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White paper
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Improving traceability in egg production

With global egg production more than doubling from 1990 to 2018 to over 76 million metric tons[1], representing over 100 billion eggs in the US alone[2], it is fair to say eggs are versatile and popular. However, with very few countries coding their eggs, such as Australia and those in the European Union, what is the importance of egg labelling?

Why coding matters

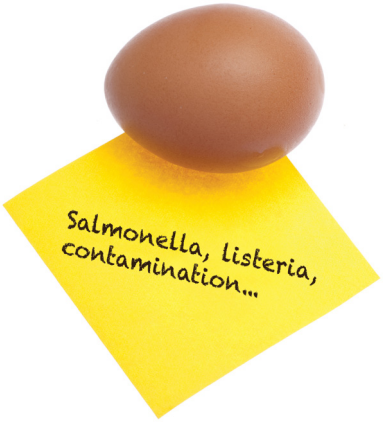
Egg recalls are not uncommon

In August 2017, UK supermarkets had to withdraw salads and sandwiches after 700,000 contaminated eggs from the Netherlands had been distributed to UK food suppliers. The Food Standards Agency had previously estimated a smaller total of 21,000 eggs were contaminated with fipronil, a chemical which is considered "moderately hazardous" in large quantities according to the World Health Organization.[3]

The following June, Germany recalled 73,000 organic eggs, again due to a fipronil contamination thought to have originated from a Netherlands-based producer.[4]

In 2018, 23 cases of salmonella were confirmed in Sydney, Australia, which resulted in the egg supplier voluntarily recalling products sold with best before dates in September and early October.[5]

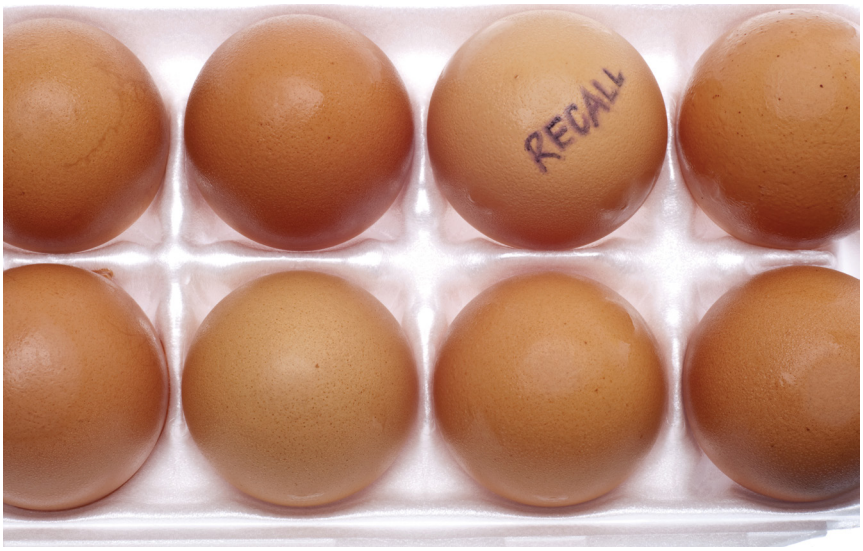
Yet, while it is compulsory in the European Union and Australia to code the eggs themselves, which is particularly helpful in recall situations and can make such events more targeted, most other countries do not have as strict legislation, despite facing similar recall situations.



Egg recalls can be caused by a range of factors impacting food safety.

For instance, over 200 million eggs had to be recalled by US grocery stores in 2018 after 35 reports of illnesses, including 11 hospitalizations, due to salmonella.[6] The problems were traced back to a production facility in North Carolina. However, the affected eggs could only be traced through the coding on the side of the carton[7], which is problematic if the consumer removed the eggs from the packaging.

More recently, in December 2019 listeria concerns led to an American food company recalling all hard-boiled eggs produced in its Gainesville, Georgia plant with 'Best If Used By' dates through March 2, 2020. Affected were products sold across 5 states under 30 brand names for foodservice use, as well as eggs sold directly to consumers. There were 8 reported cases with 5 hospitalizations and 1 death.[8]



Egg recalls can be expensive – financially and reputationally – particularly when non-targeted, due to limited traceability data on individual eggs.

Case study:

