



Sensory quality of cooked rice as affected by degree of milling

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Outline

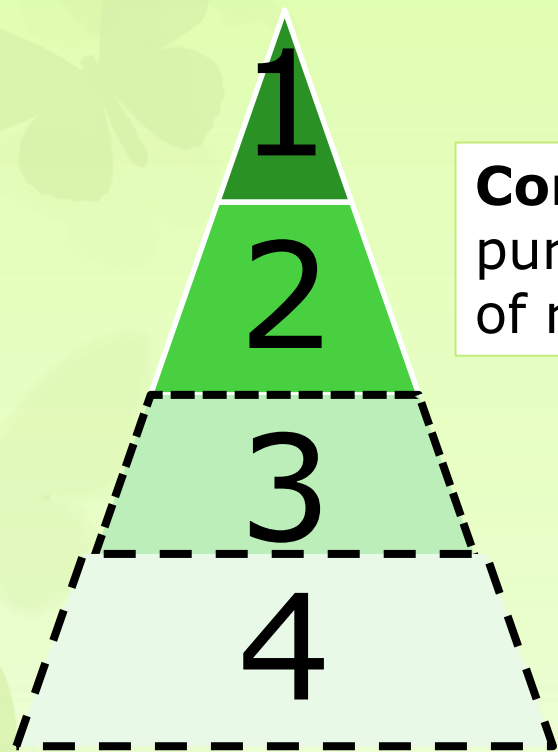


- **Background**
- **The relationship of milling degree and rice quality**
- **The effects of milling degree on expiration date**





