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木薯粉加工设备介绍及应用

Cassava Flour Processing Equipment and Its Application

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木薯粉加工设备介绍及应用

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1

Current Status of
Cassava Tuber
Utilization

木薯粉加工设备介绍---木薯块根利用现状

木薯块根利用现状

Current Status of Cassava Tuber Utilization



1

Current Status of
Cassava Tuber
Utilization

木薯粉加工设备介绍及应用---块根利用现状

Cassava is one of the world's three major potato crops with an annual output of more than 100 million tons. It originated in South America, and is mainly distributed in South America, Africa and Southeast Asia and other regions.

- At the beginning of the 19th century, cassava was introduced to China, and is currently mainly distributed in Guangxi, Guangdong, Hainan, Yunnan and other provinces of South China. Its output in 2017 was about 5 million tons.

- The processing and utilization of Cassava root in China has four development processes:

(1) Initial development (early 19th century to mid-20th century): The main processing form is washing cassava flour by small workshop. It is also one of the main feeds for livestock breeding.

(2) Rapid Development (mid-20th century to early 21st century): The main processing form is processing cassava starch and modified starch for industrial use. It is also one of the main non-grain raw materials for alcohol processing.

(3) Steady Development (early 21st century to 2013): The main processing form is alcohol processing.

(4) Structure Adjustment (2013 till now): Combined with the needs of the integrated development of the national first, second and tertiary industries and the rural revitalization, cassava flour and its food processing and utilization have been steadily promoted.



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Current Status of Cassava Tuber Utilization

木薯粉加工设备介绍及应用---块根利用现状

China's edible cassava flour processing and utilization started late. Since 2013, in the context of potatoes became staple food, cassava utilization has attracted much attention, and with the strong support of the modern agricultural industry technology system, we successfully developed a series of cassava food. It includes:

(1)flour: cassava flour, cassava whole flour

(2)bakery: crispy pastry, biscuits, sesame cassava cake, cassava cheese cakes, moon cake, cake.....

(3)beverage: fresh cassava juice, cassava juice

(4)Boiling and steaming: dumpling, steamed bun, noodles, sticky cakes, zongzi, glue pudding.....

(5)others: cassava green onion pancakes, deep fried cassava chips.....



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Current Status of
Cassava Tuber
Utilization

(1)Flour

木薯粉



Cassava Flour

木薯全粉



Cassava Whole Flour



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Current Status of
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木薯粉加工设备介绍及应用---块根利用现状

(2) Bakery





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Current Status of
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Utilization

木薯粉加工设备介绍及应用---块根利用现状

(2)bakery



(图片来自古碧老师)



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(2)bakery





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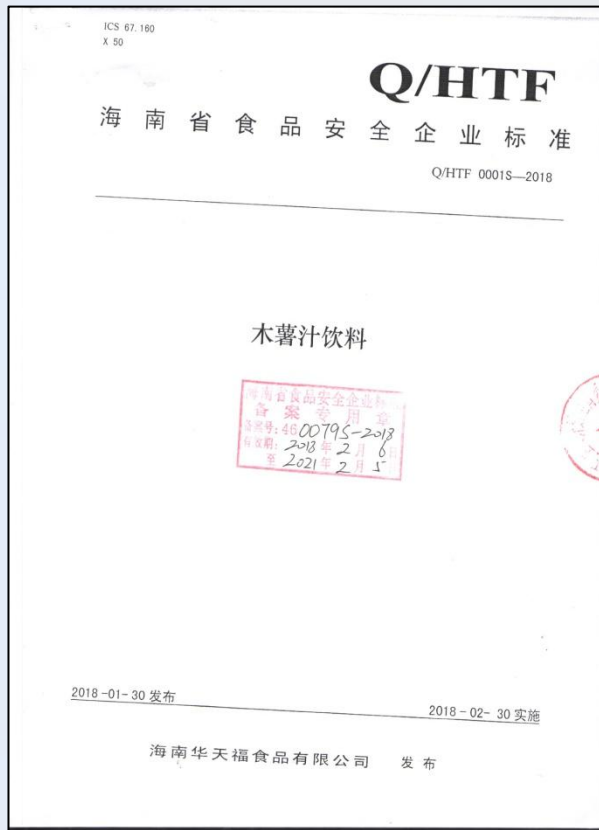
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Current Status of
Cassava Tuber
Utilization

木薯粉加工设备介绍及应用---块根利用现状

(3)beverage

Fresh Cassava Juice





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Current Status of
Cassava Tuber
Utilization

