

China's solution on rice Post-harvest loss reduction

中国产后稻米减损技术

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2022.09.13

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- 1. Potential losses & causes**
 - 2. Solutions for 3 main sections**

1. Potential losses & causes in sections

type of loss	causes	drying	store	milling
quantity loss	exceed grain content in impurities / by-products/reject or due to leakage	√ √ √	√	√ √ √
quality loss	heat damage due to exceed temp	√ √ √	√ √ √	√ √
quantity loss & quality loss (nutrition loss)	damaged by rats, bird, insect, moldy	√	√ √	√
	ultra low moisture due to exceed drying	√ √ √	√	√
	high broken kernel rate due to exceed pressure / impact /stress variation/ temp.	√ √ √	√	√ √ √
	high crack kernel rate due to exceed pressure / impact /stress variation/ temp.	√ √ √	√	√ √ √
	over milling due to exceed milling degree			√ √ √

2. Solutions for 3 main sections

2.1 Solutions for drying

2.2 Solutions for store

2.3 Solutions for milling

2.1 Solutions for drying

2.1.1 low temperature drying

(air / paddy temperature)

2.1.2 low speed drying

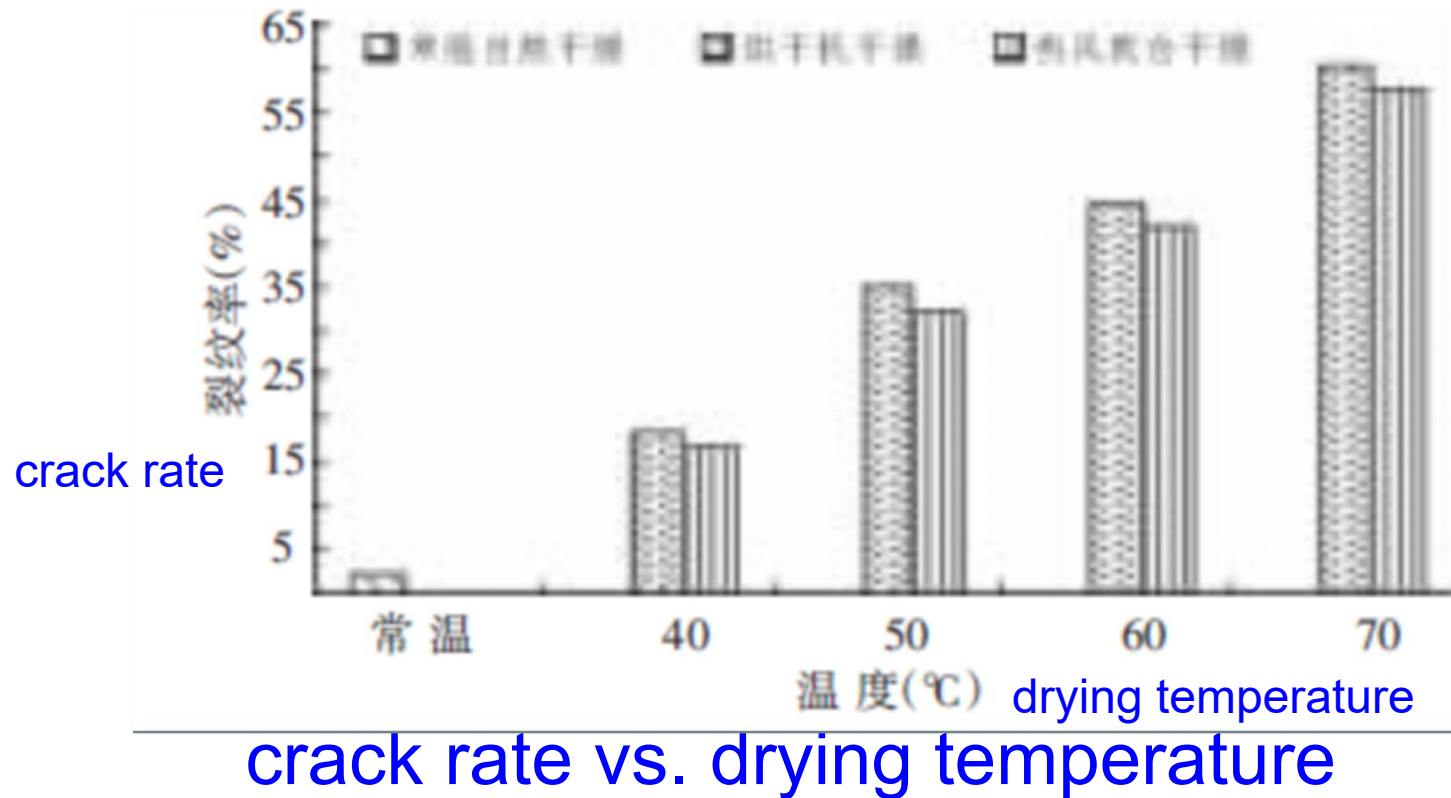
(rate of moisture reduction)