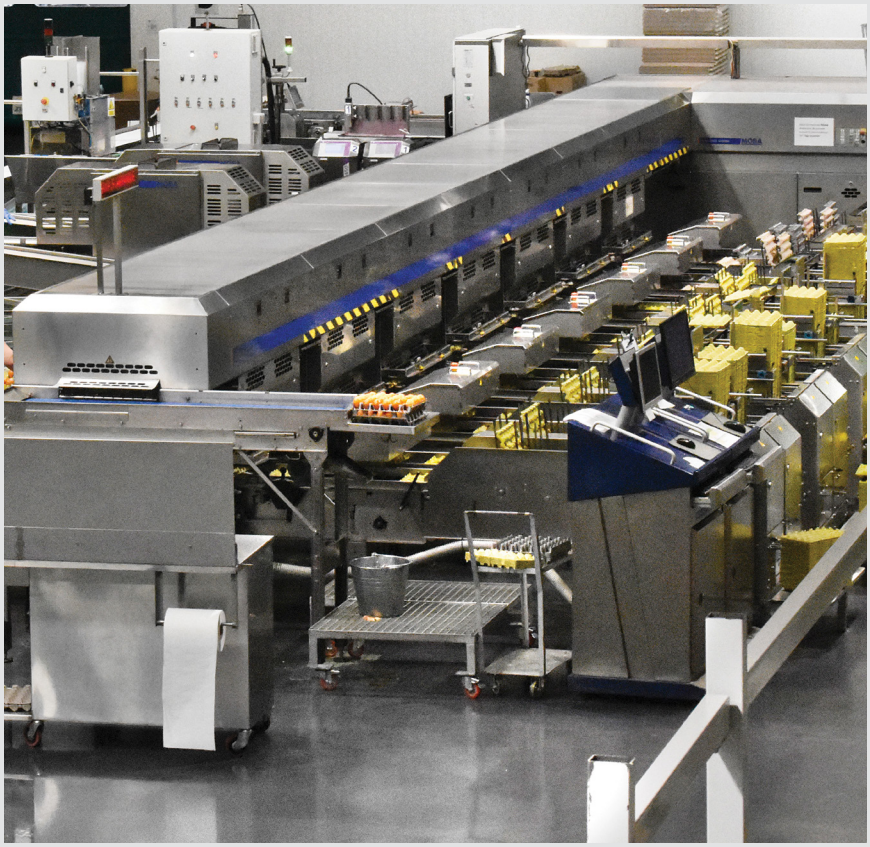
Cost-effectively improving traceability through egg coding in Spain

Huevos Guillén Group, a company with over 500 employees and 12 grading sites across Spain, produces over 150 million dozen chicken and quail eggs per year, with annual sales exceeding 190 million euros.

Its facilities, which have ISO:14001 and AENOR Welfare Quality certifications, are ultramodern guaranteeing the freshness of its products and meeting the strictest health standards. Subject to EU regulations about coding the shells of its eggs, it now uses Markem-Imaje's 9450 coders with its Moba graders to print three lines of characters at a speed of 180,000 eggs per hour.

The combination of the printhead resolution and the contrast of an ink developed specifically for this application enables more characters to be printed in less space, ensuring that all eggs sold are perfectly coded. In addition to these high-quality codes, Huevos Guillén has optimized its overall equipment effectiveness (OEE) and reduced its total cost of ownership (TCO) as compared to the previously used system.

"We are cutting our operating costs by at least 20%. The 9450 allows us to change consumables without stopping the printers and reduces the number of printhead cleaning operations. In addition, the smart ink cartridges help reduce human error and optimize everyday tasks", says **Mario Carbonell, Technical Manager.**



Coding legislation

Governments across the globe are increasingly enforcing food regulations to ensure codes, such as those on eggs, are of high quality and provide complete traceability throughout the food supply chain, which can be particularly useful in the event of infected batches.

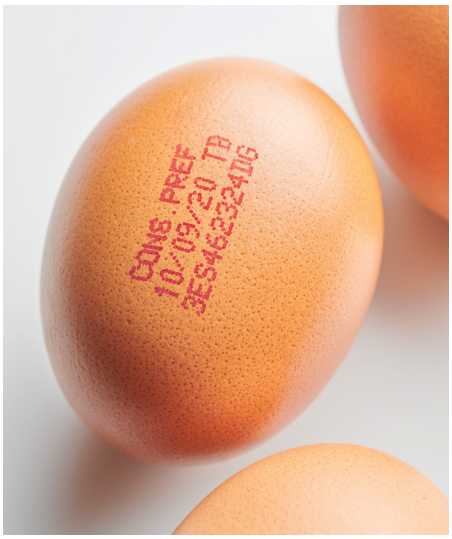
In the UK, the Registration of Establishments (Laying Hens) Regulations 2003 was put into place for sites keeping 350 or more laying hens, to help trace eggs put on the market for human consumption.[9] This legislation is enforced by egg marketing inspectors who are part of Animal and Plant Health Agency (APHA) and are responsible for the production and marketing of eggs.[10] Smaller egg producers are also subject to these conditions under certain circumstances.

In Australia, initially the only state with compulsory egg stamping was Queensland.[11] However, it has recently become compulsory for all commercial hen egg producers to put unique marks on egg shells so each egg can be traced back to its farm of origin.[12] While laws and regulations vary by state and territory, they are linked back to the Food Standards Code: Standard 4.2.5 – Primary Production and Processing Standard for Eggs and Egg Products.

Government legislation does not, however, provide the only pressure on egg manufacturers and retailers to code eggs more thoroughly. There is increasing pressure from consumers who expect quick and effective recall management. Additionally, consumers are increasingly interested in where their food comes from. Coding can help them trace the source of their eggs thereby improving producers' brand image and transparency.