Background

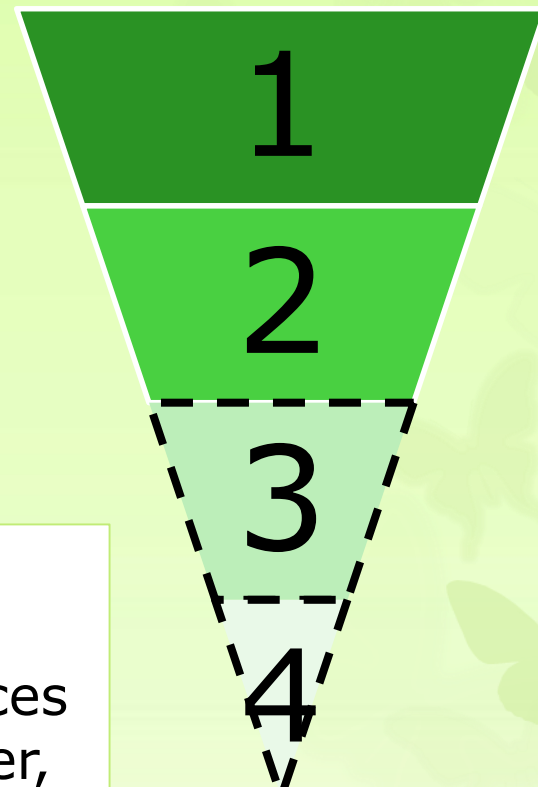


Consumers: Excessively pursuing the appearance of rice whiter and brighter

Processing enterprises :
Passive excessive processing to satisfy consumer,

Rice yield/nutrition high costs, low profits

Low rice yield, grain waste, high energy consumption, nutrition loss

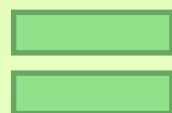


market share
/energy consumption
/rice loss rate





**High
milling
degree**



**Good
appearance**

**Good
appearance**

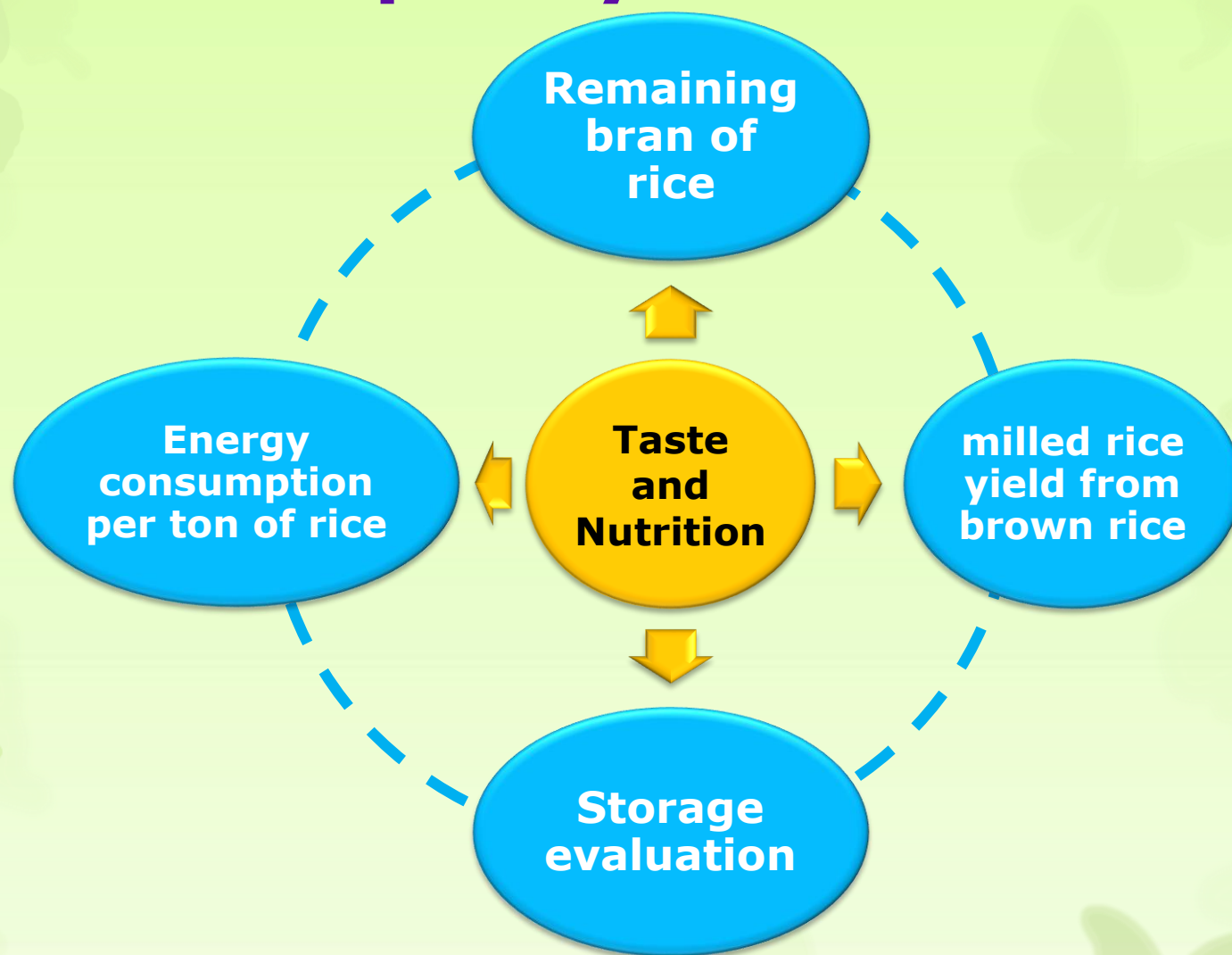


**Good
taste**



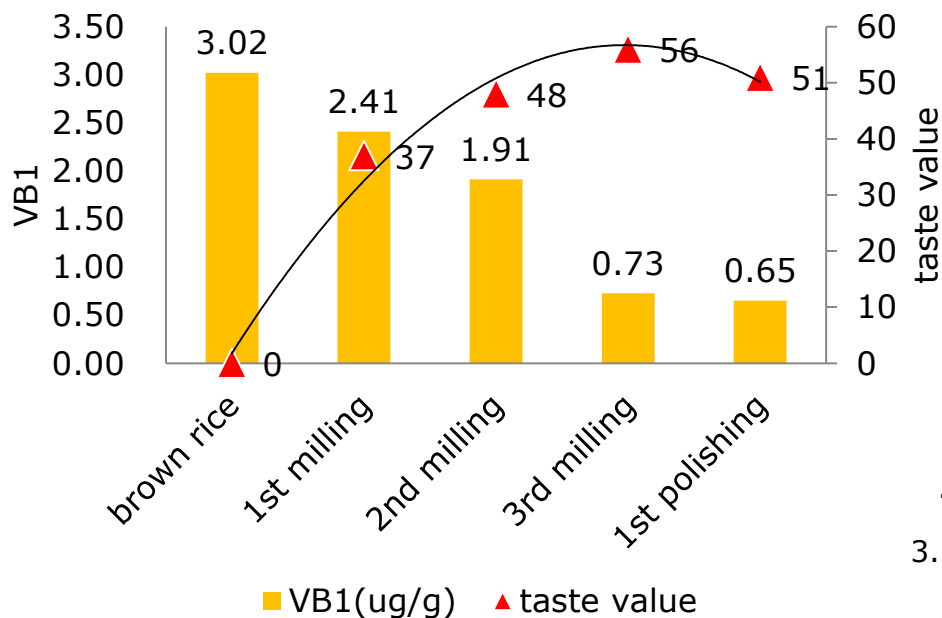


The relationship of milling degree and rice quality





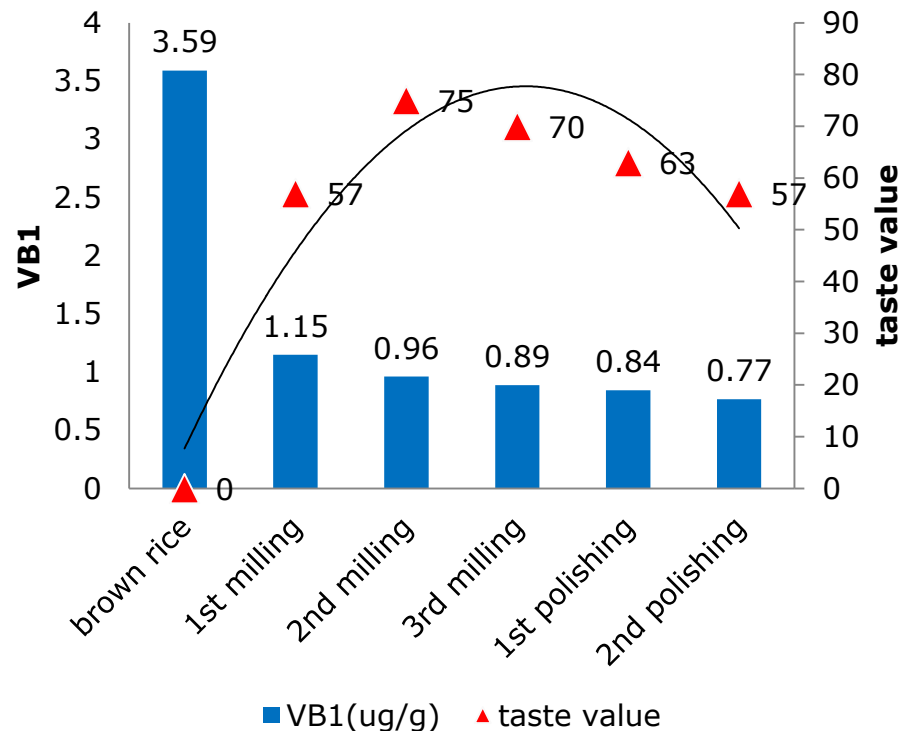
Effects of Milling Degree on Rice Quality in factory



Excessive polishing used in the factory could cause the decline of rice eating quality as well as the reduction of VB1.



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The relationship of milling degree and rice quality



White rice yield of husked rice (%) :

