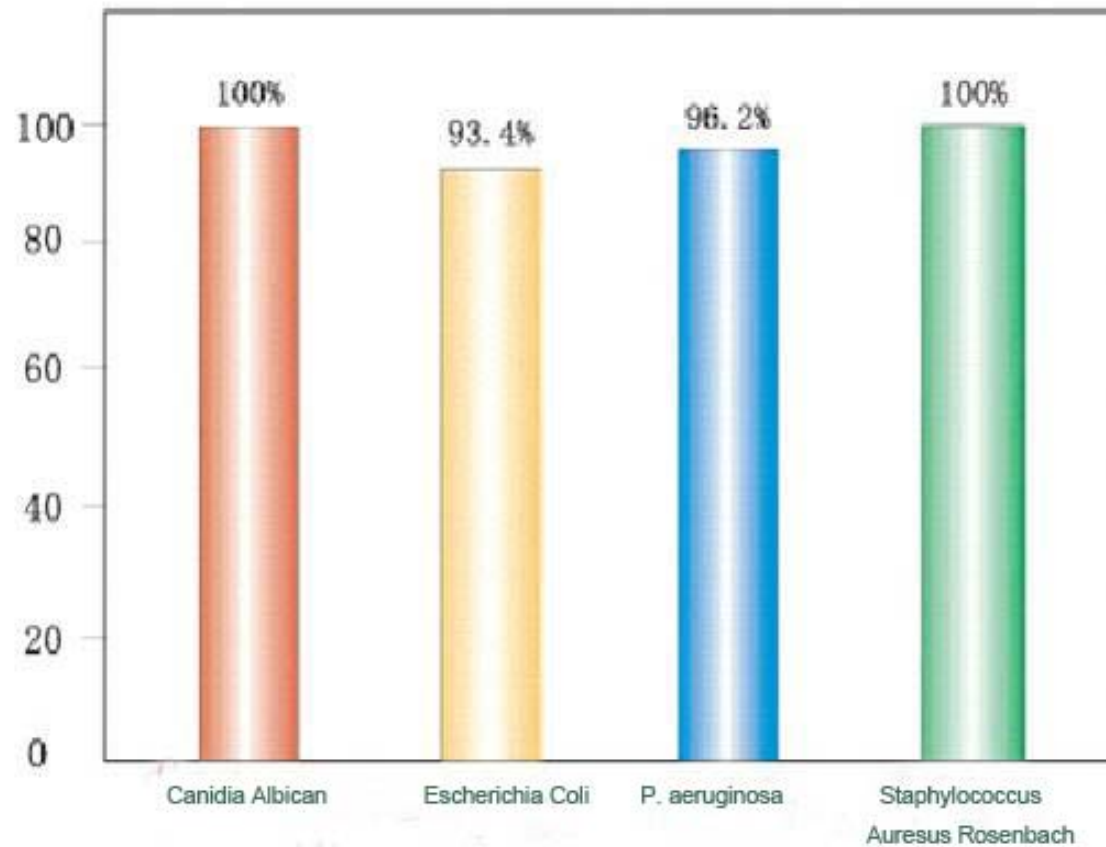


Specifications	Unit	Hemp	cotton
Fiber length	mm	20-25	25-31
Fineness	tex	0.22-0.38	0.12-0.20
Tenacity	N.tex	>0.48	0.22
Breaking elongation	%	2.2-3.2	7.12
Young's modul	N.tex	16-21	6.00-8.20
Heat resistance	Deg centigrade	370	190
Moisture absorption	Mg/min	2.18	1.33
Moisture dissipation	Mg/min	4.4	2.37



