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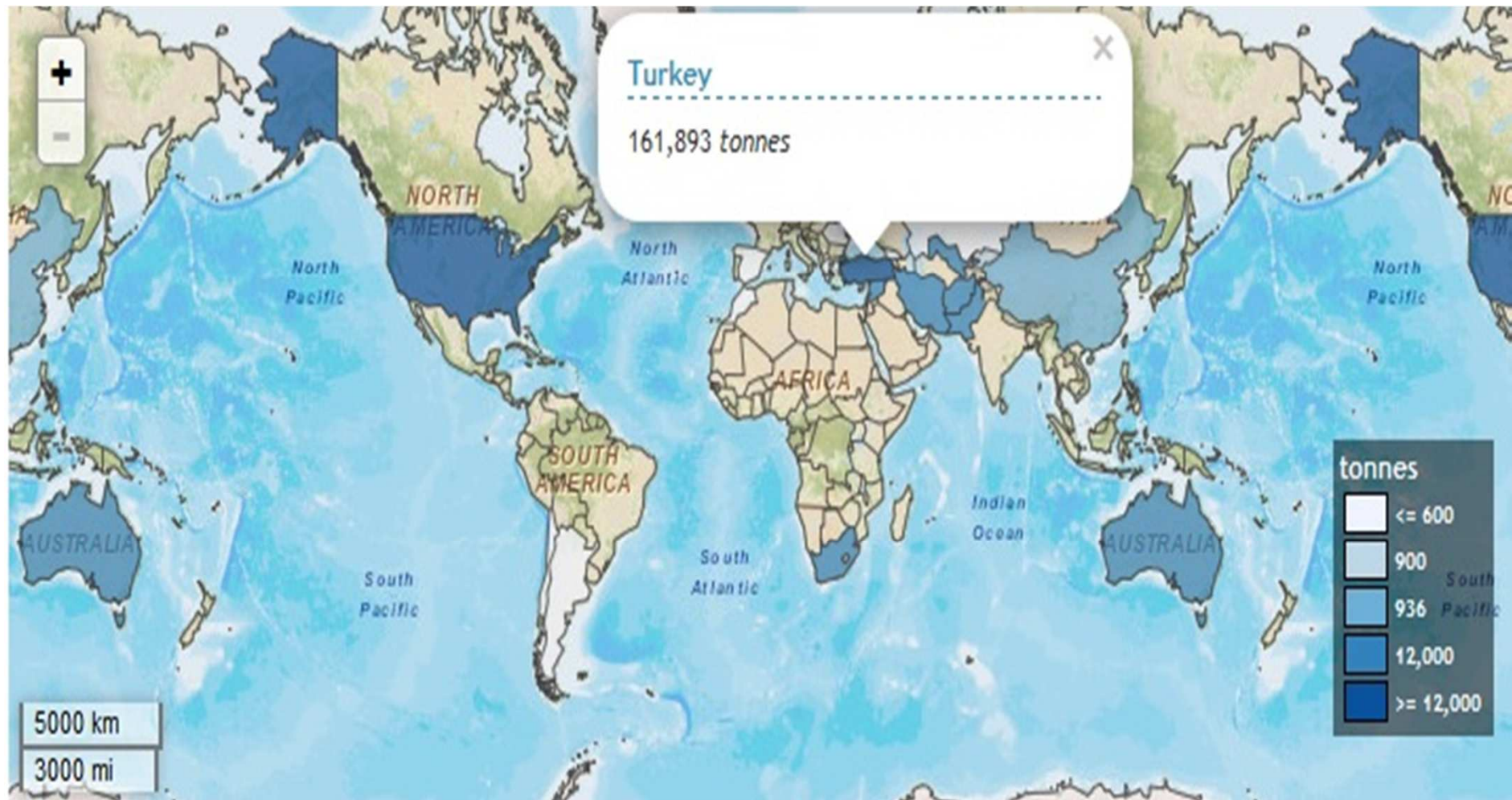
# DRIED APRICOTS