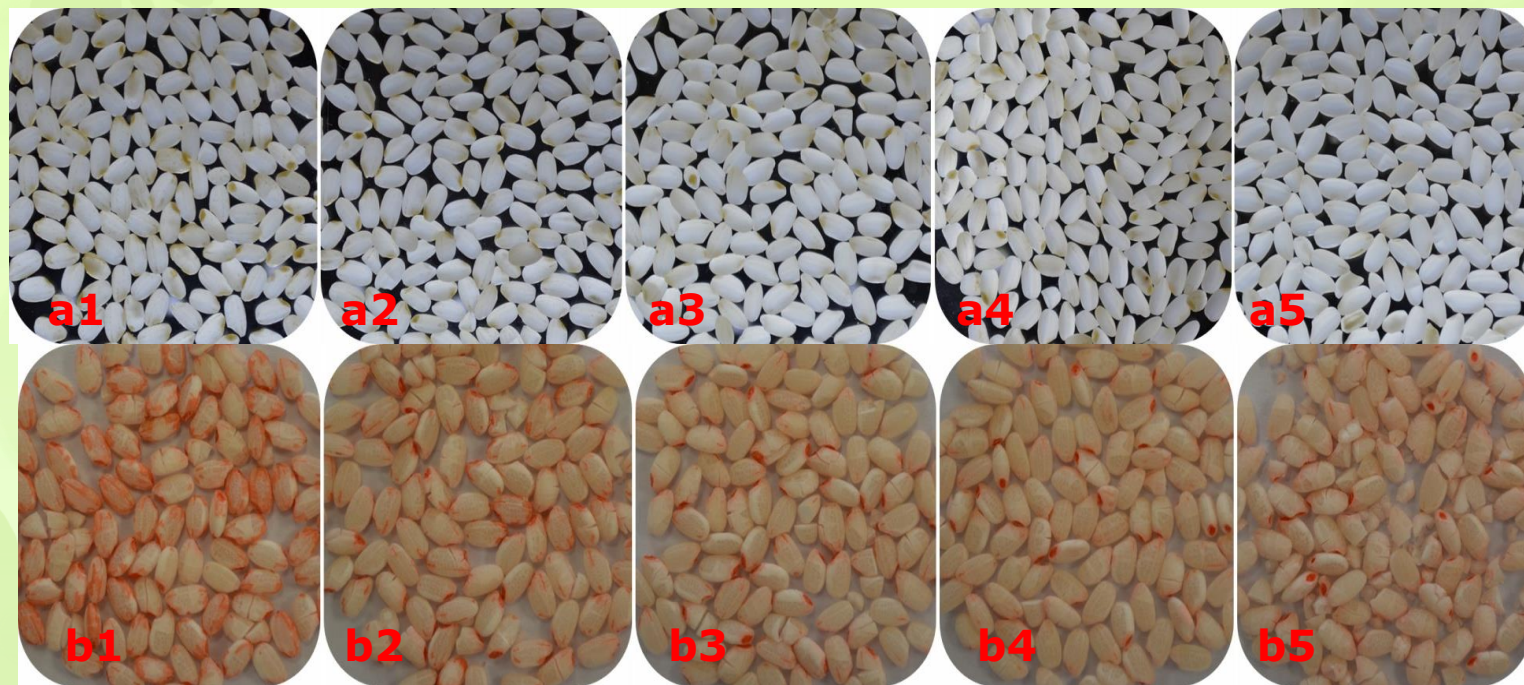
92.4

91.1

88.6

86.2

84.3



Rice Milling degree and Bran-Remaining and Embryo-Remaining Rates

Sudan III ethanol saturated solution

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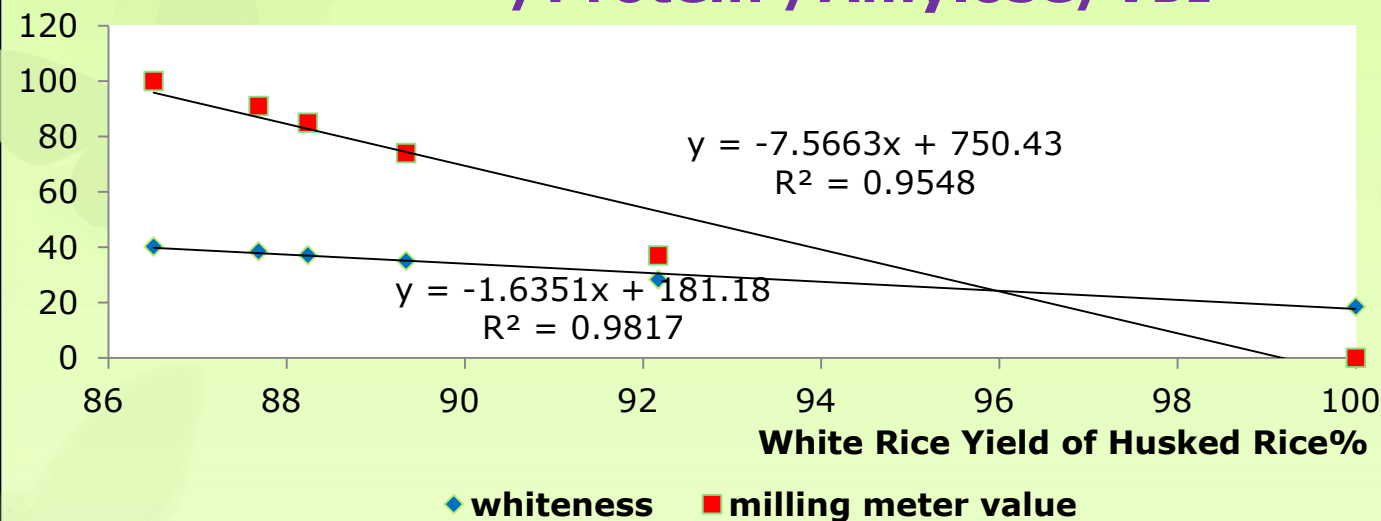




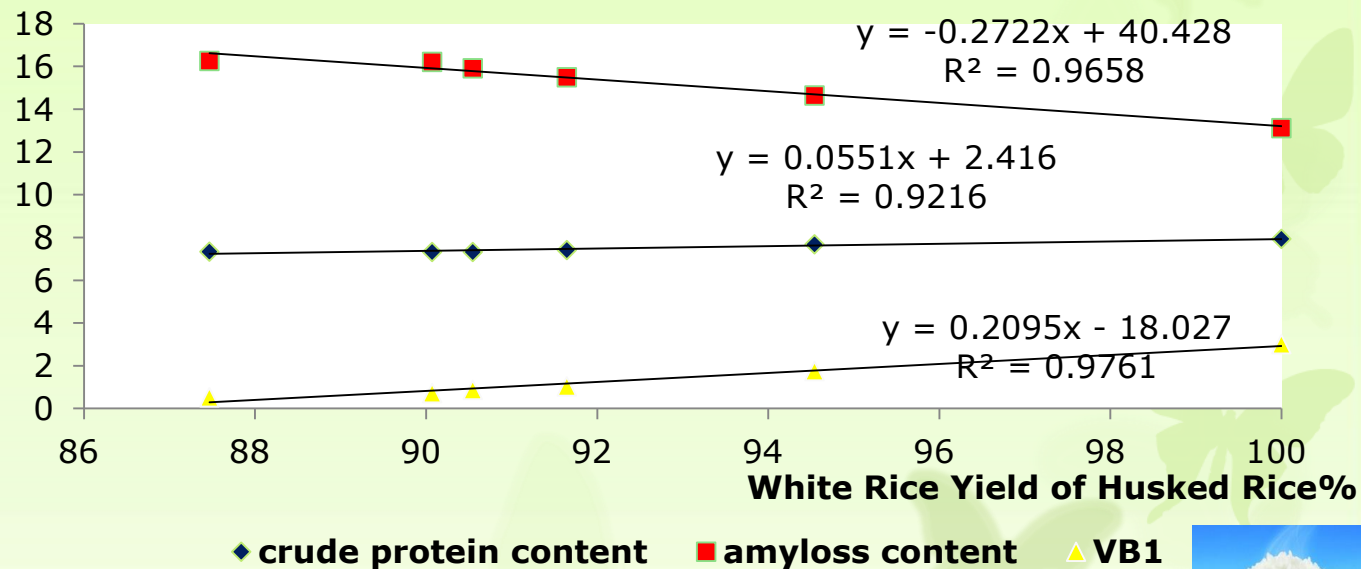
Relationship of "White Rice Yield from Brown Rice" and "Rice Whiteness/Milling Meter /Protein /Amylose/VB1"



The relationship between white rice yield of brown rice" and Rice Whiteness/Milling meter value were remarkable negative.