木薯粉加工设备介绍及应用---块根利用现状

(4) Boiling and steaming



(图片来自古碧老师)



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Current Status of
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Utilization

木薯粉加工设备介绍及应用---块根利用现状

(4) Boiling and steaming



煎饺子



蒸饺子



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2

Cassava Flour
Processing
Equipment

》 Sand Separation

鲜木薯笼式除沙清洗机 Fresh Cassava Sand Separation Cleaning Machine



- 1、 Sand separation rate and peeling rate are more than 80%.
- 2、 Size: 4000*1000*2000mm Volume: 8m³
- 3、 Capacity: 5000t/h
- 4、 Power: medium rate 1440r(380V) 1.5kw (220V 2.2KW)
- 5、 Rotation Rate: 50rpm



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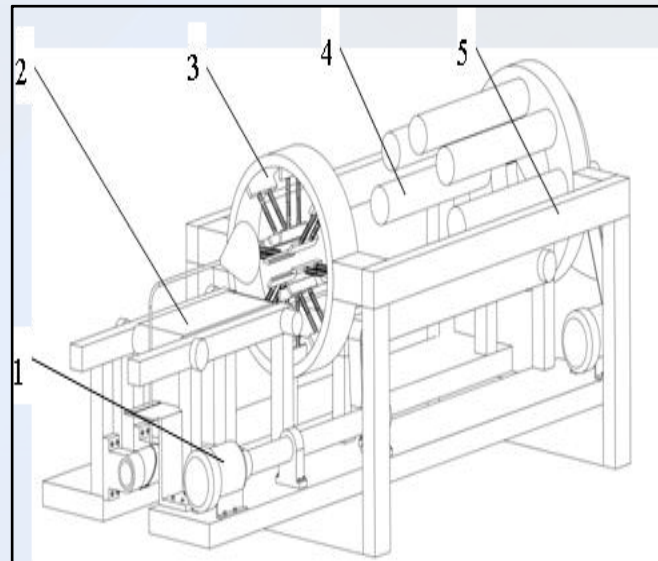
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2

Cassava Flour Processing Equipment

Peeling



Cassava peeling is a key tech of cassava tuber utilization. For many years, it has been peeled in the form of hair roller or grinding friction, and the peeling effect is not ideal. Now we are studying the second-generation machine to use the pressure difference combined with the brush to peel the skin, improve efficiency and solve the problem of industrialization.



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2

Cassava Flour Processing Equipment

Cleaning



- 1、Secondary Cleaning Machine
- 2、Size: 1300*800*1000mm
- 3、Capacity: 5000kg/h
- 4、Power: 1.5kw (220V)
- 5、Rotation Rate: 50rpm



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2

Cassava Flour Processing Equipment

Shredding

- 1、Shred Thickness: 1.5-5.0cm
- 2、Size: 1100*1080*700mm
- 3、Capacity: 3000kg/h
- 4、Power: 1.50kw (220V)



- 1、Shred Thickness: 2.0-10.0cm
- 2、Size: 750*560*960mm
- 3、Capacity: 300-1000kg/h
- 4、Power: 0.75kw (220V)





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2

Cassava Flour Processing Equipment

► Dry

■ Natural Drying

Natural drying is the way that does not use any mechanical or physical chemical methods, while only uses wind and solar energy in the natural environment to remove the moisture contained in the agricultural products. It requires fewer processes and inputs, so it is widely used, but it is limited by environmental conditions and the quality cannot be guaranteed.

■ Hot Air Microwave Drying

Hot air microwave drying is to use hot air to take away the evaporated moisture on the surface of the material. If there is no air flow to carry it away, its surface will form a film of water vapor, also known as the evaporation interface. During the drying process, the water vapor is continuously evaporated, the film layer will slowly thicken. when F (film thickness) = f (evaporation interface), the moisture will stop evaporating.



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2

Cassava Flour Processing Equipment

» Drying

■ Microwave Vacuum Drying

Microwave vacuum drying is to use magnetron to convert electrical energy into microwaves, and microwaves directly penetrate the preserved fruit for overall heating. Hence the temperature of the material continues to rise, and moisture becomes water vapor and goes outward with the heat. It only takes a few minutes to dry. It is fast, efficient, safe and environmentally friendly.





