# Enzyme-linked immunosorbent assay (ELISA )

ASSIGNMENT TOPIC - ELISA

ELISA (Enzyme-linked immunosorbent assay) is the test has evolved from other types of immunoassays in the early 1970s and is now one of the most advanced widely clinical, translational, used laboratory technique in as well as clinical medicine. This assay is also used for detecting and quantifying substances such as peptides, proteins, antibodies and hormones. With this test detect and measure antibodies in your blood. This test can be used to determine if you have antibodies related to certain infectious conditions.

APPLICATIONS:

- ELISA can be applied to determination of serum antibody concentrations in a virus test.
- ELISA tests also been found in home pregnancy test, and in the food industry when detecting potential food allergens such as milk, peanuts, walnuts, almonds, and eggs.
- ELISA can also be used in toxicology as a rapid presumptive screen for certain classes of drugs.
- The ELISA was widely used in different clinical and medical areas such as Immunology, Biological Pharmacy, Diagnostic industry.
- Detection of antibodies in blood sample for past exposure to disease. Eg; lung diseases, trichinosis, HIV, and bird flu .

PRINCIPLE:

Enzyme-linked Immunosorbent Assays (ELISAs) combine the specificity of antibodies with the sensitivity of simple enzyme assays, by using antibodies or antigens coupled to an easily-assayed enzyme. ELISAs can provide a useful measurement of antigen or antibody concentration. One major difference on this application: with ELISA application can be used antibody it will recognise the antigens. A sensitive immunoassay that uses an enzyme linked to an antibody or antigen as a marker for the detection of a specific protein, especially an antibody or antigen.

- ELISA involves detection of “analyte” in a liquid sample using liquid reagent or dry strips.
- In dry analysis, strip can be used in reflectrometry. The quantitative reading usually based on detection of intensity of transmitted light by spectrophotometry of specific wavelength.
- The sensitivity of detection depends on amplification of signal during the analytic reaction. In some enzymatic reaction, the signal generated by enzyme are linked to the detection reagents in fixed proportions to allow accurate quantification.

TYPES OF ELISA:

- Direct ELISA
- Indirect ELISA

- Sandwich ELISA
- Competitive ELISA

Direct ELISA:

It is suitable for the detection of proteinaceous antigens and may require pre-purification of sample. It is performed when desired antibody is available in a pre-conjugated state.

Indirect ELISA:

The primary antibody is not conjugated, then indirect ELISA is required in which a conjugated secondary antibody is targeted to the isotope of the primary antibody.

Sandwich ELISA

It quantifies the measure of antigen between two layers of antibodies. The antigen to be measured must contain no less than two antigenic locales equipped for official to counter acting agent, since no less than two antibodies act in Sandwich.

Competitive ELISA:

In this sort neutralizer is initially brooded in arrangement with a specimen containing antigen. The Antigen-immunizer blend is then added to the micro titre well which is covered with antigen. The more the antigen show in the example, the less free immune response will be accessible to tie to the antigen-covered well. Subsequent to washing the well, compound conjugated auxiliary counter acting agent particular for isotope of the essential neutralizer is added to decide the measure of essential immune response bound to the well.

An ELISA for specific detection of RHDV2 antigen has been designed and validated. Some of the specific serological tools are used for monitoring virus circulation and controlling diseases for the detection of RHDV2 antigens in rabbit live homogenates. Based on the use of RHDV2 monoclonal antibodies and anti RHDV2 goat polyclonal antibody was developed. The ELISA has high sensitivity which is successfully detected RHDV2 and RHDV2 recombinant virions. Rabbit haemorrhagic disease virus( RHDV) is a photo type virus of the lagovirus genus which have been founded in many other countries in both wild and domestic rabbits.

ELISA methods are used for veterinary diagnosis of RHD in domestic rabbits which has been developed and well characterised. This ELISA is used for detection of RHDV2 and it is a specific virological tool for monitoring virus circulation, which will permit a better control of this diseases.

Saxitoxin (STX) is a marine toxin which causes paralytic shellfish poisoning that shows morbidity and mortality in humans by using ELISA for the quantitative detection in Saxitoxin in human blood using synthetic blood calibrators which is inaccurate. Mouse bioassay is the common method which measures the presence of active toxin by injecting mice which extracts from shellfish and monitoring the mortality rate. In this study indirect competitive ELISA is utilized for polyclonal antibodies which recognize STX for detection. In this ELISA which is cross reacted significantly with the gonyautoxins 2 and 3. ELISA has the ability to detect the pattern recognition of epitopes and to detect multiple toxin analogues or derivatives. It is marked for

qualitative or quantitative detection of STX in fresh water and brackish water samples.