Setting-up of DST Center at National Physical Laboratory, New Delhi

At National Physical Laboratory, New Delhi, a center has been set up for the development and characterization of various biosensors like

- Fabrication of different matrices for cholesterol device
- Fabrication of biocompatible matrices for leukemia detection
- Development of sensors for food freshness & food toxin detection
- Fabrication of molecularly imprinted matrices of other analyte

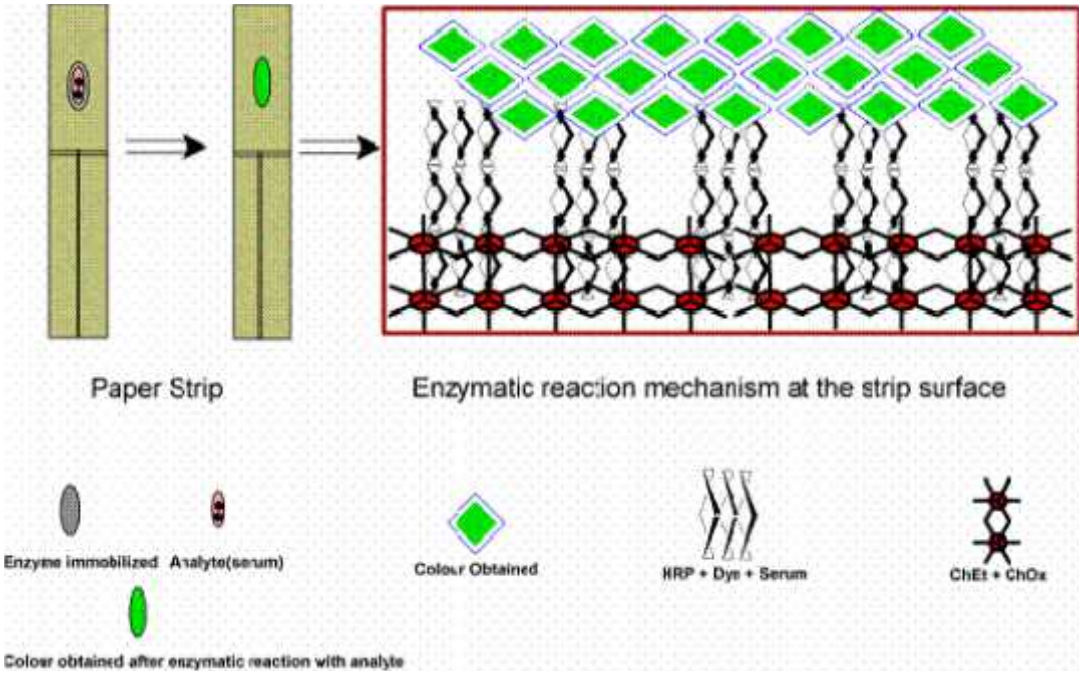
with the help of Department of Science and Technology (DST) funding. Almost all the equipments have been purchased, needed for the characterization of various biosensors. A significant progress has been made in the Cholesterol Biosensor device as follows:

Technical Development of Cholesterol Device

Total cholesterol is a useful early indicator of cardiovascular problems; cholesterol contributes to the formation of arterial plaques. This work depicts a convenient analytical test (enzyme-linked) on paper to perform cholesterol detection as a result of Bio-chemical reaction analysis of human serum/blood. Measuring cholesterol level is significant for coronary diseases, liver function, biliary function, intestinal absorption, etc. This drop test mechanism of colour formation is similar to lateral flow test methods currently available in the market for infectious & virus infected disease detection.

Optical detection of cholesterol device:

Immobilized enzyme on the strips as mentioned in the schematic. We have to immobilize cholesterol oxidase, cholesterol esterase, horse reddish peroxidise and dye. Then put cholesterol solution on the strip. A bright green colour appears on the test strip due to reaction between dye and enzymes immobilized on surface. Analysis of the strip with the help of Image Processing tools in MATLAB and other software. The schematic representation of the enzyme based paper test strip is shown below:


Paper Strip
Enzymatic reaction mechanism at the strip surface
Enzyme immobilized
Analyte(serum)
Colour obtained after enzymatic reaction with analyte
Colour Obtained
HRP + Dye + Serum
ChEt + ChOx