2

Cassava Flour Processing Equipment

Drying

■ Radio Frequency Drying

RF drying is to use polar motion of water molecules under the action of high-frequency electric field, causing violent collisions in the material, so that the water molecules evaporate from the inside of the material to achieve the drying effect. It is a drying technique in the form of high-frequency AC electromagnetic waves, and its frequency range is 3 kHz to 300MHz. RF drying is different from traditional direct heating drying methods. It has high efficiency, even drying, wide adaptability, small damage to drying matter, and accurate moisture recovery control. (Unit Price: 600k—800k yuan)



主要参数	
电源电压	380V ± 5%
电源频率	50Hz
工作频率	27.12MHz ± 0.6%
输入功率	280KVA
射频输出功率	170KW
履带运行速度	2.5米/小时—110米/小时
冷却系统	水冷、空冷
循环水量	5.0立方米/小时
蒸发容量	1.2KG(水)/KW(射频)小时
纱料最大高度	380毫米
纱料最大宽度	1650毫米
外形尺寸	13米 × 2.4米(最大3.1米) × 3.3米
机器重量	8000公斤



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2

Cassava Flour Processing Equipment

» Drying

■ Solar Drying

Solar drying is a drying method using solar radiation. According to solar energy receiving and input methods, solar drying can be divided into four types: greenhouse type, collector type, collector-green house type and concentrating type.



■ Vacuum Freeze Drying

Vacuum freeze drying is a method to freeze the aqueous substance at low temperature, and then directly sublimate the water contained in the frozen substance under vacuum conditions, so as to dry the material.

- Maximum Power: 45KWh
- Maximum Dewatering Volume: 200KG
- Dewatering Temperature: -60-70°C
- Unit Price: 300k-400k yuan





2

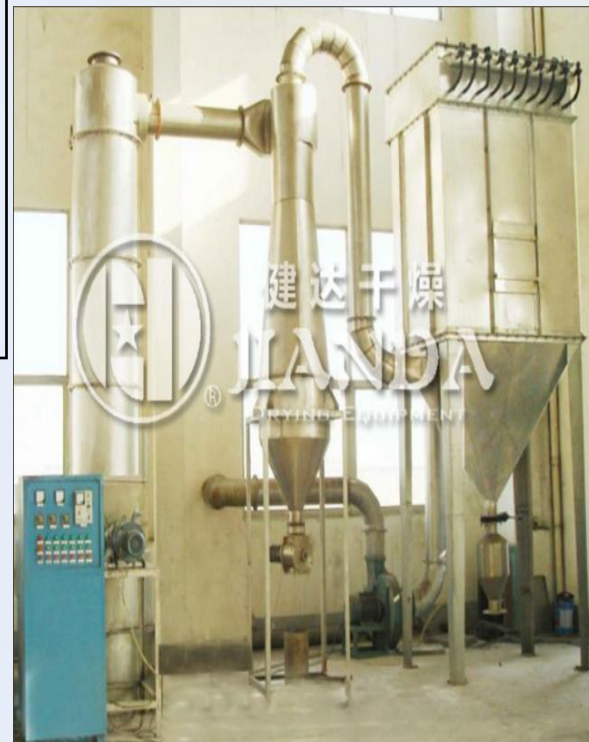
Cassava Flour Processing Equipment

Drying

Flash Drying

Flash dryer is a new continuous drying equipment integrating drying, crushing and screening, which is especially suitable for the drying of cake-like, paste-like and thin mud-like materials. Wet materials can dry in 5-8 seconds.

型号	XSG-2	XSG-4	XSG-6	XSG-8	XSG-10
主机内径mm	200	400	600	800	1000
风量M ³ /h	350-500	1150-2000	2450-4500	4450-7550	7000-12500
蒸发水份kg/h	12-17	40-70	80-150	150-250	230-4250
最大装机容量kw	10	20	40	65	85
最大高度m	4.0	4.8	5.8	6.5	7.1
占地面积m ²	15	20	28	35	40





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2

Cassava Flour Processing Equipment

» Drying

■ Rotary Drying

As the drier rotates, the material will be lifted up and fall back, so it can contact with hot gas more. The increase temperature reduces the vapor pressure of saturated water, accelerates the evaporation of water in the material, and makes the moisture in the material drain and thus it will dry evenly and quickly. ◦





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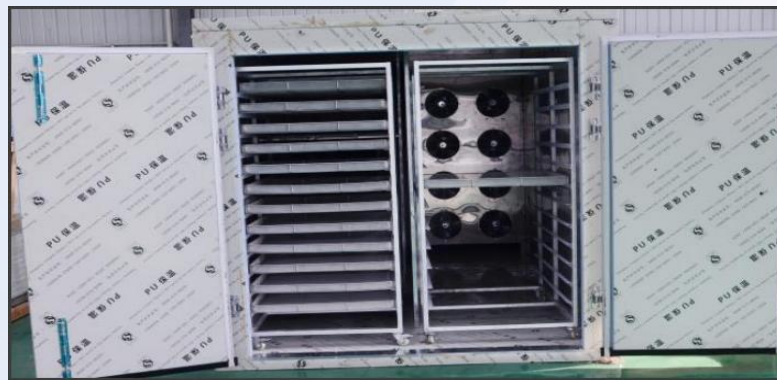
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Cassava Flour Processing Equipment