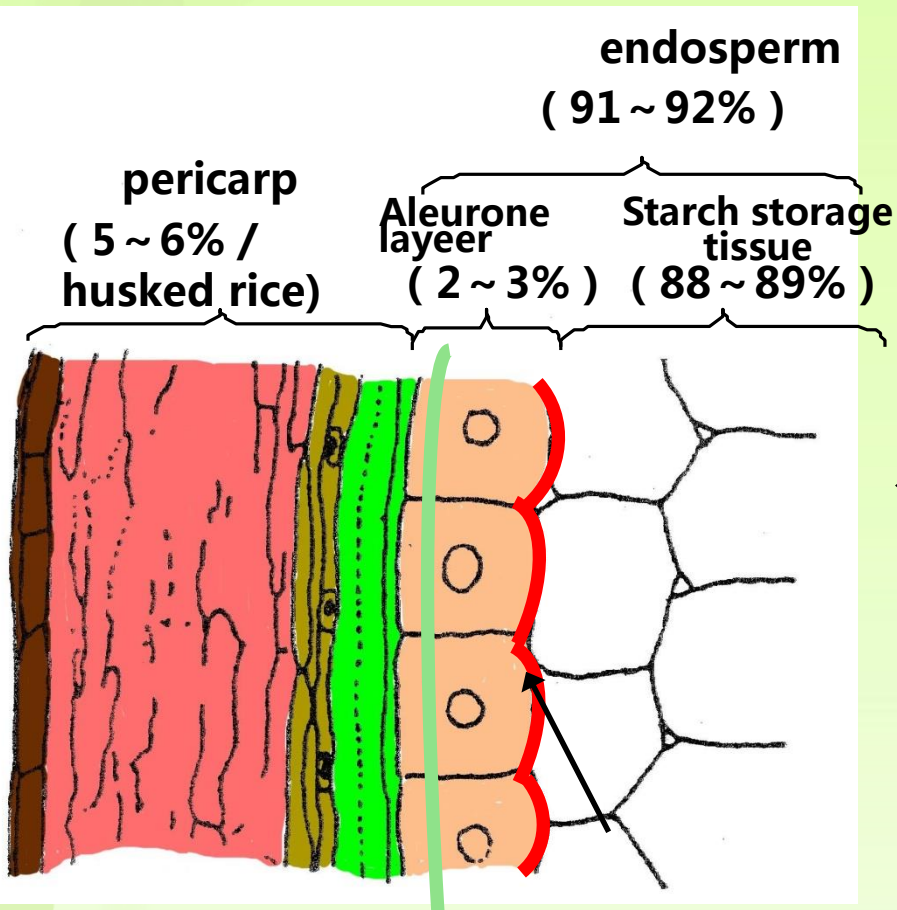
With the increase of milling degree, "white rice yield of rice", VB1 and protein content were gradually reduced whereas the amylose content gradually increased.



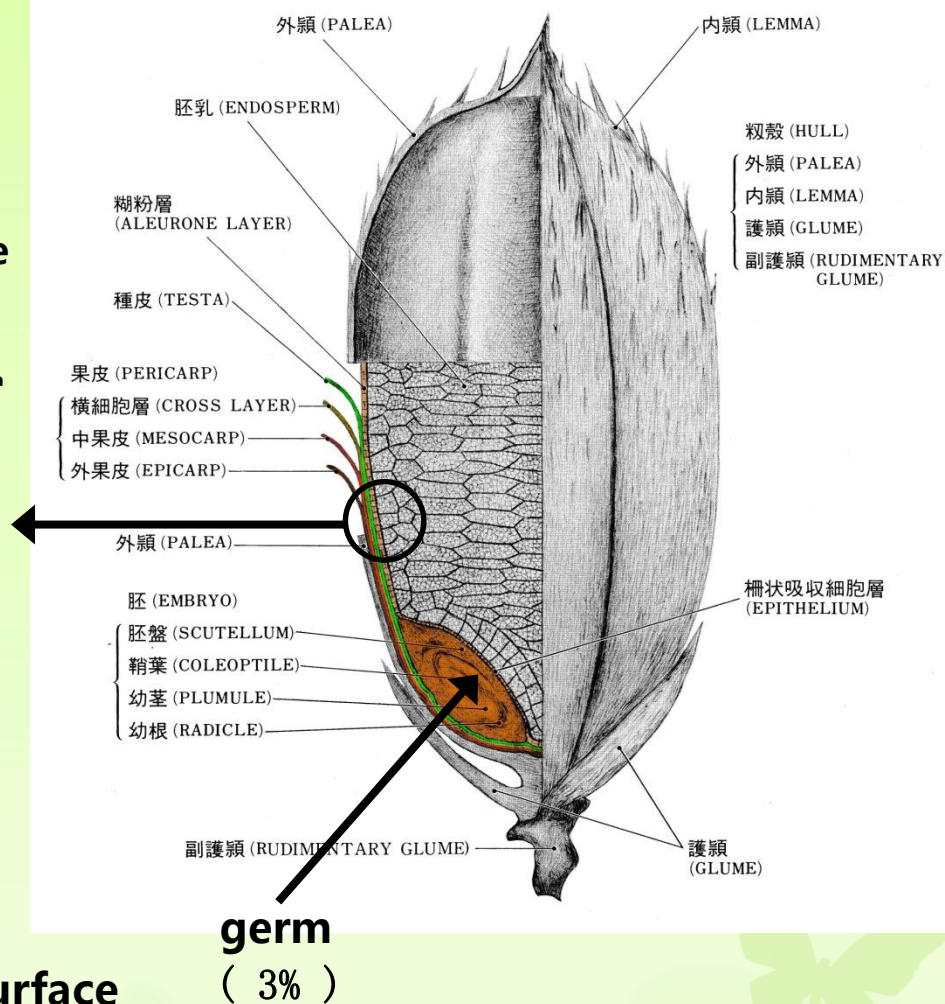


Structure of Rice

Provided by Mr. Kawano Motoshinobu



Starch storage tissue surface
(starch surface layer)

