

PARTICULARS	SPECIFICATIONS
Use	To measure the freshness of Mackerel fish in a non-invasive manner and provide real-time results
Materials used	Webcam: - Resolution 5MP, 720 Pixel Processor: - Raspberry pi 3 Display: - LCD display 16 x 4
Power supply	5V, 2 A – Power Bank
Approximate cost	Rs. 5000/- + GST

PORTABLE, HAND-HELD FISH FRESHNESS ASSESSMENT SENSOR FOR MACKEREL



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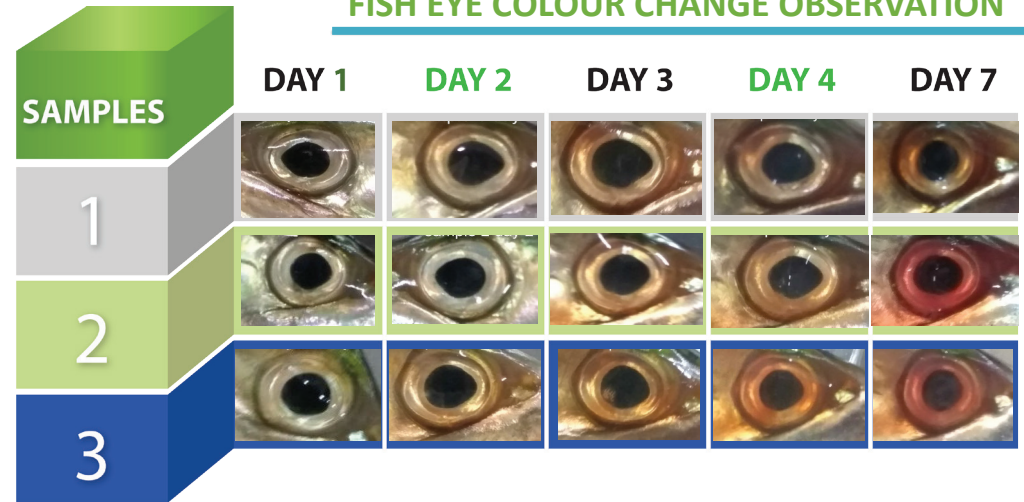
FISH FRESHNESS ASSESSMENT SENSOR

'Fresh fish' is generally assumed to be in good state and safe for consumption. In a market, to find whether a particular fish is fresh and safe for consumption or not is a tough task for the consumers. Freshness of the fish is generally determined by sensory assessment which relies heavily on the assessors. This type of assessment is subjective and the conclusion derived for the same fish may vary with the other assessors. Hence it is high time to find an alternative, instrumental method to provide an objective measurement system for assessing the fish freshness.

The method should be affordable, reliable, rapid, non-destructive and easy to use. To develop an instrumental technique, multiple spoilage indicating parameters of fish should be considered in order to reduce the error. Existing freshness meter (Torry meter) measures conductance, capacitance and q-factor of the flesh and muscle structure.

This technique completely relies on dielectric properties of fish which are prone to differ with fat and moisture content, shape and size, and the way fish is handled for measurement purposes. Therefore, this technique is non-reliable for variations within the fish species. All the instrumental techniques developed so far were at lab level only and few commercialized are not affordable to consumers at the market level.

FISH EYE COLOUR CHANGE OBSERVATION



In this context, ICAR-CIFT developed a non-destructive, portable, hand held and rapid fish freshness assessment sensor for mackerel. For analyzing the freshness of fish through a non-destructive approach, an image of the fish-eye is captured and studied over a period at different storage conditions. Computer vision is performed on the captured fish-eye image for identifying the minute changes inside the pupil and iris. Promising changes are spotted out while performing image processing, as the redness in the eye is increasing and opaqueness is formed in the pupil region as spoilage happens.

Images were captured using webcam and isolation of eye region in the fish image was done by image processing technique using raspberry pi as platform. Hough transform circle detection, drawing contours, converting RGB to HSV and defining pupil region were executed by the instrument. A power bank powers the raspberry pi with 2A current. Reflection of light in the fish eyes is taken care by incorporating a diffuser material in the camera set-up. The image processing technique was cross validated with spoilage indicators like K-value, TPC and TFC during storage for higher accuracy of prediction. The CIFT developed Sensor instrument is customized for Mackerel fish and can be used by fish vendors, consumers and food safety officers for real time checking of freshness of the fish. It can be used effectively in fish markets, homes, hotels and testing laboratories.