► Drying

■ Heat Pump Drying

The working principle of heat pump drying is the inverse Carnot principle, consuming a small amount of electrical energy to drive the compressor to run. The high-pressure liquid working medium is compressed into a high-temperature, high-pressure gas, and then enters the condenser to exotherm, continuously heats the drying medium, which can heat the drying medium to 65 °C.





2

Cassava Flour Processing Equipment

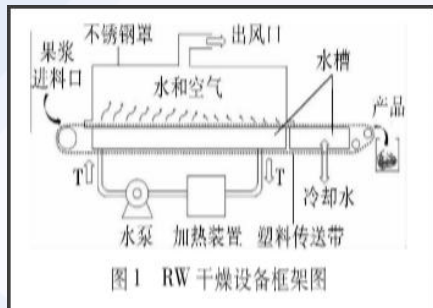
» Drying

■ Spray Drying

Spray drying is a method to atomize thin material in the drying chamber, and then contact it with the hot air to rapidly vaporize the moisture of the material after atomization.

■ Refractance Window Drying

Refractance window drying is a new film drying technology. It uses atmospheric water of 95 ~ 97°C as a heat source, and covers the transparent polyester film on the water surface, and the wet material is placed on the polyester film. The heat will be directly transmitted to the wet material through the polyester film, and the moisture evaporated by the wet material will be eliminated by the exhaust. Finally the material and the polyester film are separated to achieve the purpose of drying.





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2

Cassava Flour Processing Equipment

Drying

Types	Advantages	Disadvantages
自然干燥	工序少、成本低	不卫生、干燥周期长
微波真空干燥	干燥均匀，保持原有品质，杀菌功能	难判断终点，成本高。
射频干燥	快速均匀，物料温度低	热偏移，成本高
热风微波干燥	可连续化生产，杀菌防霉	不均匀，成本太高
太阳能干燥	节能环保，运行成本低	受天气影响，不稳定
真空冷冻干燥	保持原有风味和营养物质，复水性好。	成本高，耗能大
膨化/闪蒸干燥	品质优良，易保存，食用方便	营养损失大，难产业化。
滚筒干燥	效果好，热效率高，可自动化	容易磨损，费用高。
热泵干燥	节能，时间短	致冷机对大气有破坏
喷雾干燥	产品品质稳定，自动化高	投资高，热效率低
折射窗干燥	能耗低，易操作	占地面积大



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3

Cassava Flour
Production Line
(Small Size)

木薯粉加工设备介绍---小型木薯粉生产线

小型木薯粉生产线

Cassava Flour Production Line (Small Size)



3

**Cassava Flour
Production Line
(Small Size)**

Cassava Flour Production Line (Small Size)

Cassava flour processing is to use edible cassava root (cyanide content $\leq 50\text{mg/kg}$) as raw material, by peeling, cleaning, shredding, drying, crushing, sieving and packaging. It is a physical processing without any chemical additives.

Step	Requirement	Note
Peeling	Peel periderm	Remain flesh
Cleaning	Remove sand	Manual needed
Shredding	5-10cm strip or filament	Thickness 3-5mm
Drying	Heat pump drying 65°C 12h	Drain moisture
Crushing	Pounding shredder	Prevent machine being too hot
Sieving	80 or 100 mesh	Stainless steel
Packaging	Non-woven bags	Add lined moisture-proof bag



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Cassava Flour Production Line (Small Size)

Cassava Flour Production Line (Small Size)



Ingredients



Shredding



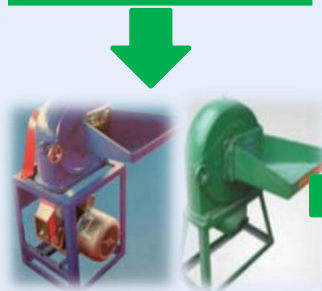
Drying



Pump heating



Patent and standard



Crushing



Packaging

◆ 技术指标Standard:

Raw material utilization rate: $\geq 98\%$; Water consumption volume: $\leq 1.0\text{m}^3/\text{t}$;
Power consumption: $\leq 25.0\text{kwh}/\text{t}$



3

Cassava Flour
Production Line
(Small Size)

木薯粉加工设备介绍---小型木薯粉生产线

Cassava whole flour processing is similar with that of cassava flour, including peeling, cleaning, shredding, preheating, cooling, drying, crushing, sieving and packaging.

