LEAD AG TEACHER
SOUTH AUSTRALIA

Almond industry activity

Almond production is an important industry in South Australia.

Thanks to the Ag Careers Hub and CMV Farms at Loxton for their input in developing this quick activity to assess almond quality:

EQUIPMENT REQUIRED:

- almonds in the hulls
- three buckets
- scales
- almond defect reference sheet
- Optional: moisture meter *(can use grain moisture meters)*

SOME USEFUL LINKS:

CMV farms website
Almonds | CMV Group

Almond harvesting video
https://youtu.be/T7CtEudv4Xs

PROCEDURE:

1. Count out 50 unhulled almonds.
2. Separate the hulls, shells and almonds into the three buckets and weigh each component.
3. Calculate the "edible yield" by dividing the weight of the kernels by the weight of the three components combined:

   Weight of kernels ÷ (weight of hulls + shells + kernels) x 100 = edible yield

   Achieving a "crack out" value of 30% edible yield or more is considered good.

   Edible yield varies with different varieties, seasonal conditions and management practices.
4. Assess the kernel quality by comparing the kernels to the defect reference sheet.

   Removing defective kernels will reduce the edible yield that achieves the best price. Weigh the good quality kernels that remain after defective ones have been removed and re-calculate the premium edible yield.

   Note that the defective almonds can usually still be used but will attract a lower price.

   By monitoring the data around defects, almond growers can work out what problems are causing them to lose income and plan effective and efficient integrated pest management for the following season. Another benefit is they can target problem areas on the farm rather than having to treat the whole farm.
5. If you have access to a moisture meter, test the kernel moisture (should be 6% or lower) and hull moisture (should be 10% or lower) as another quality check.

DISCUSSION POINTS FROM THIS ACTIVITY:

Why is kernel and hull moisture important?

"Almonds that are too wet when delivered to processors have a higher risk of developing aflatoxins created by *Aspergillus spp*., the fungal molds that produce aflatoxins. As with most molds, the most significant factor in the growth of Aspergillus is moisture content. Aflatoxin is one of the primary reasons shipments of almonds are rejected after testing is conducted at ports overseas.

Nuts whose moisture content is too high also have a higher incidence of concealed damage, a condition in which off-flavors and off-colors are revealed after roasting. Concealed damage can significantly impact quality and reduce grower returns, especially in years with late harvests and/or early rains.
Wetter nuts also are more susceptible to have cracked shells embed in the kernel during hulling/shelling process."

Source: High Moisture Content Delivers Lower Returns, Greater Damage (almonds.com)

What are the three components used for?

- **Almond kernels:** whole nuts, slivered almonds, flaked almonds, almond meal, almond flour, almond milk, almond oil
- **Almond shells:** animal beddings or gardening substrates, biofuels, e.g. as pellets or briquettes, smoke chips
- **Almond hulls:** source of fibre in stock feed rations (especially for cattle)
- **Emerging uses:** Emerging Markets and New Uses Generate Value for Hulls, Shells (almonds.com)

Is there a market for the defective almonds?

Some are not able to be used unless pasteurized (eg those with mould) but some can be used for almond milk, meal and flour.

What seasonal conditions would affect edible yield and what can farmers do about it?

- Rainfall, temperature, hail, strong winds, frosts, humidity
- Irrigation regimes, tree planting density, planting in areas with suitable climate, variety selection, weather forecasting and monitoring tools

What management practices affect edible yield and what can farmers do about it?

- Irrigation regimes, pest, weed and disease management, pollination
- Monitor soil moisture and plant stress, increase the number of bee hives, plant native vegetation, bird scaring strategies, fungicide, herbicide and insecticide applications, variety selection, maintain farm hygiene & biosecurity

How are almonds harvested?

Almonds are removed from the trees by a mechanical shaker, then the almonds are swept into rows with a mechanical sweeper and picked up with a harvester before sun-drying and stockpiling

https://youtu.be/ql9NIPilcPI

How are almonds processed?

They are sorted and separated from sticks, stones and soil, de-hulled and shelled using a series of mechanized screens and sorters.

https://youtu.be/KcLPRJw1w_E

How important is almond production in Australia?

Australia is the largest almond growing region in the Southern Hemisphere and is the 2nd largest producer in the world (USA is 1st). More than 120,000t are harvested each year and it is worth about $1.6 billion to the economy, employing about 9,500 people.

Source: Hort Innovation | Economic analysis of the almond industry (AL19004) (horticulture.com.au)

What careers are involved in almond production?

Growers, agronomists, quality assurance officers, mechanics, harvest machinery operators, apiarists, office admin, farm managers, truck drivers, irrigation managers, engineers for processing plants

ALMOND DEFECT RECOGNITION

REFERENCE 14

NPA
NUT PRODUCERS AUSTRALIA

These photos refer to defects listed in almond product specifications in use at Riverland Almonds.

Dissimilar		Double	
Scratches - 4mm or larger			
Splits & Broken			
Foreign			
Stain			

ALMOND DEFECT RECOGNITION

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These photos refer to defects listed in almond product specifications in use at Riverland Almonds.

Shrivel		**Sap**	
Embedded Shell			
Mould			
Insect Damage