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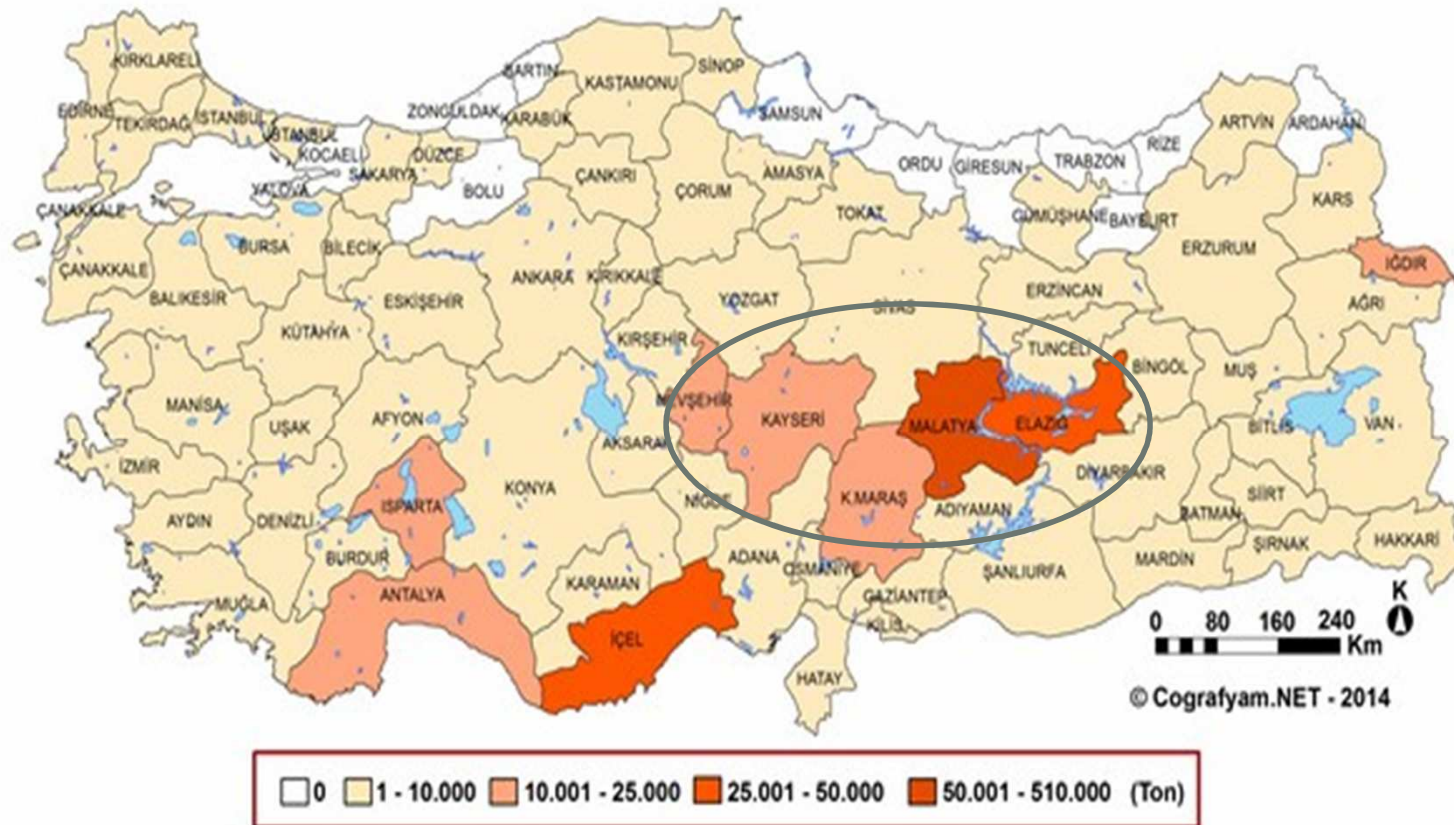
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# World apricot production