2.1.3 sufficient tempering

(control composition of air)

2.1.1 low temperature drying

lower term. drying = lower crack rate
= lower quantity loss & quality loss



2.1.2 low speed drying

lower speed drying =

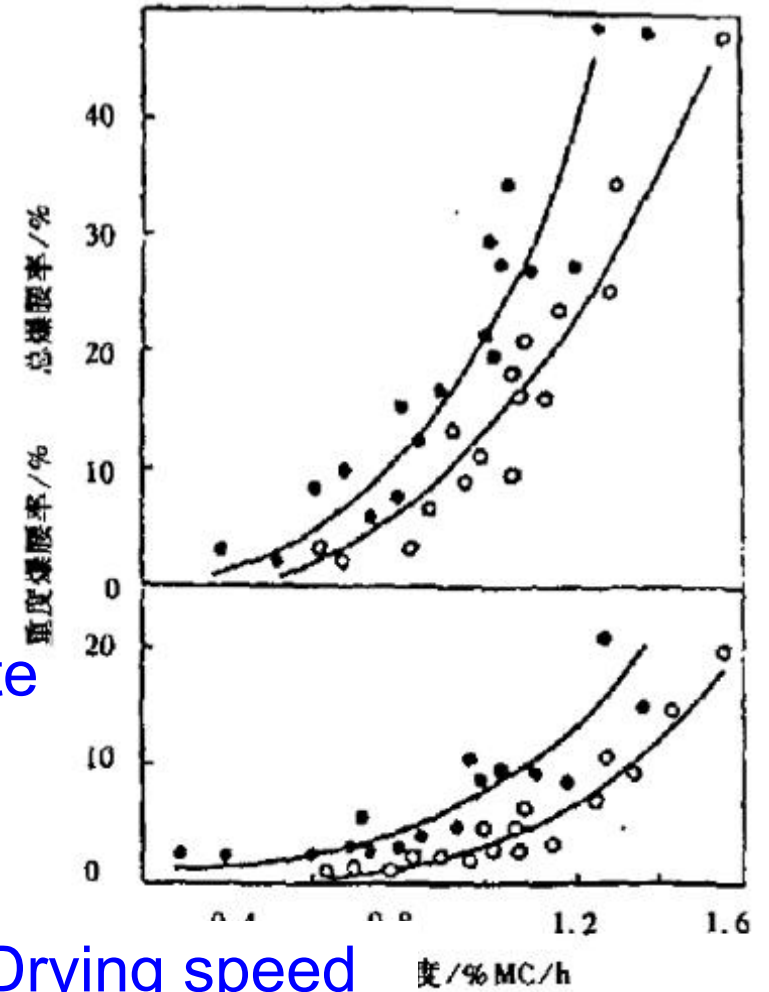
lower total crack rate raise,

lower heavy crack rate raise

= lower quantity loss & quality loss

Crack rate

Heavy crack rate

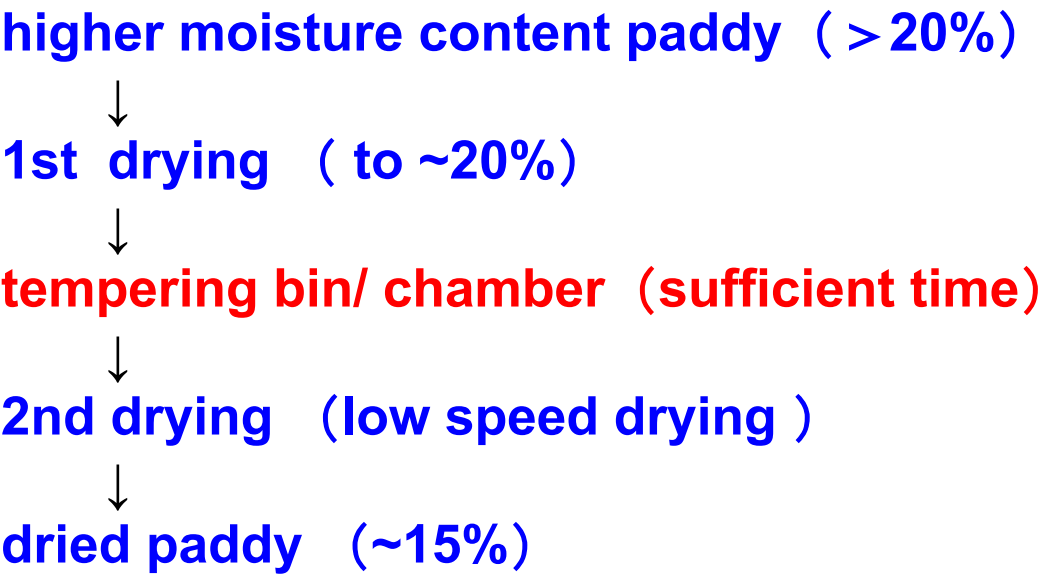


2.1.3 sufficient tempering

sufficient tempering (let moisture tran. to the outside from inside
= less crack rate raise = less broke rate raise
