- **An Infrared based sensor system for the detection of ethylene for the discrimination of fruit ripening**
  (Link: https://www.researchgate.net/publication/319015188_An_Infrared_based_sensor_system_for_the_detection_of_ethylene_for_the_discrimination_of_fruit_ripening)

Summary
Ethylene, a hormone for speeding up the ripening process of a fruit, can be measured through different methods, for instance, optical based sensors, e-nose sensors, electrochemical sensors etc. which are not only expensive but also accuracy level for detecting ethylene is very low. In this research paper, the authors highlighted a new approach of detecting ethylene with Infrared (IR) thermal emission based ethylene gas sensor. Since most of the fruits produce a wavelength. So applying a silicone temperature detector and infrared rays on a fruit with wavelength changing applications can detect ethylene more accurately from the absorption of IR across the fruit's wavelength and converting the output in electrical signal (mV). This can also detect original and artificial ethylene.

Methodology
First of all, for detecting the ethylene level of a fruit, a thermal wave emitter is fabricated using a micro electromechanical system. Then an estimated IR is produced and it is placed in front of a fruit. Also the silicon temperature detector detects the temperature of different areas of the tested fruit. Then a certain level of IR is being absorbed by the fruit and from here, the rest of the IR reflects which is then transformed into electrical sensors for analyzing through a software.

Equations
The ethylene concentration is measured by,
% Sensitivity = (Gas concentrat ion /Change in detector output voltage)× 100

Components Used
The list of components used here are as follows:

1. DC power supply (0-25V) (Agilent, E3631A)
2. 6½ digit multimeter
3. IR thermal radiation source
4. Silicone temperature detector
5. Gas test cell

6. Custom reflector

Findings

Previously used methods for identifying ethylene in fruit do not provide accurate results. Therefore, using Infrared (IR) thermal emission based ethylene gas sensor with silicone temperature detection is more accurate and reasonable and easier to implement.

Novelty

The novelty of this research is, they have introduced a new approach of detecting ethylene levels more accurately using Infrared (IR) thermal emission based ethylene gas sensors. This can also detect original ethylene produced by fruit and artificial ethylene.

Analysis

In the analyzing segment, they analyzed the absorption spectrum of ethylene, response and recovery time, calibration of the sensors, reproductively and estimating artificial ethylene.

Research Gap

The authors did not mention any hands on based technology like smartphones or other devices where we can use this method easily.

Problems Faced

While going through the entire process, I was having difficulties understanding.

Future Work

In future, they can implement their strategy in smartphones or other devices so that it becomes handy and cost effective at the same time. Moreover, this approach can be used in cold storage too.