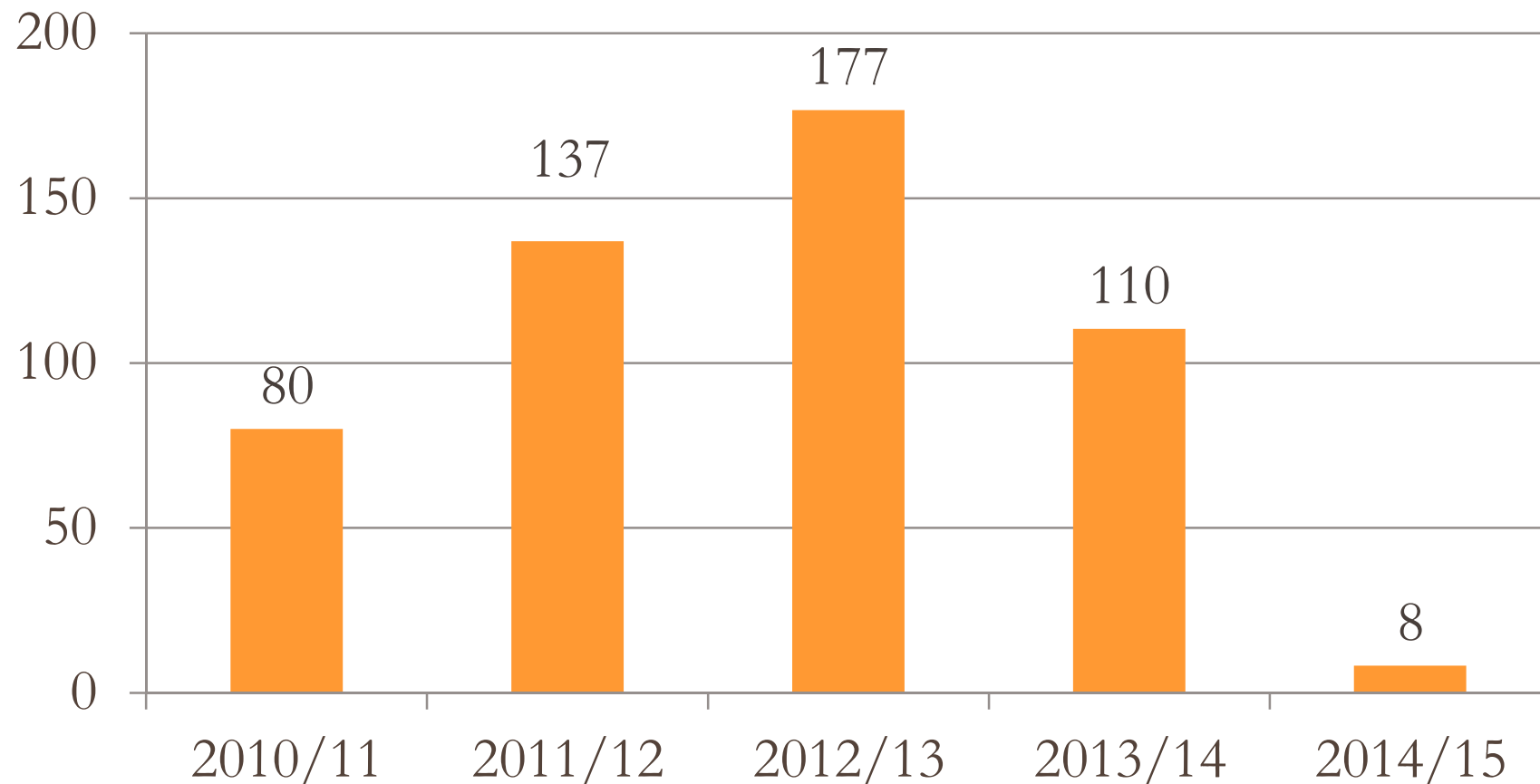


## APRICOT PRODUCTION IN TURKEY



# DRIED APRICOTS

## OFFICIAL ESTIMATE BY SEASONS (1.000 MT)



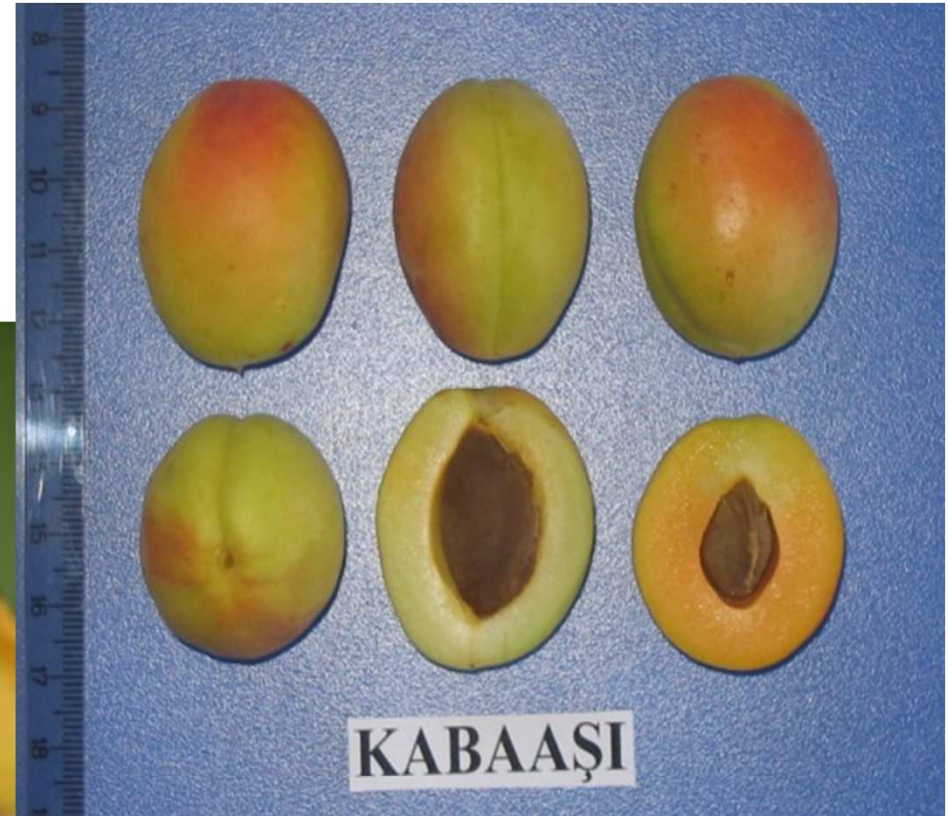


# FROST DAMAGE

- Frost on 30-31 March 2014 severely damaged crop
- 2014 dried apricot crop estimate 8.210 MT  
(93 % down from the previous season.)
- Carry over (45-55.000 MT) contributed to trade



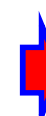
# Major Turkish apricot varieties for sun-drying



Kabaaşı, also a pollinator for Hacıhaliloğlu, the main variety for commercial drying



# Sulphur treatment and sun-drying of apricots



# HARVEST

- For fresh market, fruit are harvested at intervals,
- For drying, all fruit are harvested at once.
- Proper harvest time is important:
- Early harvest: the quality is inferior and the fresh to dried yield decreases.
- Late harvest: fruit juice leaks, fruit are inferior in shape and colour,  $\text{SO}_2$  absorption is less.





# How to assess the optimum harvest maturity?

- Softening of the flesh especially the fruit tip,
- Separation of the pit from flesh,
- Easy removal of the fruit from the stem,
- Total soluble solids content,
- Acidity content,
- Maturity index,
- Fruit firmness

## Effect of maturity stage on the final quality

<b>Maturity stage</b>	<b>Fruit colour</b>	<b>Fresh to dried yield %</b>
<b>Unripe</b>	<b>Yellow</b>	<b>23.95</b>
<b>Semi-ripe</b>	<b>Light orange</b>	<b>30.13</b>
<b>Fully ripe</b>	<b>Orange</b>	<b>33.86</b>







# Harvest

- Fruit harvest must be done early in the morning or late afternoon,
- Avoid irrigation prior to harvest,
- Manual harvest is preferred however it is time consuming and costly,



## Drying process: Sulphur treatment

- Harvested fruit are placed in plastic boxes,
- Over mature, unripe, irregular shaped, bruised, torn or damaged fruit must be removed,
- Transferred to the sulphuring chamber for sulphur treatment or near the drying yard for natural apricots,
- Washed with pressurized water to remove dust or leaking juice,
- Additionally moist fruit absorb sulphur better,
- If treated fruit are homogenous in size and maturity, the  $\text{SO}_2$  content variation among individual fruit is less.
- Sulphur treatment prevents discoloration (browning) and microbial growth.