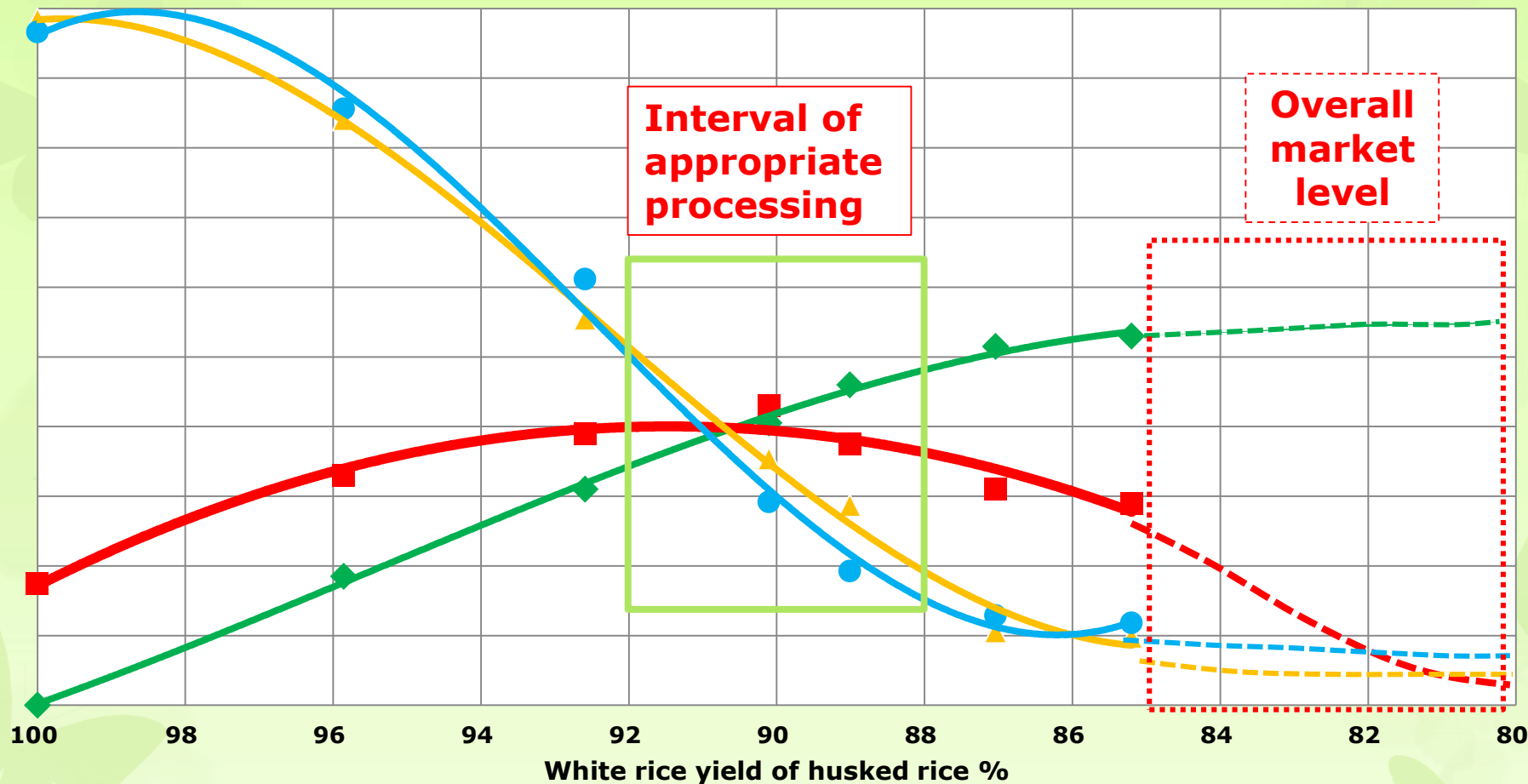


germ
(3%)





Relationship of "White Rice Yield of Brown Rice" and "Milling Meter Value/Taste Value/VB1"

