Dec 19th, 12:00 AM

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RAPID DIAGNOSTIC KITS FOR PLANT DISEASES

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The accurate diagnosis of a plant disease is the most important step in developing an effective management strategy for that disease. Yet diagnosing plant diseases is often difficult and frustrating. Distinctive symptoms may not develop until late in the disease cycle. Many plant diseases fail to produce obvious symptoms or produce general, nondescriptive symptoms, such as yellowing, stunting or wilting, that could be produced by a number of biotic or abiotic factors. Recent advances in molecular biology and biotechnology are being used to develop rapid, sensitive diagnostic kits for detection of plant diseases.

Currently most of these kits are based on the immunodetection method referred to as ELISA (enzyme-linked immunosorbent assay). In an ELISA system a purified pathogen (ex. a specific fungus, virus or bacterium) has been used to produce antibodies specific for that pathogen (now called the antigen). This antibody is increased in quantity and used to coat small plastic wells, dipsticks, cards or detector units. The plant suspected of having the disease for which antibody has been developed is ground up in a buffer solution and a small quantity of the resulting liquid is placed on the antibody coated detection unit (well, card, etc.). If the target pathogen or antigen is present in the liquid from the diseased plant, that antigen will bind with the antibody. Then a series of enzyme conjugates and substrate solutions are sequentially added to the detection unit. In most tests the development of a definite color on the detection unit indicates that the specific pathogen was present in the plant sample and has been detected by the test.

The technology behind these kits is sound and the tests are accurate and sensitive in detecting low levels of pathogens. However, it is important to handle kits properly and follow instructions precisely when using these rapid diagnostic kits. Most of the kits come with all necessary equipment and supplies to run six or twelve tests. Each test takes about ten minutes to run although it may take additional time to prepare plant sample for testing. Many of these kits are designed for use in the field or in the user's office.