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Development of RapiDot immunoassays for the detection of banana bunchy top virus

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Banana (*Musa* spp.) belongs to the family *Musaceae* and is one of the globally important fruit crops grown in more than 125 countries with production of 99.99 MT (faostat.fao.org) providing major source of carbohydrates for over 400 million people in tropical countries. Banana Bunchy Top Viral (BBTV) coat protein was used as an antigen to produce single chain fragment variable (scFv) antibody using phage display technology. Two clones showing highest reading in monoclonal ELISA were selected *viz.*, pBSNMAB5 and pBSNMAB40. Single chain antibody fragments of pBSNMAB5 and pBSNMAB40 were expressed in pQUANTabody expression vector which enabled to transcriptionally fuse with scFv monoclonal antibody fragment and the gene coding for alkaline phosphatase (PhoA) enzyme. The clones were sequenced with LMB3 forward and pHEN reverse primer and characterized. The scFv genes of both clones were 795bp long and they found to share similar homology sequence. BLASTn and BLASTx analysis results indicated 85per cent homology with synthetic construct anti-TNF alpha single chain Fv antibody gene, partial cds and further the BLASTx analysis showed that the 86 per cent homology with circulating B cell antibody heavy chain variable region [*Homo sapiens*]. Upon expression of clone, it has produced fusion protein of ALP along with pBSNMAB5 and pBSNMAB40 monoclonal antibody. The scFv-ALP conjugate has been produced against BBTV protein. These specific antibodies conjugate were used to develop a RapiDot Immunodiagnostic kit to detect BBTV in infected banana at field level as low as 0.9 g/ml of antigen concentration.

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Comparison study of physiology and biochemistry of *Paeonia lactiflora* Pall

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Paeonia lactiflora Pall, a herbaceous perennial herb in the genus *Paeonia*, family Ranunculaceae is widely distributed in Russian, Mongolia, Korea, Japan and China. *P. lactiflora* is included in the List of Very Rare Plants and *Mongolian Red* Book as very rare. There are two kinds of research works in *P. lactiflora*. The first one is about the influencing factors to number and diameters of flowers. Since it's an essentially important medicinal plant, the main focus of the research works were on the biologically active compounds. Unfortunately, the research on its physiology, water relation and water potential of this plant are very rarely conducted. Therefore, we have decided to conduct the comparison study on the water relation, chlorophyll fluorescence, and the simple phenolic content in the wild and the cultivated Mongolian very rare plant of *P. lactiflora*. The water deficit was lower and water potential was higher in the cultivated (-0.577±0.23 MPa) plant than in the wild plant (-1.403±0.41 MPa). The optimal quantum yield (QY) and ratio fluorescence decrease (Rfd) was higher (1.4-2.1 times) in the cultivated plant than in the wild plant. In addition, the chlorophyll index is higher in the cultivated plant (54.5±7.2) than in the wild plant (46.3±2.53). This result showed that physiological process of cultivated plant is more active than the wild plant. The simple phenolic content was about 1 time higher in the leaves, stem, and tuber of cultivated plant than in the wild plant. Eventually, it could be the optimal solution for conserving the natural wild plants from becoming extinct.

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