Snapshot Report

Digitally signed meat labels

Traceability - Primal to Steak / Steak to Primal Track 2 - Digitally signed labels using Countermark

Project Code
2021-1192

Prepared by
Alan Bell, Wessex Technology OEP Ltd, Portsmouth, United Kingdom

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Project Description

This project was one of two tracks investigating the use of Countermark to implement Primal to Steak / Steak to Primal traceability. This document describes Track 2 – where existing meat label designs were adapted to include Countermarks and the Countermark system was adapted to perform the Primal to Steak / Steak to Primal traceability.

Countermark is a printed data carrier – like a QR code except it can be printed with conventional label printers and it uses alphanumeric characters rather than black and white squares. The labels below were produced by the Countermark traceability software.

Figure 1 Countermark used to digitally sign primal (left) and Consumer (right) labels

Figure 2 Countermark signed GS1 packing label - the top row of the Countermark acts as a serial number

The use of alphanumeric characters means that the Countermark can be entered by hand when automated reading does not work. The Countermark data carrier itself is part of a much larger data system - a complete environment including servers hosted on the Microsoft Cloud, mobile apps, printer and weigh scale interfaces and web portals for data analysis. The Countermark data system integrity is assured using Ethereum blockchain and comprehensive data and application encryption is used to ensure data security.

Countermarks can be used as a digital signature to show provenance and link to further information such as phytosanitary data or promotional material.

The goal of this Track 2 of the project was to determine whether it was possible to achieve Primal to Steak / Steak to Primal traceability by attaching Countermarks to the existing family of meat labels whilst retaining existing work practices and label printing technology.

Project Content

The project assumes that the provenance of the primal is known in the abattoir. The existing label designs were adapted as per Figure 1, Figure 2. The ability to incorporate two languages into each label was also developed and incorporated into the process.

The project consisted of interfacing the Countermark servers to commercial meat scales and label printers to ensure that the labels (that include weight and other data) can be automatically created as part of the normal meat processing workflow.

The weigh scales and printers were incorporated into new web pages to support the following meat handling processes:

a) Weigh a primal and create a label (Figure 1 left)
b) Pack primals or consumer packs into a packing carton and produce a GS1 format shipping label (Figure 2)
c) Receive primals at a local meat processor and check weigh each received primal
d) Slice each primal and produce a controlled number of consumer pack labels (Figure 1 right), but not more than can be cut from the identified primal and transfer traceability data from the primal onto the consumer pack labels.

A consumer facing web page was created for consumers that use the Countermark app to scan the Countermark on the Consumer label – the web page gives full traceability data including the farm, abattoir, recipes and the Animal ID if known to the abattoir.

The web pages a) – d) are available via a controlled log-in allowing any abattoir or local meat processor, including those outside Australia, to participate in the Countermark traceability chain without a major software investment.

The direct costs and benefits of implementing digital signing of beef labels for primals or steaks was not calculated as part of this study. Also the benefit expressed as improved confidence of buyers of Australian beef should be evaluated.

Project Outcome

The project was successful in terms of demonstrating that Countermark can be used to detect fake labels or fraudulent amendments to meat labels. This can be done without recourse to other security print devices such as holograms, secure inks etc. The chain of data from primal to consumer label was demonstrated as was the ability for a consumer to retrieve full traceability information about their purchase.

The Countermark analytics can show the farmer and abattoir where and when Countermarks were scanned, allowing them to see important market data and detect product diversion – meat intended for one market appearing in another.

The web interface works well and the full software was tested on 3 primals processed as part of Track 1 at Reading University. In that environment the system worked using a 3G hotspot in a weak signal area, underlining the fact that although internet connectivity is needed for Countermark traceability to work, it does not have to be on a high-performance data link.

The Countermark system has been in use for several years protecting ISO9000 certificates from falsification. It is supported in China with a Chinese version of the Countermark website and Countermark app as well as download options suitable for the Chinese market.

This Countermark development was tested in accordance with existing Countermark quality controls and test methods which are certified to meet the requirements of ISO9001.

Benefit for Industry

Australian beef is a premium product, well known for its quality and taste. Preventing product substitution in the supply chain maintains the reputation of Australian meat producers and prevents the lost revenue of missed sales and the possible commercial impact of a recall due to tainted meat passed off as Australian produce.

Using Countermark as a digital signature for labels on individual primals or steaks reduces the ability for fraudsters to substitute product and can provide the abattoir and farmer with aftersales information – clear data on where and when their product was used or consumed.

Countermark based traceability also gives clear information to consumers showing where their steak was farmed, slaughtered and how best to cook it. The Countermark traceability lends itself to additional certification systems whether Halal, Kosher or organic, with the capability to include copies of original certification data in the Consumer information.

This project showed that existing labels, printers and scales can be used as now with little or no changes to manual operations or other activities, with full access to the Countermark traceability available to all sizes of abattoir and meat processor in Australia or in Australian red meat export markets.

The security which is part of Countermark uses conventional labels and allows the packing for steaks and primals to be authenticated and verified providing clear analytics and alarms if wrongdoing is detected, for example, out of date meat being relabelled, faked labels, etc. The Countermark top row can be incorporated into delivery notes and invoices as a serial number meaning that existing financial audit processes can access the shipping / sales information for individual steaks and primals even after the produce has been consumed.

The functionality of the software developed and tested for Track 2 is fully interoperable with the directly printed Countermarks evaluated as part of Track 1 of this study.

Useful resources

www.Countermark.com