# Effect of sulphuring

- Prevents enzymatic and non-enzymatic (maillard reaction) browning (discoloration),
- Maintains the typical orange color,
- Corrects some previously formed discoloration,
- Prevents growth of microorganisms,
- Provides protection against pests and diseases
- Enhances drying,
- Slows down the reduction of vitamins,
- Prolongs shelf-life,

Due to negative effects on human health, the maximum limits tend to be lowered.



Apricot fruit placed  
on drying trays



### Chambers:

Width: 2.5 m;

Height: 2.2 m;

Wall thickness: 30  
cm

### Door:

Width 110 cm;

Height: 200 cm

Provide gas  
tightness





The metal plate used to burn sulphur: 25-30 cm in diameter, 5-6 cm depth.

0.5 kg sulphur burns in 30 minutes; 1 kg in 50 minutes and 2 kg in 90 minutes.

# Sulphur treatment

- The duration of the treatment is related to:
  - Variety,
  - Maturity stage,
  - Whole or split into halves,
  - Chamber temperature
  - Sulphur concentration

Variety	Maturity	Whole/Half	Duration (h)
Hacıkız	Ripe	Whole	6
	Unripe	Whole	4
	Ripe	Half	2
Hasanbey	Unripe	Whole	10
	Ripe	Half	6
Hacıhaliloğlu	Ripe	Whole	8
Çöloğlu	Unripe	Whole	6

## ***Apricot fruit right after treatment***

**When to end sulphur treatment:**

**Fruit skin becomes transparent,**

**Fruit softens,**

**2/3 of the fruit flesh appears as if cooked in the cross section.**



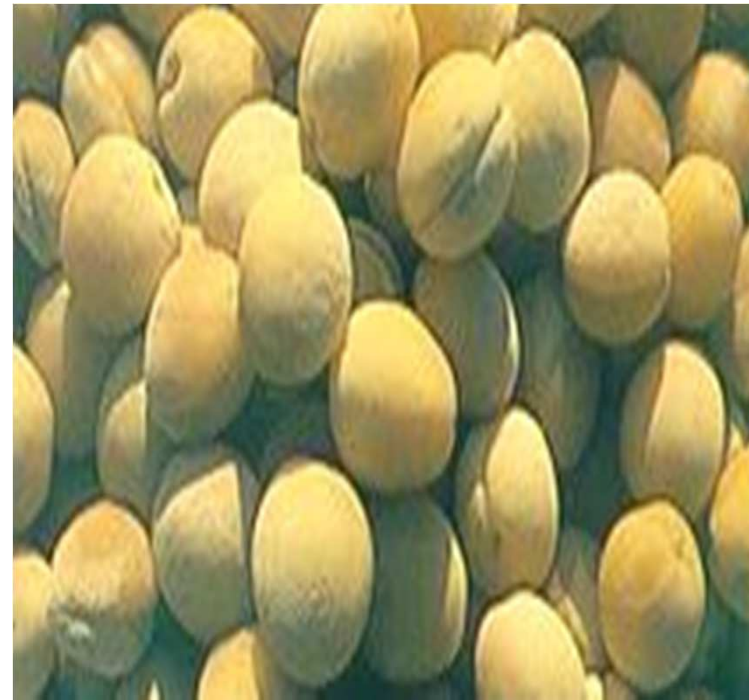


## Mistakes in sulphuring

- Varieties must not be mixed,
- Fruit must be classified according to their maturity stage,
- Whole and halved apricots must be sulphured separately,
- Excess levels or durations result in high sulphur dioxide concentrations in fruit creating residue problems.

# Mistakes in sulphuring

- If sulphur is not burnt well,
  - Fire slows down or goes out,
  - If fire is too strong,
  - If the excessive amount of fresh apricots are placed in the room,
- Sulphur powder covers the fruit surface as dust.
- This process is called 'spill'.
- Repeated sulphuring results in low dried fruit quality and high SO<sub>2</sub> residues.