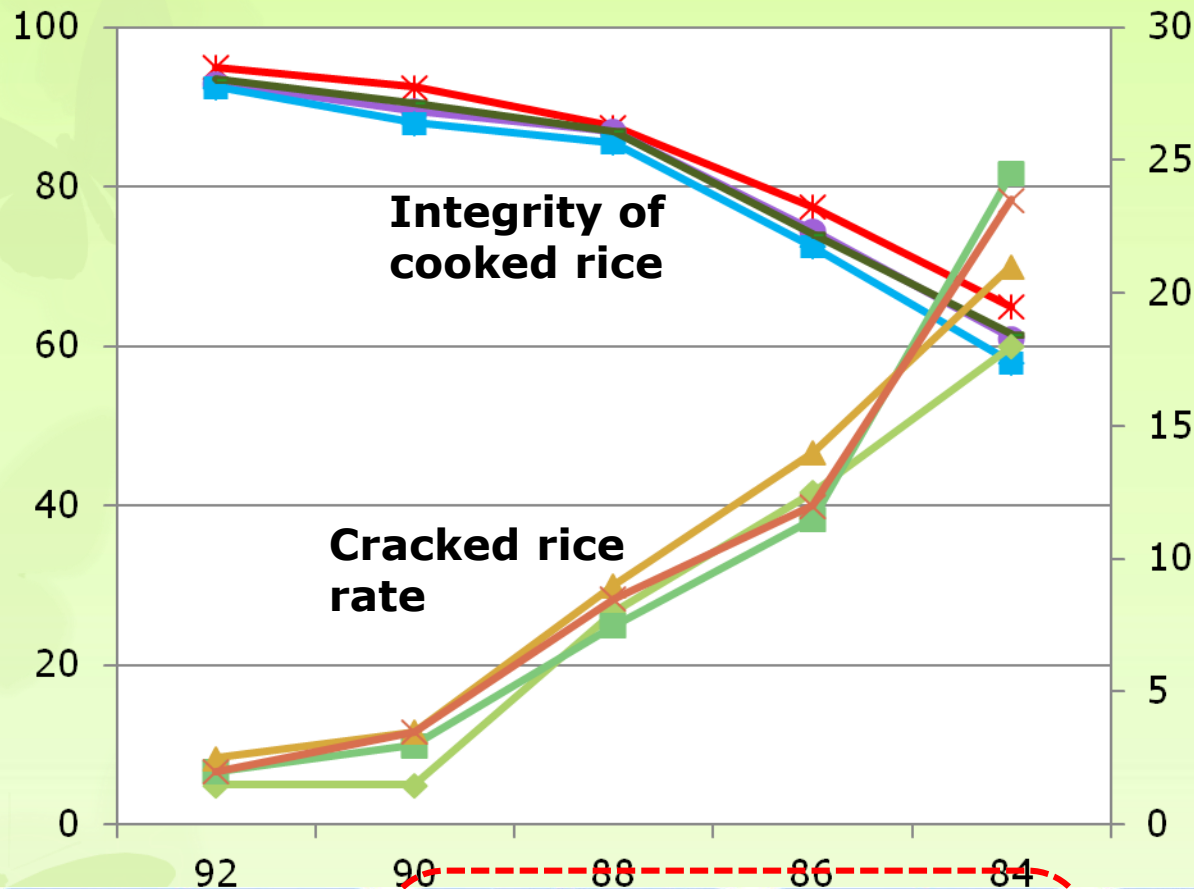


◆ milling degree ■ taste value ▲ VB1(ug/g) ● Fe(mg/kg)

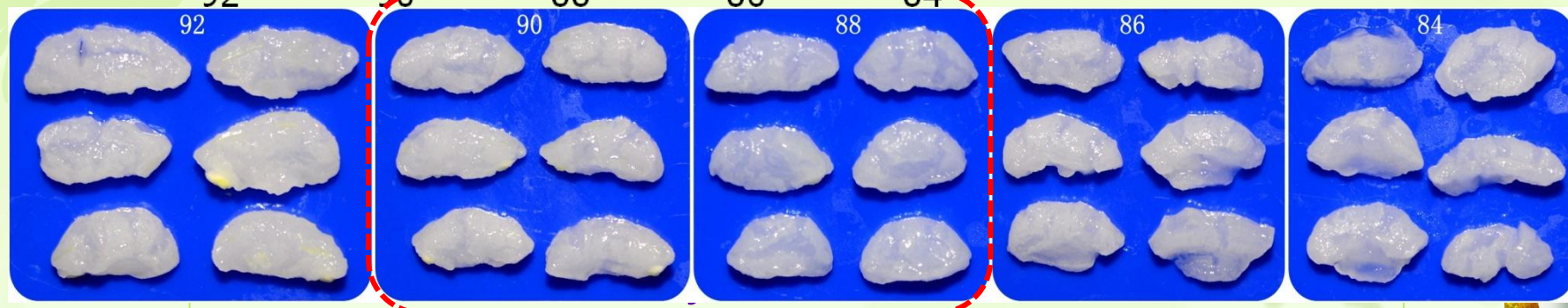
As the milling degree increased to a range from 88% to 92%, the taste value is much higher than current market level (below 85%). While the eating quality reached the highest value (solid line box), the nutritional substance retained between 40% and 75%, and the mineral substance such as Fe retained between 45%-75%, about 15mg/kg in average.



Effects of rice milling on integrity of rice and cooked rice



Types of cracked rice





**Good
appearance**



Good taste



**With an appropriate reducing of
the milling degree and
polishing process, the taste of
the cooked rice will be better!**

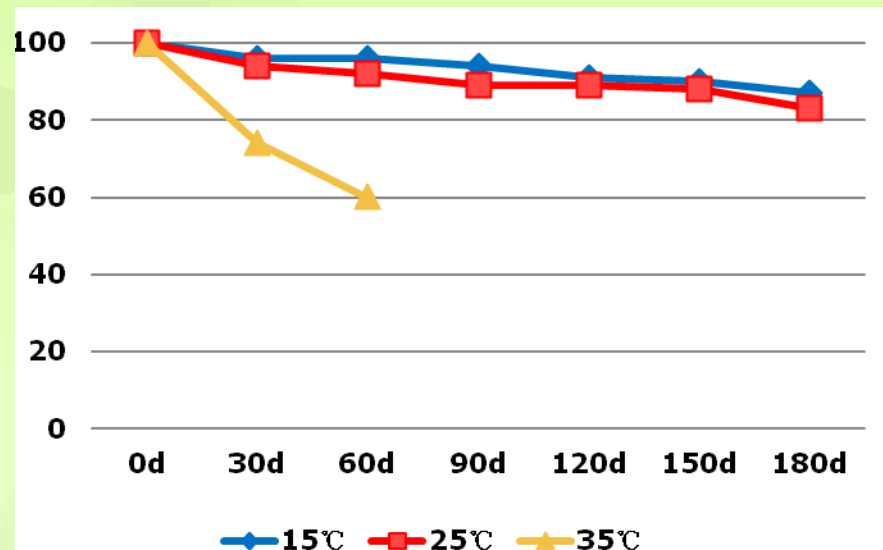




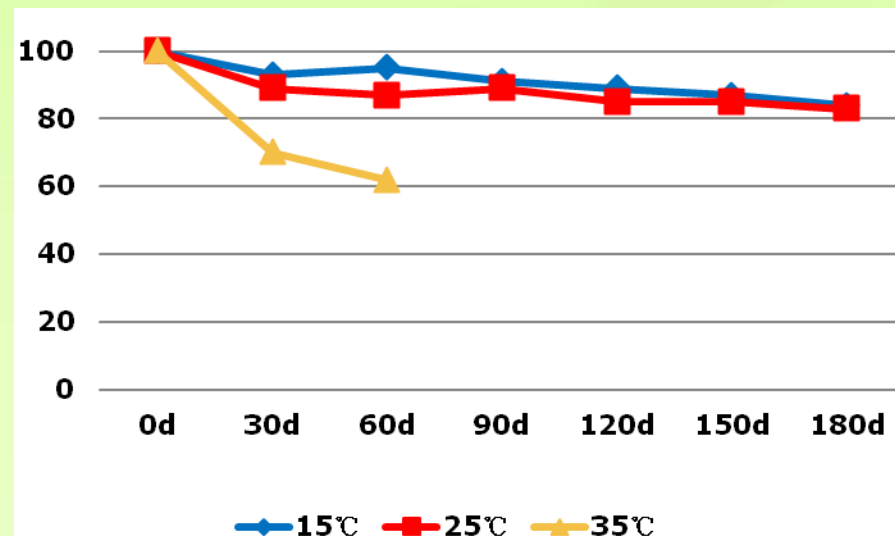
The Effects of Milling Degree on Rice Expiration Date