Interpreting the code

Within the EU the code begins with a number to identify the farming method of production: 0 - organic, 1 - free range, 2 - barn eggs and 3 - caged hen eggs. This is then followed by two letters which denote the country of origin. Finally, the egg and its packaging are each stamped



Huevos Guillén egg coded to EU standards.

with a unique code which identifies the registered farmer who produced the egg.[13]

British eggs may also include a Lion Mark which means the hens were vaccinated against salmonella and have been produced under the British Lion Code of Practice which ensures the highest standards of food safety. Currently over 90% of UK eggs are produced under the scheme and more than 130 billion British Lion eggs have been sold since its launch in 1998.[14]

British consumers can even see where their eggs came from by visiting http://lioneggfarms.co.uk/.

Egg code stamping meant that, in 2019, a targeted recall of eggs with suspected salmonella was enacted. Consumers were told look for eggs marked with the unique flock code of 1UK11871 marked on the shell.[15]

More recently, eggshell coding facilitated another targeted salmonella-related recall in France. Consumers there were told to avoid consuming eggs whose shells were marked with the code 3FRMDB08 and had recommended use by dates of 26 April - 14 May 2020.[16]

In Australia, it is not mandatory to apply anything other than a unique mark on each egg which can identify the producer. However, it is recommended that a date code and/or batch number be produced in order to further enhance traceability.[12]

How it works

Printing codes directly on to curved, fragile porous egg shells can be complicated. Each egg varies in shape and size which increases the risk of image distortion or blurring, particularly with smaller eggs. Additionally, each code must be readable on the brown and white egg surface, and not come off even when the eggs are boiled. Codes also need to be applied accurately, at high speeds on many eggs simultaneously, without increasing downtime or cracking the egg.

Fortunately, continuous inkjet (CIJ) printers designed for egg coding exist to address the challenges. Being non-contact, CIJ is commonly used for egg shell coding. With this technology, a constant flow of ink is sprayed from nozzles directly onto the egg surface, at whatever angle is required.

Inks specifically designed and approved for direct food contact are available in pink or blue, the color chosen depending on region and egg type, white versus brown.

CIJ can print up to four lines of text and one logo per egg, allowing it to fit all necessary information and brand marketing if desired.

Thanks to specific communications protocols, printers can be easily integrated with a variety of egg graders.

For example, a specially configured version of Markem-Imaje's 9450 coder is available to code 250,000 eggs per hour on an eight-track grading machine. This inkjet printer offers a range of additional features not available with others commonly used to code eggs. For example, the ability to operate from a standard 7-inch color touch screen and its online guiding system mean operators gain time when starting or stopping print runs, changing cartridges and checking printer status. And, without stopping the line, the embedded software allows egg producers to monitor consumable consumption and running costs. This enables them to react proactively to protect uptime and keep costs under control.

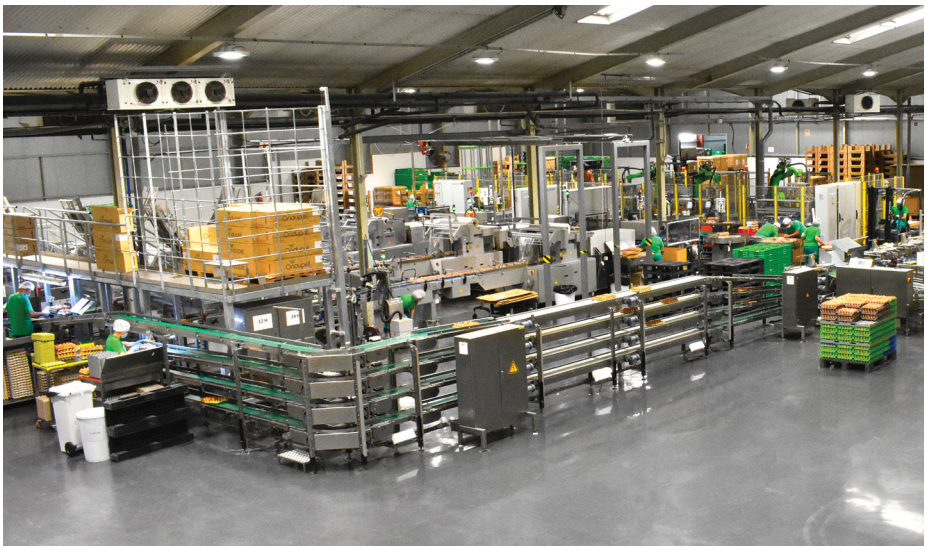
Additionally, service intervals on the printer's pressure pump have been extended to 14,000 hours. This is nearly double the interval associated with older generation pumps from various suppliers which are still widely used across the industry.

What to eggspect

Egg recalls will continue to occur and, if not handled well and quickly, can damage reputations and financial bottom lines.

There is also rising consumer and governmental demand to increase traceability and reduce health and safety risks through better egg marking.

How ready are manufacturers to meet these needs and protect their brand?



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