## **Sulphur treatment by:**

- \* dipping into sodium or potassium metabisulfide, sodium bisulfide or sodium sulfide
- \* direct exposure to sulphur dioxide gas

**Dipping into 8% solution for 30 minutes**





## Removal of the pit

Apricot fruit are then spread onto trays/canvas and sun-dried for 2-4 days.

Then the pit is removed and the fruit is pressed and flattened.







Pitted apricots are further sundried for 2-3 days to lower the moisture content to  $<24\%$



**Sulphur  
treated**



**Natural  
(Untreated)**



# Storage under ambient conditions

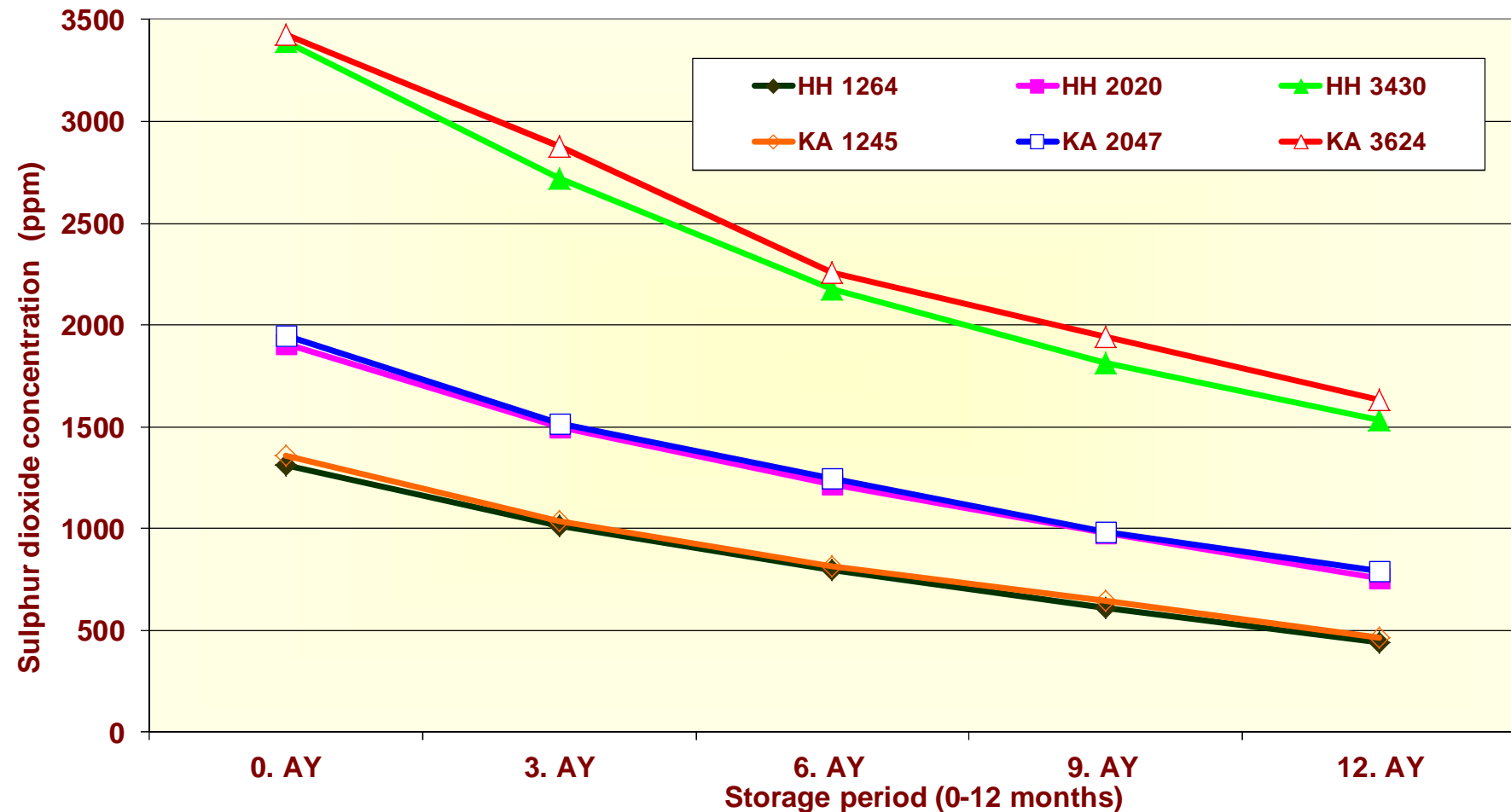


Pest damage  
limited shelf  