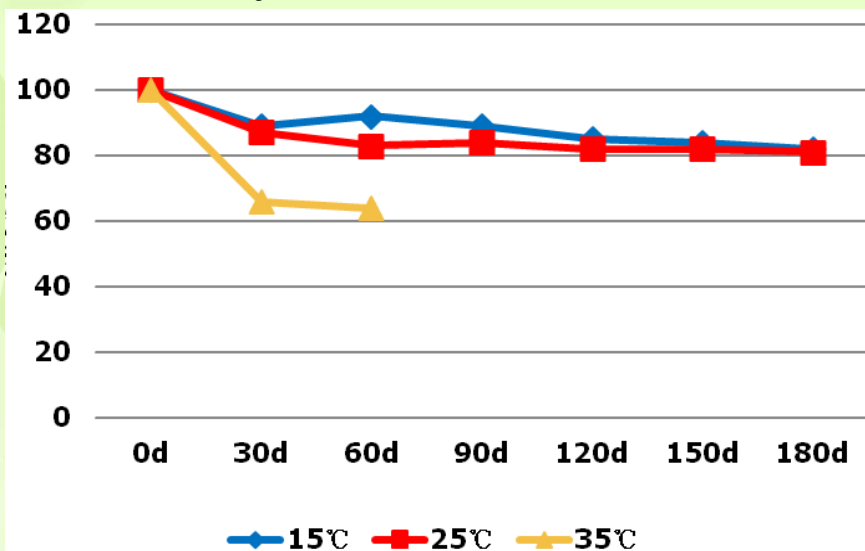
white rice yield of husked rice : 92%



white rice yield of husked rice : 90%



white rice yield of husked rice : 87%



The freshness of rice with different milling degree stored in 15 °C , 25°C , 35°C respectively

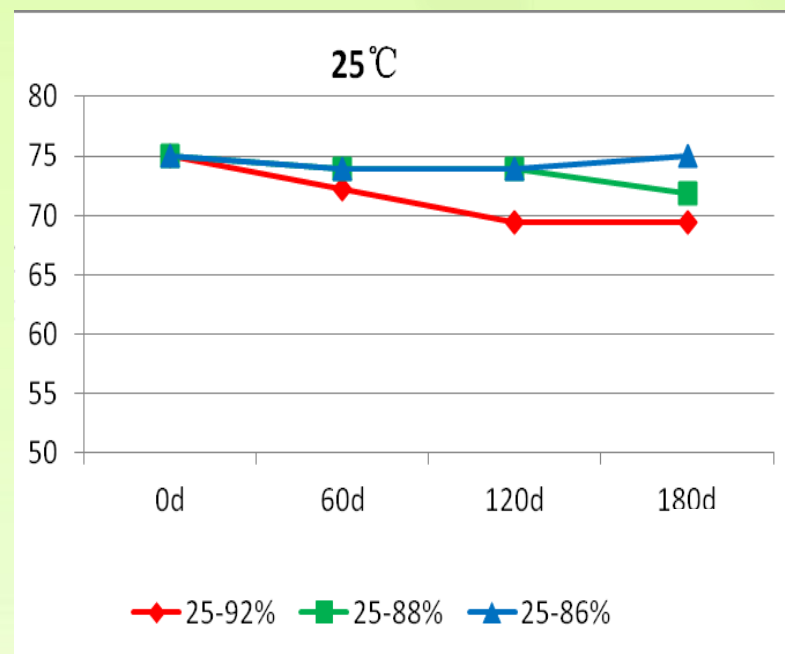
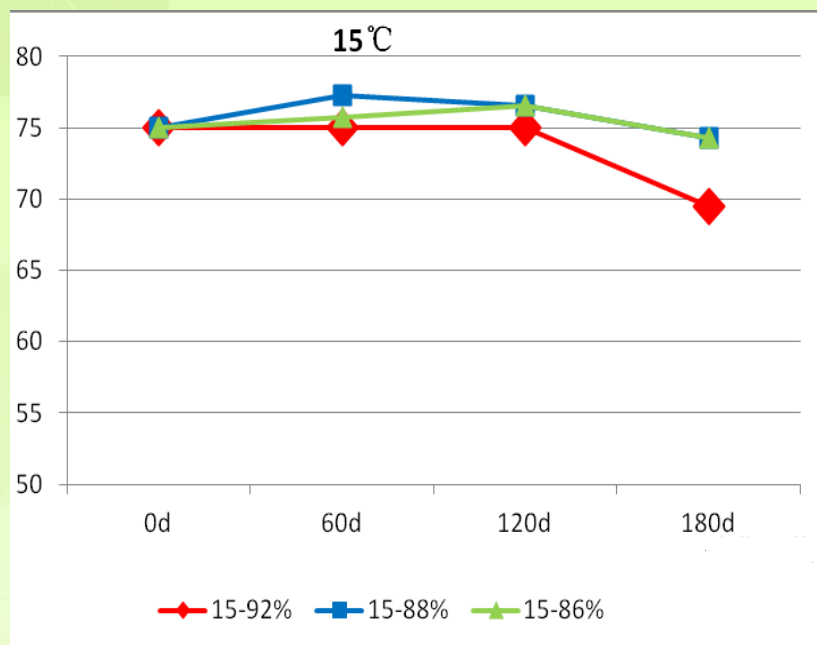
The freshness of three rice samples decreased in the range of 15-20 when stored at 15 °C and 25°C for 6 months, while it decreased 40 when stored at 35°C for only 2 months.



The Effects of Milling Degree on Rice Expiration Date



The taste value of rice with different milling degree stored in 15 °C and 25°C



- The smell is abnormal as stored in 35°C for only 30 days.
- For the rice samples with the milling degree of 86% and 88%, the taste value of rice changed a little when stored in both 15°C and 25°C for 6 months.





The Effects of Milling Degree on Rice Expiration Date



- With the control of storage temperature and package, the quality of the rice with appropriate milling will not change a lot for 6 months.





