Lateral Flow Device: How it works and its advantages

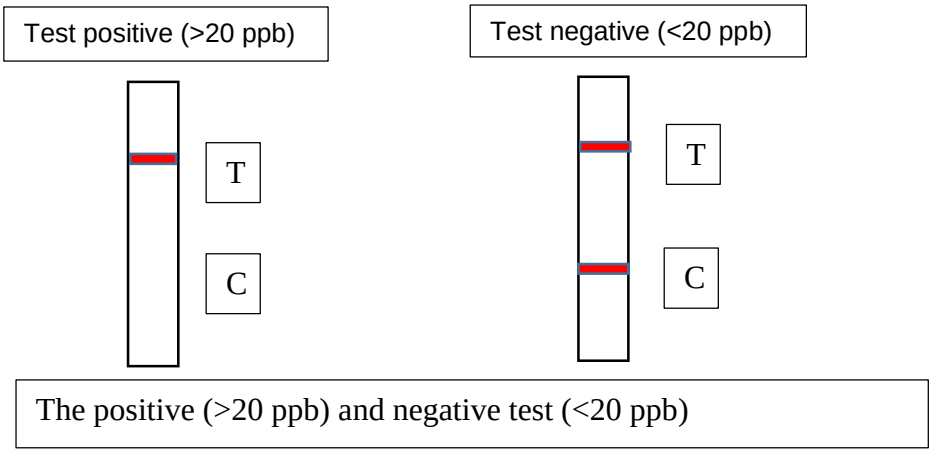
The Lateral Flow Device enables the field testing of crop samples for aflatoxin contamination. It works on the principle of a competitive antigen-antibody reaction.

An aflatoxin-BSA conjugate is dispensed as test line (T) on the surface of a nitrocellulose membrane. A gold conjugated anti-aflatoxin antibody is used in this method as a coloured visible detector reagent. The detector reagent is dispensed into a conjugate release pad that is located upstream of the nitrocellulose membrane.

The sample dissolves the dry detector reagent that will interact with any aflatoxin present in the sample liquid.

If the sample contains aflatoxin, then this binds to the gold conjugated antibody. If the aflatoxin (antigen) in sample binds with the antibody, then the antibody will not be available to interact with the aflatoxin-BSA on the nitrocellulose membrane, and hence it cannot develop any coloured line in the test (T), but the positive control (C) line (at the C-line, an antibody directed against the detector antibody interacts with any available conjugate particle) will appear on the test strip. Hence, if the sample is positive for aflatoxin, one pink line will appear on the strip.

On the other hand, if the sample does not contain any aflatoxin above a pre-defined detection limit, then the gold conjugated antibody can freely bind with the AFB1-BSA dispensed on the test strip, and form one pink colour line on test (T) and another pink line for control (C). Hence, if the sample is negative for aflatoxin, two pink lines will appear on the strip.



What's novel about it

1. It is a 100% field testing kit that doesn't need a laboratory to extract and test the sample. The kit comprises an extraction device, chemical needed for extraction of samples and the test strips. Though other commercially available kits are promoted as field testing kits, they need minimum laboratory facilities to extract the sample.
2. Sample grinding can be done manually at the rate of 250 grams per minute, allowing for subsample testing. This saves on the cost of buying battery and electricity-using powerful grinders.
3. The use of 50% ethanol followed by PBS extraction replaces methanol usage, thereby reducing exposure to harmful chemicals.
4. Since there is no need for filters that are normally used for sample extraction in analytical or other immunochemical methods, diagnosis time is saved.
5. The use of colour development does away with the need for a reader or sensor.