## Natural fibers in China

### Natural Anti-bacterial Quality of hemp



**Test result shows: Hemp fiber repress Nosocomial Germs**

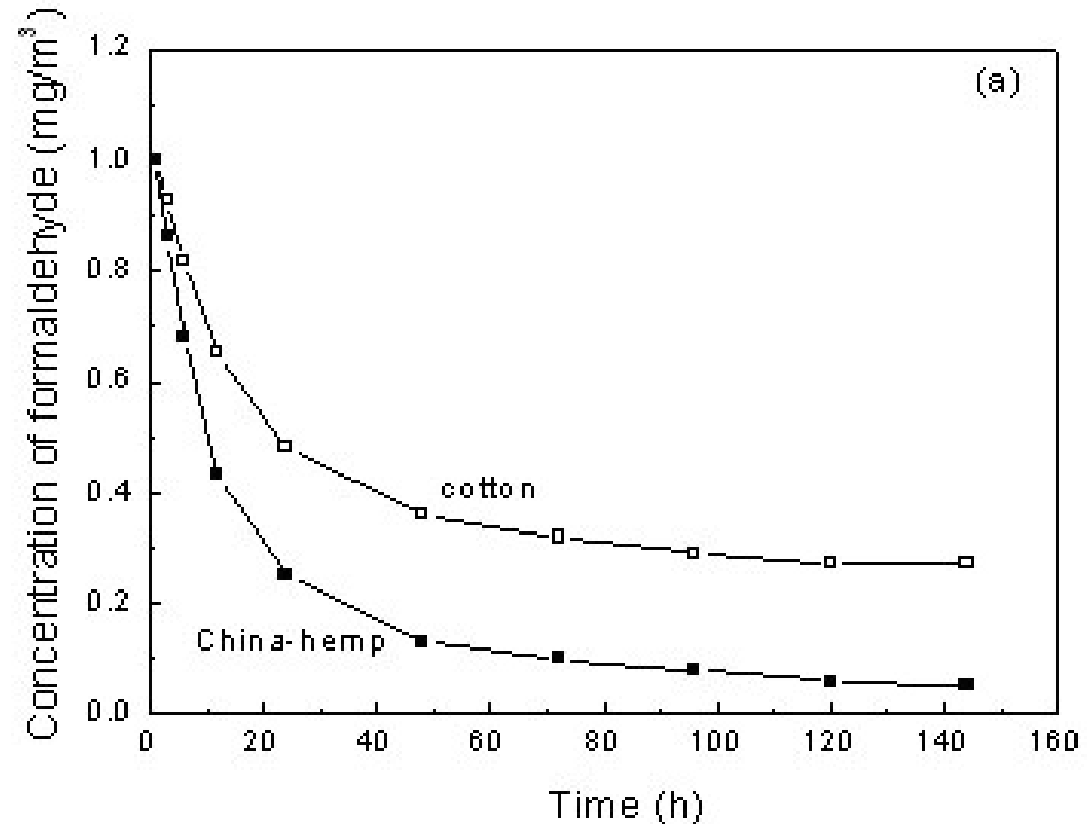




## Natural fibers in China

### Unique adsorbability

Formaldehyde Adsorbing  
of hemp is 9-10 times  
higher than that of cotton



Test contrasted adsorbability to formaldehyde of hemp and cotton