= lower quantity loss & quality loss

	drying temp.	tempering time : drying time	
	(°C)	no stop	3:1
crack rate raise (pentagon point)	45	1.9	0.7
	50	6.6	1.9

combined drying flow



2.2 Solutions for store

2.2.1 air-tight storage

(control air movement)

2.2.2 low temp. storage

(control air / grain temp.)

2.2.3 low O₂ storage

(control composition of air)

2.2.1 air-tight storage

(control air movement)

prevent moisture loss = lower quantity loss

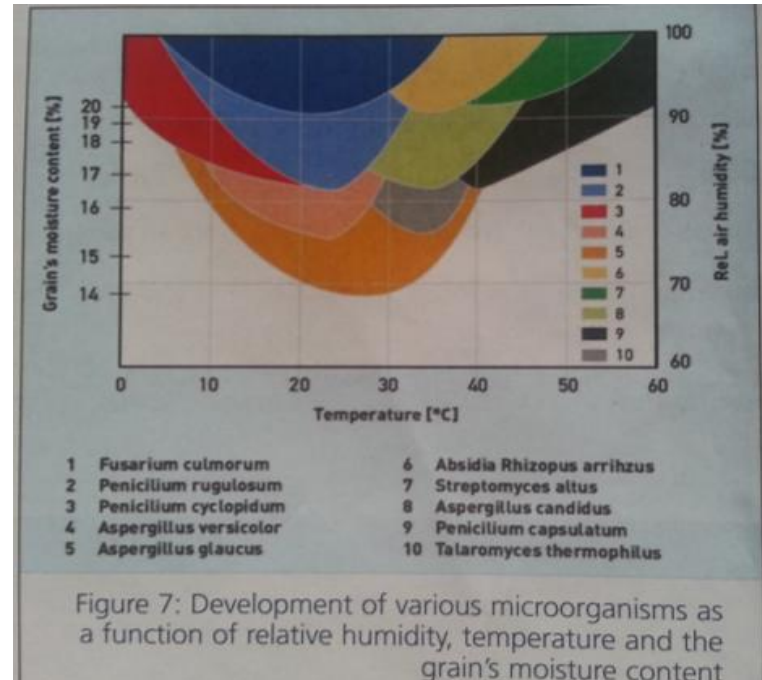
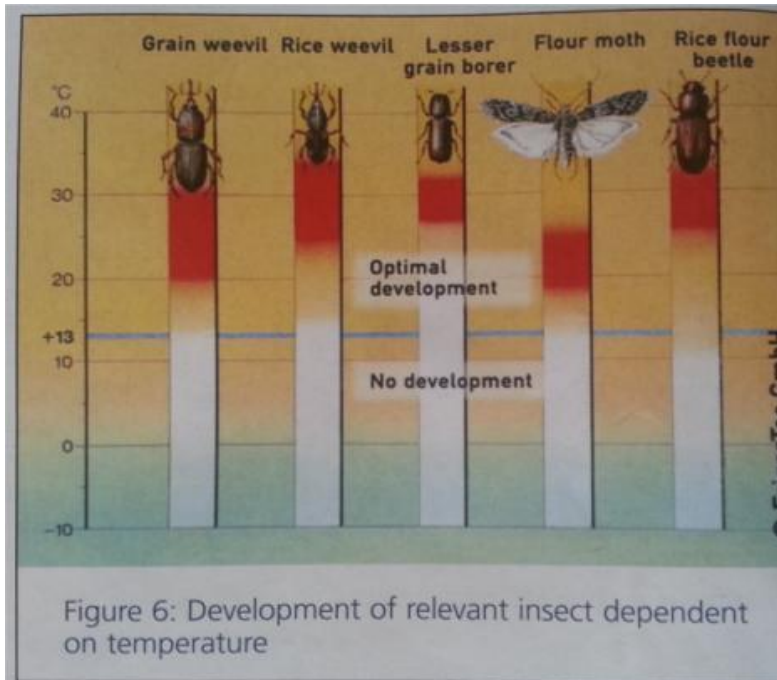
prevent damaged by rats, bird, insect

