Application of the fully automated evidence MultiSTAT benchtop analyser to the fast (under 19 minutes) easy to record, customised milk screening of up to 130 contaminants simultaneously

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Introduction: The Infiniplex for Milk (IPM) array, based on biochip array technology, allows the simultaneous screening of approximately 130 contaminants (including antimicrobials, anti-inflammatories, anti-parasitics, corticosteroids, growth promoters and mycotoxins) from a single undivided milk sample as previously reported on the Evidence Investigator analyser. A comprehensive detection of veterinary drugs in milk - including all legislated antibiotics at or below the relevant regulatory requirements – is achieved, which is important for consumer protection. With the aim of reporting test results faster, this study summarises the application of this biochip array to the benchtop Evidence MultiSTAT analyser, which allows the fully automated milk sample multi-contaminant customised screening (under 19 minutes) without sample preparation. Methodology: Evidence MultiSTAT automatically performs the immunoassay processes in a self-contained cartridge, which contains all the required components for the simultaneous competitive chemiluminescent immunoassays on the biochip array. The results are determined by the generation of light from chemiluminescent reactions from each discrete test region on the biochip surface. The light output from each region is simultaneously detected using digital imaging technology and compared to that of a reference standard providing qualitative results. The system is operated with a touchscreen Graphical User Interface (GUI) and the test results can be searched and viewed in a table format. The viewed results may then be exported as a hard copy print, a portable digital file (PDF) or a Comma Separated Values (CSV) file. The multiple processed results generated are stored in the analyser, which allows the user to access previous results on demand. The intuitive software enables the search for all archived results of the same sample if the code/barcode entered at sample entry remains the same.

The analyser has the capacity to assess two biochips in under 19 minutes. Bovine raw milk samples (250 µl) were added directly to the biochip.

Results: Performance was established for each detectable contaminant (up to 130 authorised and unauthorised contaminants) and the decision levels (DL, concentration of contaminants resulting in >95% of positive results) ranged from 0.04ppb (aflatoxin M1) to 150ppb (melamine). Under the tabulated format of result presentation, samples with a not detected (n.d) result for a contaminant indicates the absence of the contaminant or its presence at a concentration lower than its DL whereas an initial positive result may indicate the presence of at least one contaminant in the sample at concentrations ≥ DL. A sample displaying positive result with a unique value for the DL indicates contamination by the analyte indicated. The assessment of natural incurred raw milk samples using the IPM biochip array on the Evidence MultiSTAT showed percentage agreement >90% with Liquid Chromatography-Mass Spectrometry/Mass Spectrometry (LC-MS/MS).

Conclusion:The application of the fully automated Evidence MultiSTAT allows the fast (under 19 minutes) customised screening of up to 130 contaminants from a single milk sample by using the IPM biochip array. The multiple results generated are displayed in an easy

to visualise tabulated format and the system has the capacity to store and archive the results produced, which assists with milk recording.