life of  
untreated  
fruit with  
max 3  
months



# Reduction of sulphur dioxide concentration in storage (at 3 SO<sub>2</sub> concentrations)

HH: cv. Hacıhaliloğlu KA: cv. Kabaası





# Color prior to storage

## Hacıhaliloğlu



## Kabaaşı





Color of dried apricots after 9 months of storage (cv. Hacıhaliloğlu)





**Color of dried apricots after 9 months of storage  
(cv.Kabaası)**





**Color of dried apricots after 12 months of storage  
(cv.Kabaaşı)**

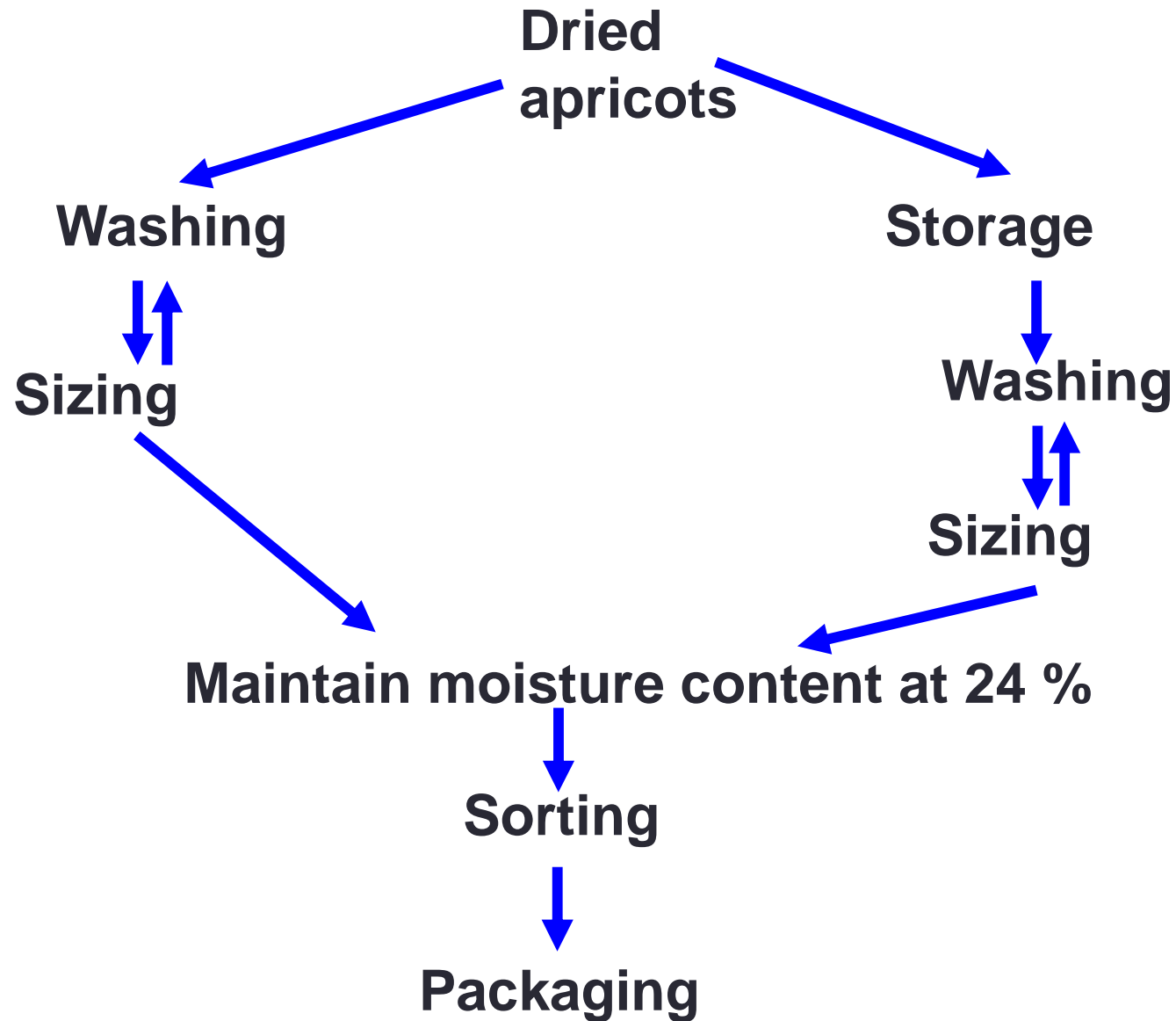
Cold storage slows down sulphur loss and preserves quality  
For untreated dried apricots it helps to extend shelf life