= lower quantity loss + lower quality loss

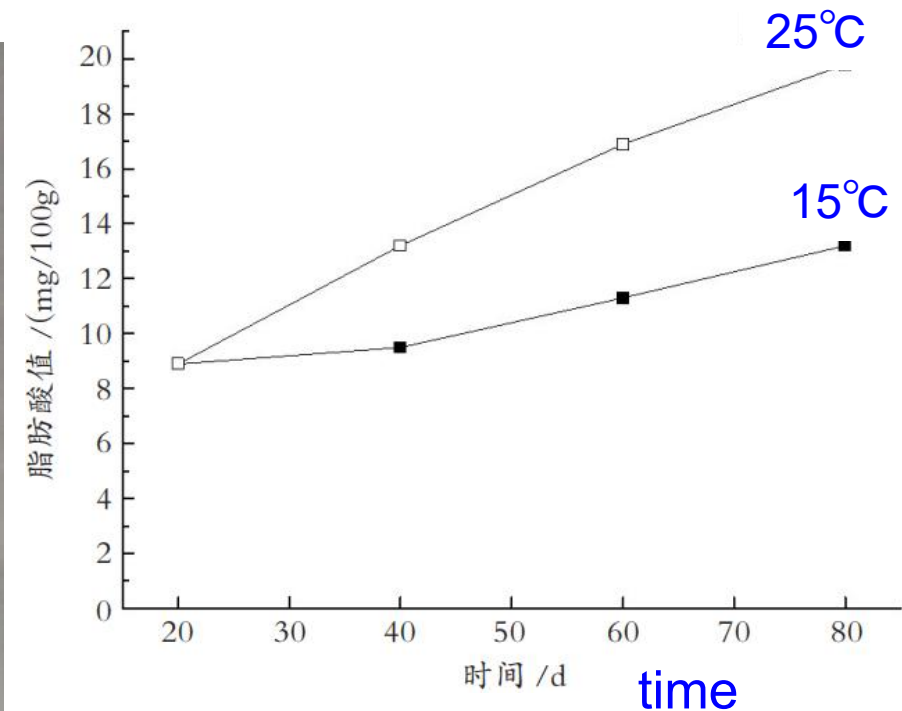
2.2.2 low temp. storage

(control air / grain temp.)

control insect, fungi & lower FAV



FAV



2.2.2 low temp. storage

(control air / grain temp.)

control insect, fungi & lower FAV



air tight + heat isolation + ventilation system / air conditioner / grain chiller