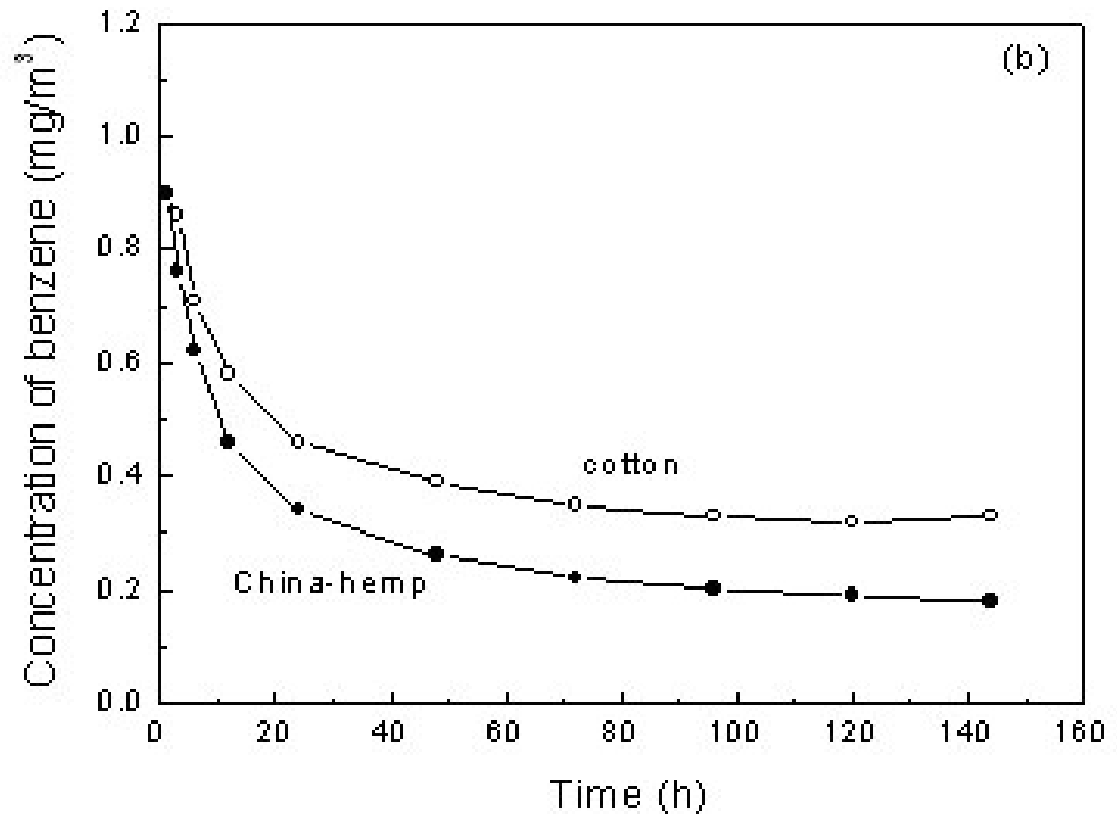




## Natural fibers in China

### Unique adsorbability

**Benzene adsorbing of hemp is 6-7 times higher than that of cotton.**



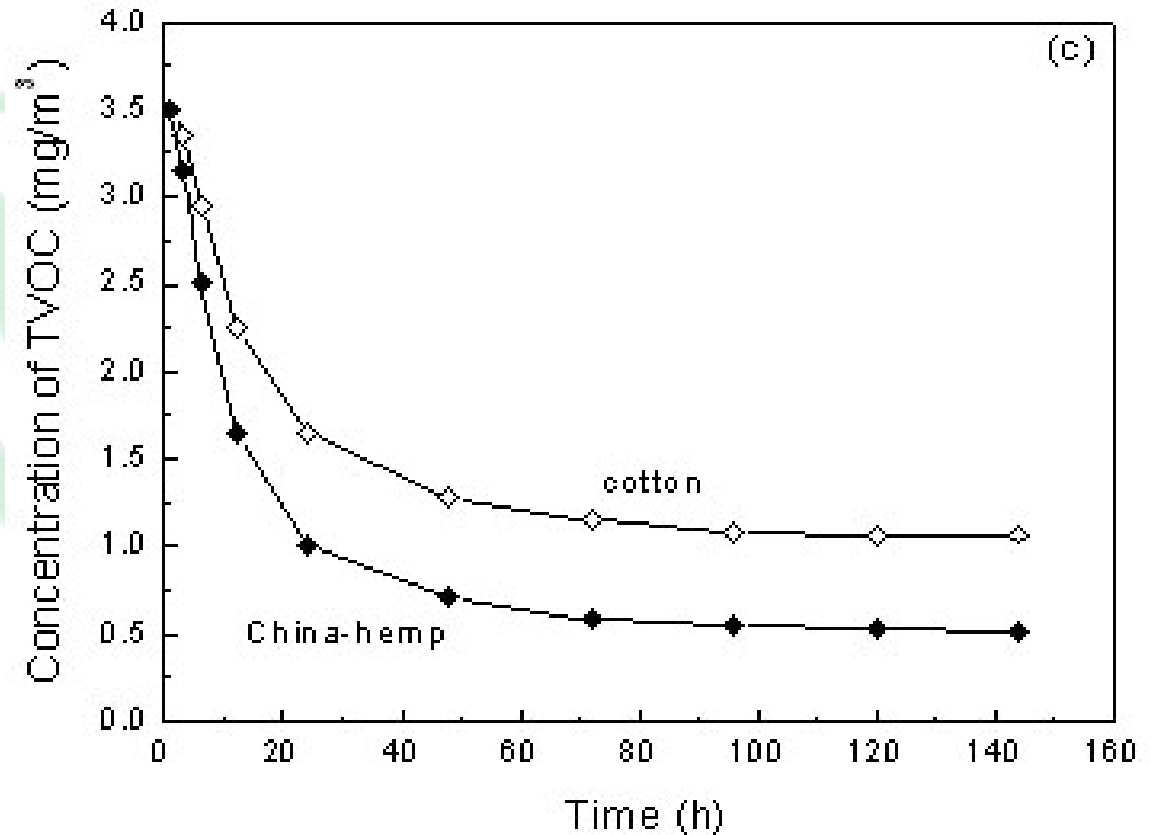
Test contrasted adsorbability to benzene of hemp and cotton



## Natural fibers in China

### Unique adsorbability

TVOC adsorbing of hemp is 6-7 times higher than that of cotton.



