

# Plant DNA Fingerprinting

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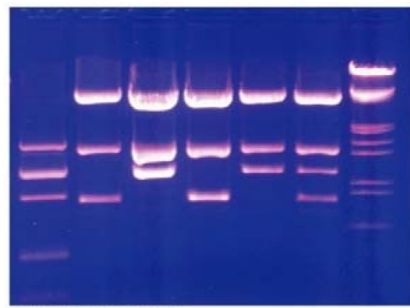
DNA (deoxyribonucleic acid) is a nucleic acid that carry genetic information located in the nucleus of virtually every cell in all living organisms. A DNA fingerprint is an organism's unique sequence of DNA base pairs.



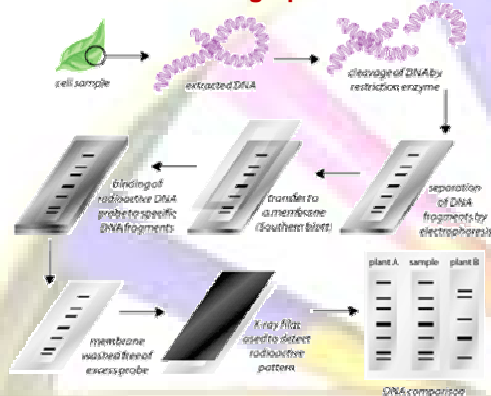
## Forensic Application

- ❖ **Illegal logging**
  - Big concern in Indonesia: DNA can be used to identify if imported wood or wood products have DNA markers from trees in a database of Indonesia trees
- ❖ **Detect fraudulent wines**
  - Wine companies are adding light reflective ink to grape DNA and placing it on labels that seal the bottle. Scanners can pick up on the ink and the DNA can be tested to match the vineyards DNA
- ❖ **Has been used in murder cases**
  - First case was in 1993 when Mark Bogan from Phoenix, Arizona was convicted of murder because pods from a palo verde tree found in the suspects truck matched the pods at the murder scene
- ❖ **Can be used to find geographic location of kidnap victims, ransom notes, murder victims at time of death in criminal cases**
- ❖ **DEA can use it to link certain drugs and their fields or greenhouses to their growers and distributors**
- ❖ **Grain & seed theft in plant breeding & seed industries**

## DNA fingerprint



## How a DNA fingerprint is made:



Genetic markers can also help locate genes for important characteristics of fruits & vegetables

- ❖ **Productivity**
  - Number of fruits or vegetables on the plant
  - Size of the fruit or vegetable
  - Resistance to plant diseases
  - Resistance to insects that feed on the plant
- ❖ **Quality**
- ❖ **Taste**
- ❖ **Color**
- ❖ **Texture**



## Plant breeding

- ❖ **Reduces the amount of time to produce crops with desirable new traits**
- ❖ **Breeders can guarantee the authenticity of the specific variety of fruit or vegetable for their crops**
  - pattern of genetic markers are unique to each variety
- ❖ **Breeders can ensure other breeders do not steal the varieties they have developed**
- ❖ **Simplify the more traditional methods of selective breeding by identifying markers associated with agricultural traits**



Authenticate & control quality of medicinal plants & herbs

- ❖ **FDA requires various tests are conducted throughout the manufacturing process to ensure identity, purity, quality, strength, potency, & consistency of botanical drugs**
- ❖ **Some herbs sold under a generic name are from different species**