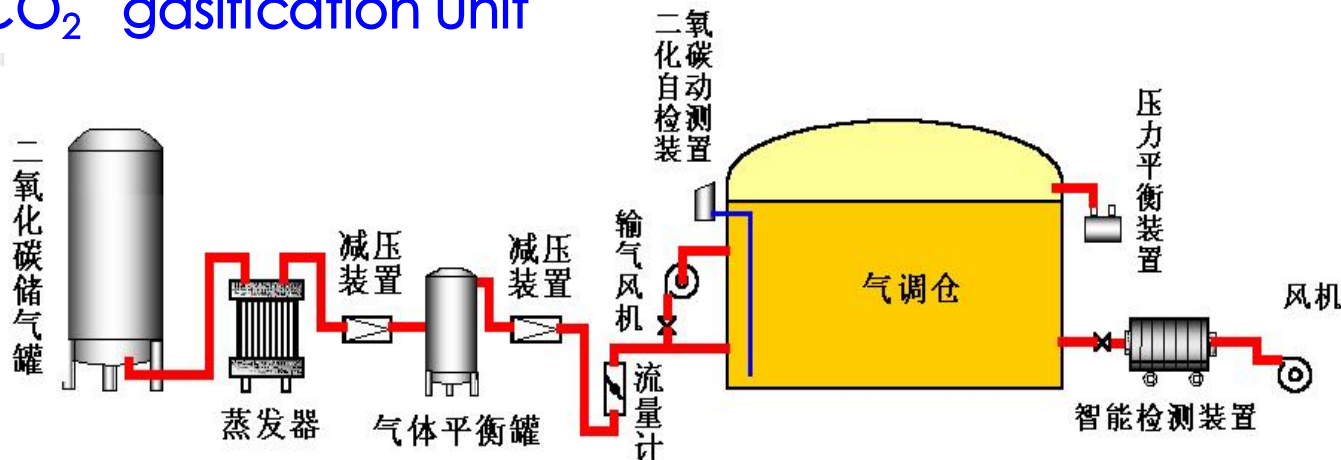
2.2.3 low O₂ storage

(control composition of air)

control insect & lower FAV



CO₂ gasification unit



N₂ separator

2.3 Solutions for milling

- 2.3.1 lower grain content in impurities/ by products
(precise separation to reduce
paddy content in impurities/
whole kernel white rice in broken/
white rice in bran or in bran powder)
- 2.3.2 low pressure husking
(control pressure between husker's rolls)
- 2.3.3 low temp. raise whitening
(control temp. raise in whitening process)
- 2.3.4 low O₂ or light proof packing

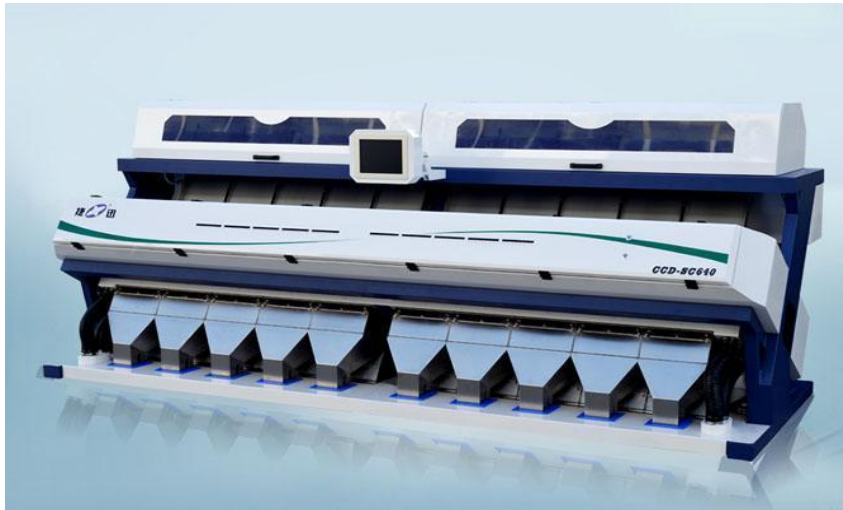
2.3.1 lower grain content in impurities/ by products

(precise sorting /separation)



2.3.1 lower grain content in impurities/ by products

(precise sorting /separation)



color sorting

VS



sifter

+



length grader

precise control broken rice content

2.3.2 low pressure husking

(control pressure between husker's rolls)

Intelligent control frequency conversion (patent)

- Auto adjust the speed of fast roller and slow roller respectively, according to the change of rollers' diameter stabilized line-speed difference, lineal-speed sum
- broken rate drop : >1 percentage point and more



2.3.3 low temp. raise whitening

(control temp. raise in whitening process)

whitening machine (lower temp. raise type)

compared with traditional whitening machine

temperature raise: ↓15 °C~20 °C

broken rate: ↓6 percentage points

power consumption: ↓10 kWh /Mt milled rice



- frequency conversion
- HMI touch screen control
- automation

2.3.4 low O₂ or light proof packing

keep the product in right condition, for longer Shelf Life

- ✓ **air-tight:** plastic bag, PET bottle & tinplate can or Al can
- ✓ **vacuum,** CO₂ filling or N₂ filling
- ✓ **light proof:** tinplate can / Al can /



Solution on rice post-harvest loss reduction

- ◆ low temperature **drying**
- ◆ low speed **drying**
- ◆ sufficient **tempering**
- ◆ **air-tight storage**
- ◆ **low temp. storage**
- ◆ **low O₂ storage**
- ◆ precise **sorting /separation**
- ◆ low pressure **husking**
- ◆ low temp. raise **whitening**
- ◆ low O₂ or light proof **packing**

Thank you
谢谢聆听！

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