□ 0 - 4°C and  
%55-65 RH



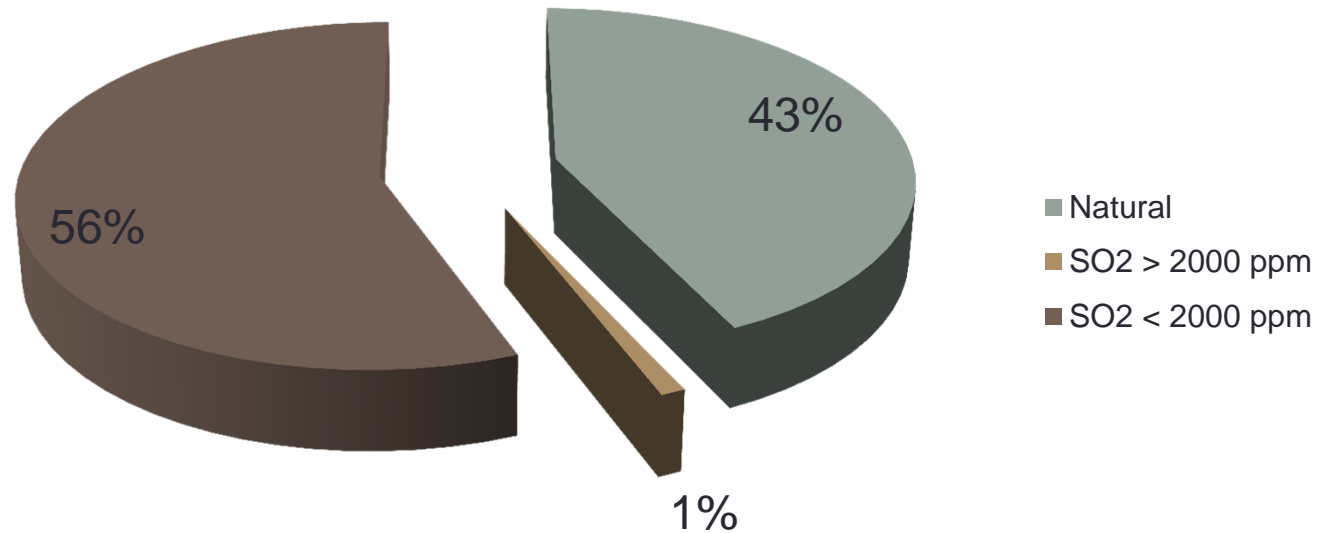
# PROCESSING AND PACKAGING





# Dried apricot export of TURKEY

Shipments volumes (%)



Source: Pagy, INC Annual Conference 2015

100 g

12.5 kg boxes



500 g

100, 125, 250, 400, 500 and 1000 g packs









# XXX. INTERNATIONAL HORTICULTURAL CONGRESS

12 - 16 AUGUST 2018  
ISTANBUL - TURKEY

[www.ihc2018.org](http://www.ihc2018.org)

*Istanbul  
awaits you!*



**THANKS FOR YOUR ATTENTION !!**