Test contrasted adsorbability to TVOC of hemp and cotton



## Natural fibers in China

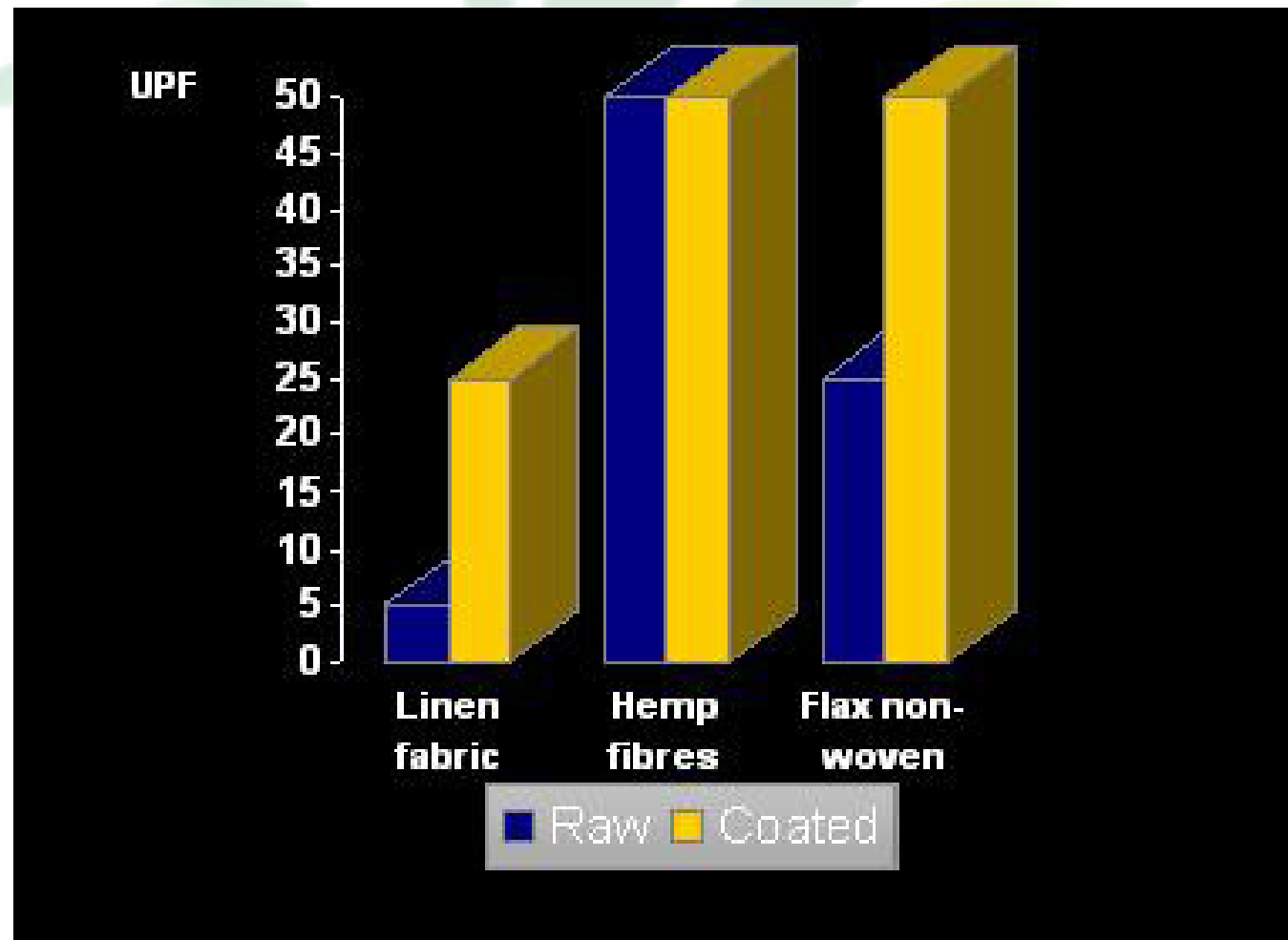
Very high adsorbability to toxic gases of hemp is an excellent attraction for household textiles