The milling degree and eating quality correlation verification test



苏垦米业



华润五丰米业



中粮江西米业



湖北省质检站



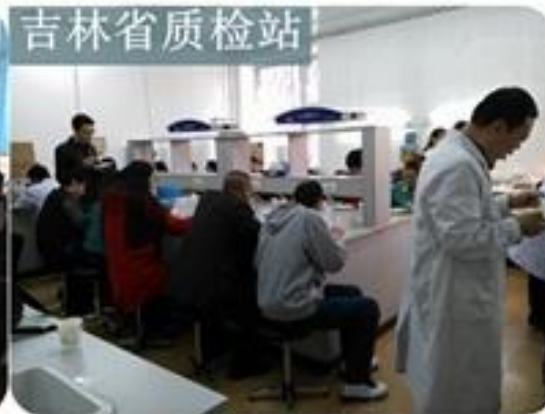
宁夏质检站



辽宁省质检所



吉林省质检站



黑龙江绥化市粮食局





Taste preference survey

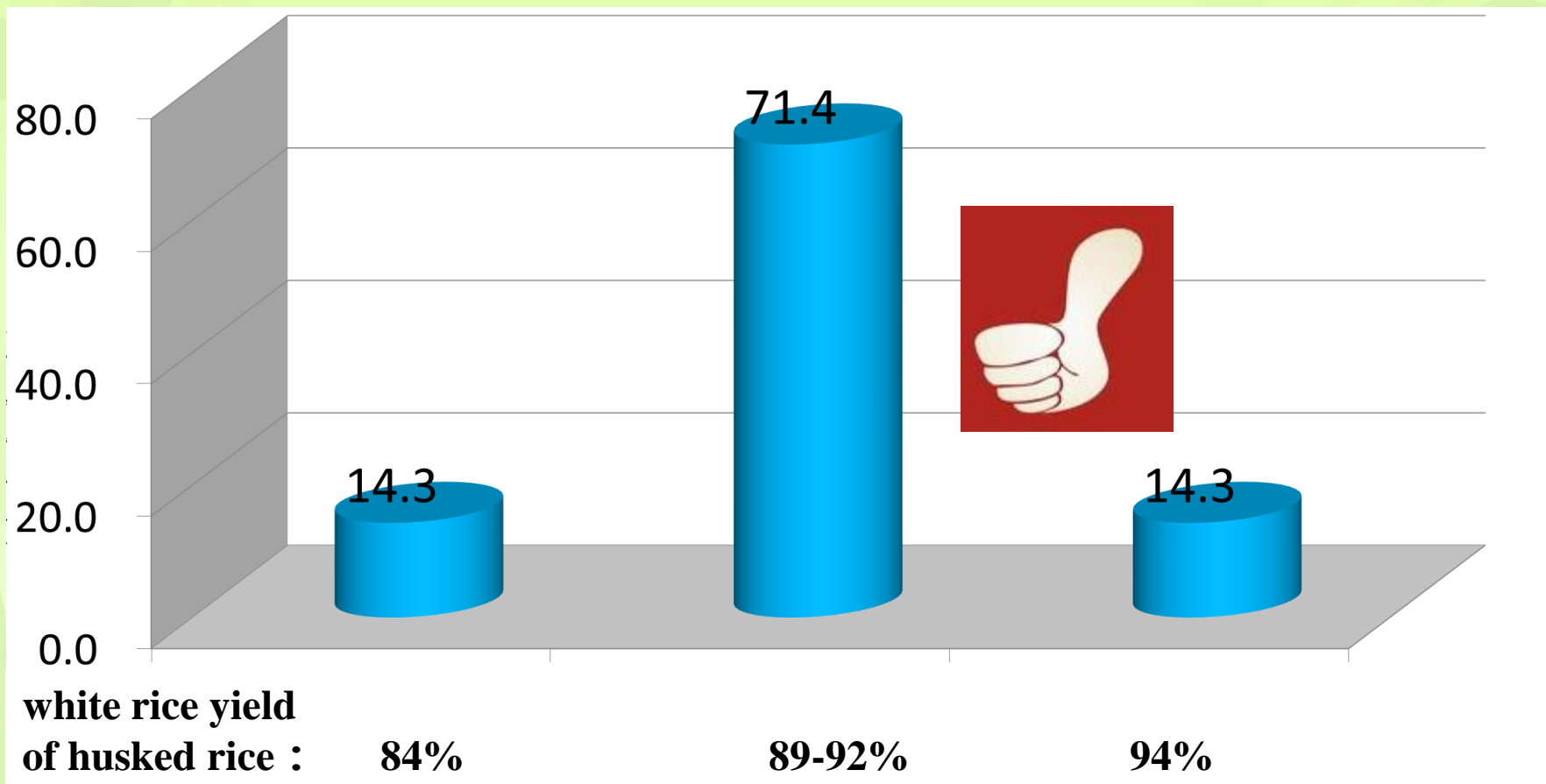


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Taste preference survey





Conclusions

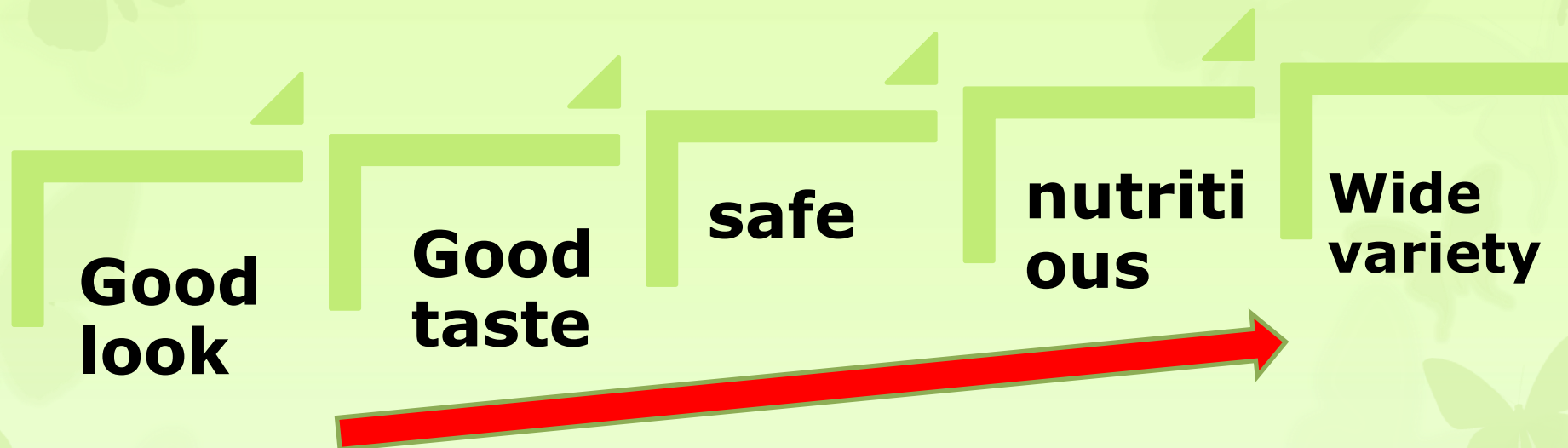


- *Excessive milling and polishing causes a waste of grain resources and higher energy consumption in addition of loss of nutrition.*
- *Good appearance ≠ Good taste*
- *A appropriate reduction in milling degree of rice can solve these problems, as well as improving the rice nutritive value and also eating quality.*





Rice consumption trends





THANK YOU!

