[0005] Another way of inspecting packages containing a substance subject to spoiling is by destructive testing in which the package must be opened or otherwise rendered unusable such as pH analysis and culturing. Each method of destructive testing has its individual disadvantages such as not detecting early stage spoilage or not being sensitive to certain bacteria or contaminants. More importantly, however, destructive testing requires opening the package to sample the substance. The act of opening the package to sample the substance reintroduces the potential for contamination and spoilage. Thus, any test on the substance may not be valid for a given package going forward. Therefore, any packages tested are taken to be representative of a production lot and the sampled packages themselves are culled. This results in incomplete testing of a lot, excess product waste, and a significant expenditure of time which reduces flexibility in responding to changes in product demand.

SUMMARY OF THE DISCLOSURE

[0005a] An aspect of the present invention provides an apparatus for determining whether a substance in a package is spoiled, said apparatus comprising: an electromagnetic source for generating an electromagnetic signal; an electromagnetic scan system for receiving the generated electromagnetic signal, directing the received signal at the package, and receiving an attenuated electromagnetic signal; and a processor for determining whether the package contains spoiled substance as a function of the received attenuated electromagnetic signal; wherein the substance is a biological fluid and is aseptically packaged, and wherein the package is substantially transparent with respect to a frequency of the electromagnetic signal.

[0005b] Another aspect of the present invention provides a method for determining whether a substance in a package is spoiled, said method comprising: generating an electromagnetic signal; directing the generated electromagnetic signal at the package; receiving an attenuated electromagnetic signal; and determining, as a function of the received attenuated electromagnetic signal, whether the substance in the package is spoiled; wherein the substance is aseptically packaged into the package.

[0006] In one embodiment, an apparatus inspects a case of packages containing a substance subject to spoilage. The system includes an inspection system, a processor, and a labeling system. The inspection system includes an electromagnetic source, a plurality of electromagnetic scan systems, and a sampler. Each of the packages in the case has a corresponding electromagnetic scan system. The electromagnetic source generates an electromagnetic signal, and each of the plurality of electromagnetic scan systems directs the generated electromagnetic signal to a corresponding package in the case of packages. Each of the plurality of scan systems receives an attenuated electromagnetic signal from the corresponding package, and the sampler samples each of the received attenuated signals to generate a set of data points representative of an amplitude of the received attenuated signal over a predetermined period of time. The processor analyzes each set of data points by detecting a peak within the set of data points, shifting the data points with respect to time based on the detected peak, and determining whether the shifted data points correspond to a package containing a non-spoiled substance without generating an image from the set of data points. The labeling system marks any case having a package containing spoiled substance. Optionally, the apparatus includes robots for removing cases of packages from pallets for inspection and returning non-spoiled cases to a pallet after inspection. The apparatus may also include a culling system for removing packages