## Natural fibers in China

### UV Resistance of Hemp is excellent

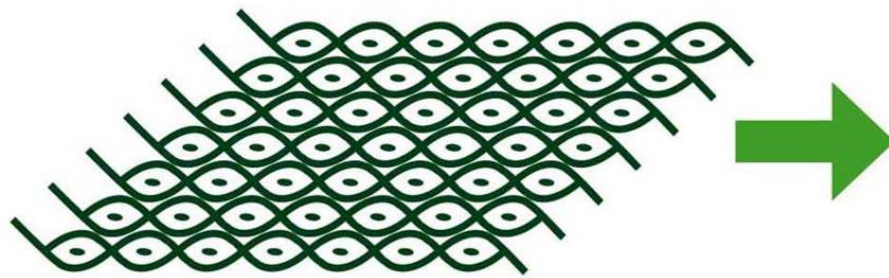




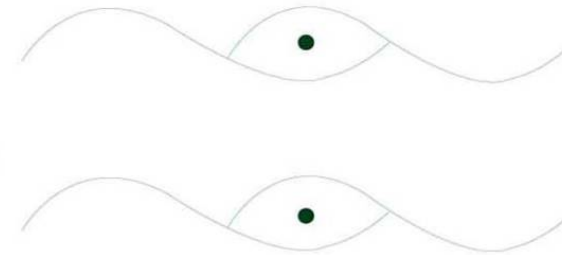
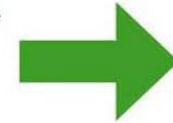
## Natural fibers in China

# Cottonisation of hemp

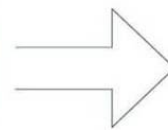
By a group of degumming technologies, we cottonise hemp fibres.



粗、硬(木质素含量8-10%)  
coarse, hard(lignin 8-10%)



细、软(木质素含量0.2-0.3%)  
fine, soft(lignin 0.2-0.3%)





## Natural fibers in China

**We developed technologies and machines for hemp fibre processing**



● 切麻机  
CUTTER



● 分纤漂洗机  
FIBRE SEPARATING  
BLEACHER & WASHER



● 机械软麻机  
MECHANICAL  
SOFTENING MAC





## Natural fibers in China

# We developed technologies and machines for hemp fibre processing



● 快速渗透养生机

HIGH SPEED PENETRATING  
& STRESS RELEASING MAC



● 液氨处理机

LIQUID AMMONIA  
PROCESSOR



● 高温蒸煮机

HIGH TEMPERATURE  
STEAMING COOKER



## Natural fibers in China

# We developed technologies and machines for hemp fibre processing



● 开松梳理机

OPENNING & CARDING MAC



● 汉麻牵切机

DRAFTING & BREAKING MAC



● 高速分离梳理机

HIGH SPEED COMBING MAC





## Natural fibers in China

### Viscose fibres made by hemp hurd

- linters is in China the raw material for producing viscose fibre. We successfully make viscose by hemp core hurd. There are 3 significances:
  - shortage of linters supply in China can be relaxed;
  - cost of viscose can be decreased;
  - also farmers benefit more
- hemp viscose still have very strong anti-bacterial quality, thus it is a functional viscose fibres and Asahi Kasai has the same conclusion after they test our hemp viscose in their lab
- hemp viscose fibre has also very good resistance to UV, therefore fabrics made by hemp viscose will have much stronger UV resistance than viscose made by linters.



