

Development of sensors for quality evaluation coconut oil

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Project Objectives

- To develop biosensor for the confirmative test of Virgin Coconut Oil(VCO)
- To develop a capacitive type sensor for the determination of Peroxide value (PV) of Coconut Oil.
- Validation of the developed sensors with conventional methods

Description

Virgin coconut oil is costly than most of the oils because of its health benefits and hence, it is reported that vegetable oils like palm oil, palm, kernel oil, sunflower oil and also with trace amount of animal fat is adulterated with VCO. The detection of adulteration of VCO with coconut oil is an another problem in market and it is extremely difficult to detect this adulteration as both oils contains more or less same colour, aroma and has same amount of lauric acid, phenolic compounds, proteins. The only parameter which is present in relatively more amount in coconut oil is the diglyceride content (4.10%) where as in Virgin coconut oil (VCO) is 1.55%. Hence, diglyceride content determination may be the suitable solution to detect the adulteration in VCO. Existing analytical methods to determine the diglyceride content are based on chromatographic separation like HPLC, NMR. However, these methods are complicated, time consuming and it is not cost effective. Hence, there is a need for development of biosensor for the determination of diglyceride content. Biosensor may be the feasible solution to determine the diglyceride content in the VCO.

VCO can deteriorate quickly during storage due to hydrolysis, polymerization and thermal oxidation; It leads to oxidative rancidity and cause unpleasant odour and flavour. Oxidative rancidity can be regarded as a important parameter to determine the oil deterioration and expressed as Peroxide Value. Peroxide value gives a measure of the extent to which an oil sample has undergone primary oxidation and is an important chemical factor to determine the oil quality. Various instruments and methods exists to determine the peroxide value of the oils by FT-IR, iron-based spectrophotometric method, titration method. But these methods have some limitations as the suitability for different types of oils and complex calibrations, costly and laborious methods. Hence there is a need for development alternative method for detection peroxide value. Nondestructive methods like dielectric properties based capacitive type sensors which can eliminate the above mentioned limitations. Therefore, development of capacitive type sensor needs to be developed for the determination of Peroxide value of VCO by using the dielectric properties.

Development of biosensor for the confirmative test of Virgin Coconut Oil (VCO) and capacitive type sensor for the determination of Peroxide value (PV) of Coconut Oil is under progress.