Step	Requirement	Note
Peeling	Peel periderm	Remain flesh
Cleaning	Remove sand	Manual needed
Shredding	5-10cm strip or filament	Thickness 3-5mm
Preheating	70°C water for 10 mins	Remove cyanide
Cooling	20mins	Solidification
Steaming	45mins	Maturation
Drying	Heat pump drying 65°C 12h	Drain moisture
Crushing& sieving	80 or 100 mesh	Stainless steel
Packing	Non-woven bags	Add lined moisture-proof bag



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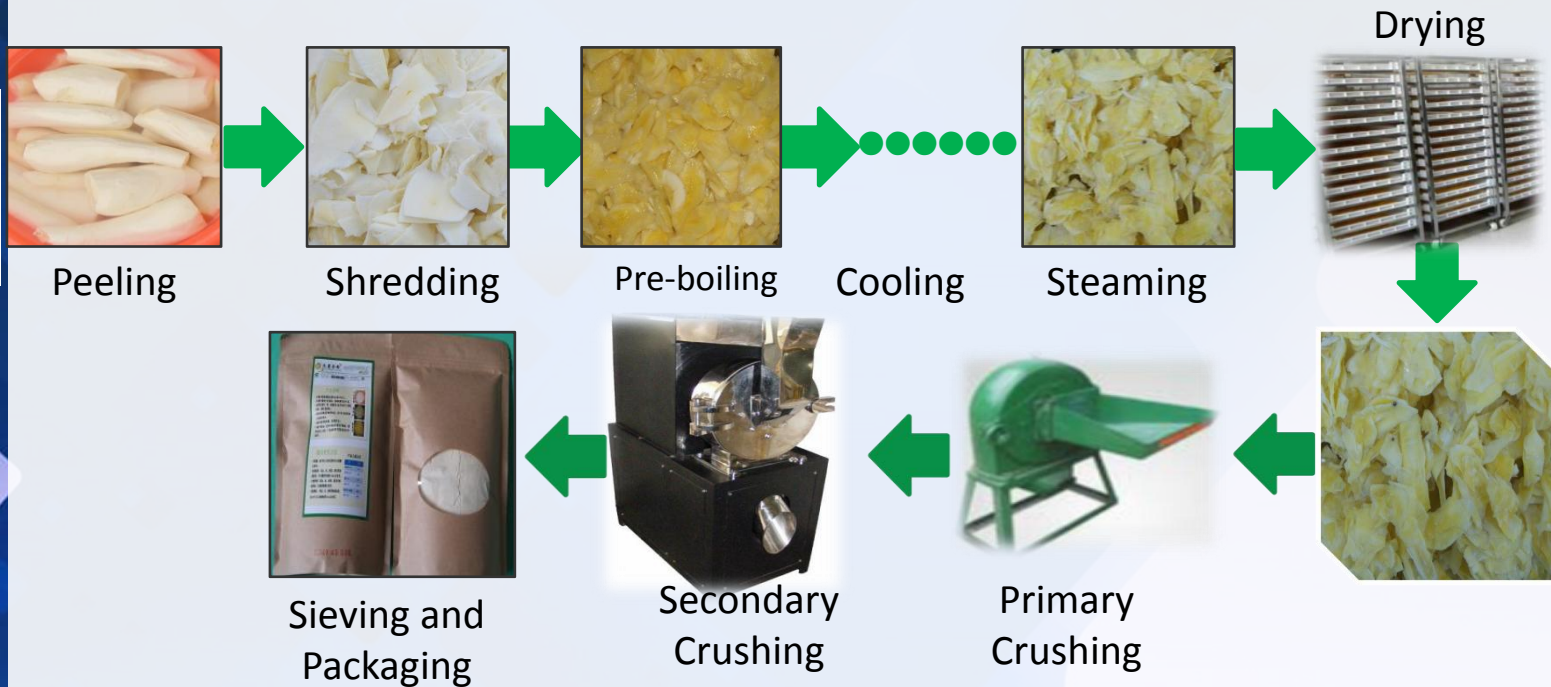
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3

Cassava Flour
Production Line
(Small Size)

木薯粉加工设备介绍---小型木薯粉生产线





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Thanks for your attention!