## Natural fibers in China

# Viscose fibres made by hemp hurd

### Specification of Viscose staple fibers made by hemp core hurd

Item	spec dtex X mm	origin	color	Dry denacity cN/dtex	Wet tenacity cN/dtex	Dry elongation %	Luster
1.5d x 38	1.67 x 38	China	white	2.49	1.53	22.31	bright
3d x 62	3.34 x 62	China	white	2.44	1.41	25.72	bright

Our test shows: hemp viscose has same anti-bacterial character like the fibres extracted from hemp bark



**3. hemp agriculture + hemp industries  
= contribution to Food Security**



## Natural fibers in China

### Hemp agriculture---benefits for Food Security

- cotton growing needs correct soil conditions and a great amount of pesticide must be used
- hemp asks for much lower soil condition and much less pesticide will be used for growing hemp, which means contribution to the protection of soil and environment.
- if 1'333,333 ha. of hemp will be grown, China can less grow about same acreage of cotton, which means this 1,333.333ha. can be used for growing food crops!
- Our great plan: by growing 1,333,333ha. of hemp to produce 2,000,000tons of fibers for China textile industry
- Main crops in northern China plains are soybean and wheat, hemp is the best choice for Rotate Crops---farmers make better use of their lands and make more money in the same time.



## Natural Fibers in China

### **Comprehensive using technology of hemp---benefits for farmers and industries.**

- Hemp core hurd: wood plastic composite, activated carbon
- Hemp seed: Edible oil, healthcare oil, cosmetics & lotions
- Hemp leaves and flowers: new medicines
- hemp roots: will not be thrown away--- combustibles





## Natural fibers in China

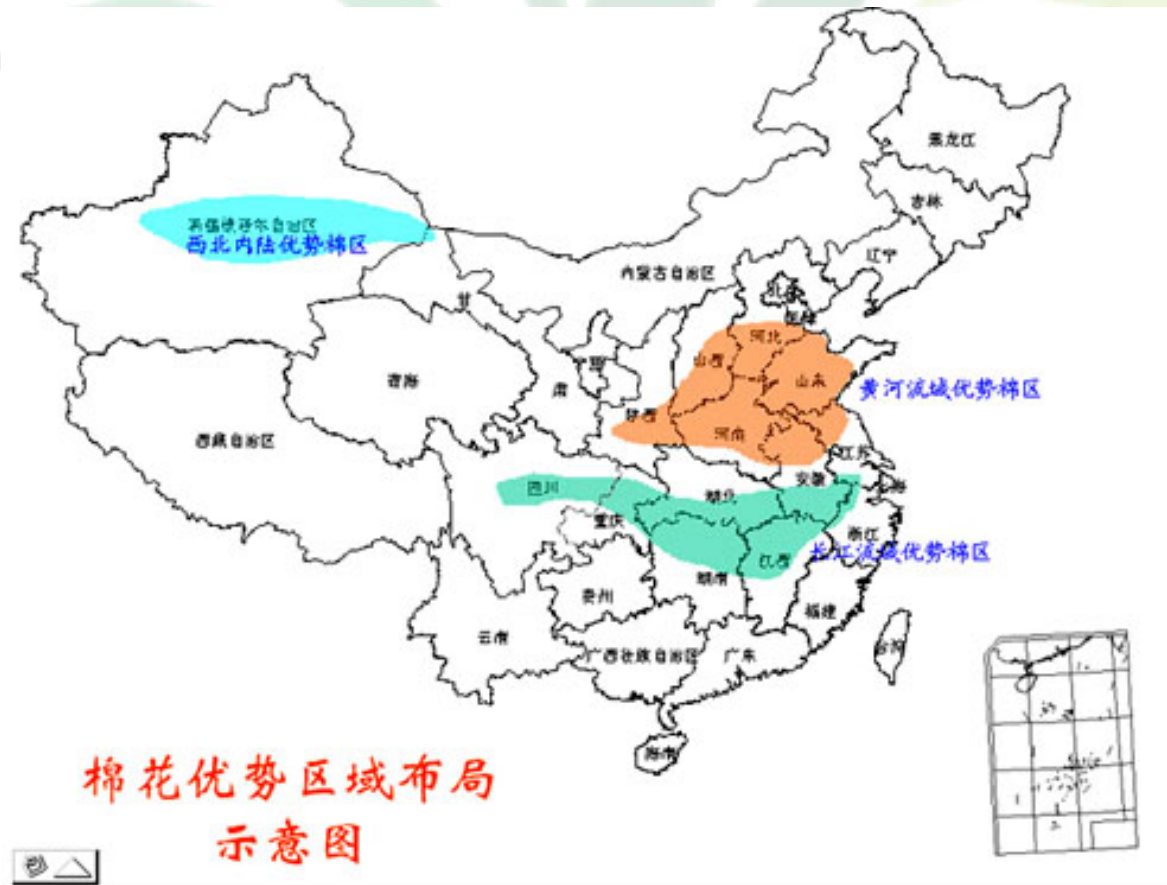


Hemp WPC has been used for outdoor flooring of Beijing Olympic Park



## Natural fibers in China

major cotton growing regions are also the same regions where major food crops such as rice and wheat grow.







## Natural fibers in China

In this map, green colored parts are the regions we plan to grow 1,333,333ha. of hemp. These regions are not major food crops growing places or hemp will be ideal for rotate crop.







## Natural fibers in China

### **Conclusion:**

- Farmers living on hills & uplands as well as semiarid, and poor soil places will profit from growing hemp
- Our country will have more places to grow food crops
- Industries will also have benefits in developing eco-friendly products with more useful functions



### Living Examples

- Example 1: a family in Xishuangbana
- Example 2: Combine harvester + decorticator
- Example 3: first hemp fibre processing mill at commercial scale



## Natural fibers in China

### **Example1: a family in Menghai County, Xishuangbana**

- The family living at a village in upland and they own about 4 ha.s of tilth in many small pieces.
- Family members: 4persons(wife&husband as farmers, 1daughter at 18 working in hotel of city center and 1son at15, still student in high school)
- Major crops they can grow are rice and corn. They grow about 0.4ha of rice for family's food supply and grow about 1ha of corn for livestock(1 farm cattle, 3pigs, 20 chickens)
- Before they grow 0.7ha of Tea to make money. But recent 2 years, tea price is very low, so they nearly give up.
- Before they did not grow anything in their rest 2ha.s of tilth, because no ideal crop for choice.



## Natural fibers in China

### **Example1: a family in Menghai County, Xishuangbana**

#### **Family budget/plan:**

- Family payout:
  1. food(oil, meat,,vegeatbles)/clothing/power/fertilizer/pesticide (about rmb2,000 per year)
  2. schooling for son(about rmb1200 per year)
  3. renovating house: in 2008, they can use about rmb15000 for renovating house( still they have some surplus)
- Source of incomes
  1. by growing 1.4ha.s of hemp in 2007, he earned additionally rmb18,000(net)
  3. daughter working in hotel contributed about rmb5000 to family

Previously the family could only make balance for food, production and schooling. But in 2008 The family is very happy to be able to renovate house



## Natural fibers in China

### Example 1: a family in Xishuangbana

Old house



Renovated new house





## Natural fibers in China

### **Example 2:Combine harvester + decorticator**

- Hemp is best choice for farmers for rotation with Soybean in northern China, because farmer earning more
- Size of soybean farm in Heilongjiang is normally enormous and farmworkers have to work with machines
- Our newly developed “combine harvest + decorticator” makes feasibility.



## Natural fibers in China

### Example 2: Combine harvester + decorticator



Field Trial of  
Combine Harvester + Decorticator





### **Example 3: first hemp fibre processing mill at commercial scale**

- The factory is located in Xishuangbana, Yunnan Province.
- Its capacity is 5,000 tons hemp fibers per year.
- About 8,000ha.s of hemp planting to be needed for supply hemp barks as raw material to the factory
- Processed hemp fibers will be mainly used for cotton/hemp textiles.





## Natural fibers in China

### the factory in construction





## Natural fibers in China

# the design of the factory





## Natural fibers in China

### **Support from Nation's President:**

- our nation's main strategy for 21 century are:
  - setting up a harmonic society
  - sustainable developing by resources economizing, eco-friendly technologies and technological innovations
  - greatly improving agricultural production as well as the life of farmers.
- Our Nation's President Mr. HU Jintao gave very good evaluation to our project.





## Natural fibers in China

President Mr. HU Jintao was visiting our pilot factory on May 12, 2006.





## Natural fibers in China

President Mr. Hu Jintao talking with Prof. Zhang





## Natural Fibres in China

### **IYNF2009 Event in China**

- Together with the China Academy of Engineering, we are working on organizing seminar + products show of natural fibres, (including also fashion shows) in China between March-April, 2009
- We will invite major cotton and other natural fibres companies of China to attend the event
- We also warmly welcome our friends from all other nations who are working in the field of natural fibres to participate this event.





## Natural Fibers in China

thank you!