

The economic and hygienic benefits of egg washing

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It is a great pleasure for me to stand before this group and present a paper on egg washing. I will discuss some of the headlines on egg washing such as the ones that are summarized below.

Proven, trouble free continuous type egg washing allows for the following:

- Eliminates shellborne *Salmonella enteritidis*, and eliminates shellborne bacteria
- Does not remove cuticle
- Improves egg shell appearance
- Lowers the cost of cartoned eggs, by Increasing machine capacities of cartoned eggs
- Eliminates necessity to have a cooling chain (refrigeration)
- Eliminates necessity to spray oil eggs
- Prohibits submersion egg washing
- Eggs are to be washed in egg packing plants
- Allows voluntary continuous type egg washing connected to egg graders, egg breakers or stand alone

About 40 years ago, commercial capacity continuous type egg washers and dryers were developed. This provided for a safe, economical, hygienic and practical method of egg cleaning. At last, eggs could be safely washed and dried in quantity under supervised conditions. The United States and Canadian Departments of Agriculture took a positive approach and established regulations for shell egg cleaning operations in egg packing plants. The USDA Egg Cleaning Regulations are the same for the U. S. Forces in Europe. Since 1975, the USDA regulations forbid submersion egg washing in egg packing plants.

Delays caused by requests for additional tests are not necessary, because the system has been proven by more than 40 years' use in the USA, Canada, Japan, Australia and Sweden. Now in Russia, Mexico, Saudi Arabia and other countries

Egg producers could send nest run eggs to packing stations and eliminate the inconvenience and the largest labour problem they had, which was to clean eggs.

A quote of Dr. Don Bell of the University of California: " In the US, we know where the egg comes from, we know it is dirty (not necessarily to the eye) and therefore we clean and sanitize it. In the 'non-washing countries', if they see the egg appears clean, they do not consider it dirty and washing is not allowed. In the US, washing and sanitizing are only a part of a more comprehensive program, which takes eggs all the way to the consumers."

The North American the result of washing is: eggs are clean, of high quality, have excellent shelf life in the stores, and provide economical savings benefiting the egg producer, the egg packer and the consumer. In addition, the stores providing the cleanest eggs sell more eggs. In contrast, the European Common Market has restrictions on egg cleaning which are very outdated and certainly damaging economically to the egg industry and the consumer.

These unnecessary restrictions have the following detrimental effects: it forces the egg producers to bear the expensive labour costs of attempting to sort out eggs too dirty to go to the egg packers. Most egg industry people say the EEC egg producers wash 10% of their eggs in less desirable immersion (submersion) egg washers. The egg packers then have the labour cost of picking out 5-10% more dirty eggs and, at the same time, lose that much production of cartoned eggs and there are still some dirty eggs in cartons. The egg producers and packers are forced to sell eggs that are partially dirty. The consumer is forced to buy partially dirty eggs, which reduces egg consumption. This forced regimentation is unnecessary.

Submersion egg washing is prohibited in USDA plants, but since the EEC has not set the conditions as indicated they would in 1967, an average of 10% of the eggs in the EEC are washed by submersion; a discredited, outdated method? This 10% is mixed with other eggs and marketed as Grade "A" or Class "A".

Wouldn't it be simpler to set the continuous type egg washing conditions similar to those proven over many years in other countries?

In parts of the world where egg washing is not allowed, the story is different. Do people really prefer dirty eggs, or are they just not well informed, were they led to believe the falsehood that dirty eggs are fresh eggs. Hasn't anyone heard of shellborne bacteria or salmonella and how they can enter through the shell and possibly cause problems the egg industry doesn't want and cannot afford to have? A dirty egg is still a dirty egg. The majority of today's population is more hygienically minded and wants clean eggs. They should not be denied being able to purchase hygienically clean eggs.

Observations and comments from research

The best-known precaution to remove any shellborne *Salmonella enteritidis* is the use of commercial continuous type egg washers, sanitizers and dryers (Baker, US). All eggs are to be washed. Baker also recently prepared and distributed a list referred to as "The Ten Commandments of Washing Eggs" which re-states what others have also recommended.

Glenn W. Froning stated it has been shown by previous research that washing effectively reduces or eliminates *Salmonella enteritidis* (SE) on the shell.

There is considerable misinformation about washing consumption eggs. The purpose of this paper is to provide correct facts regarding modern egg washing practices, and to remove doubts and correct outdated misinformation that uninformed persons have given the egg industry and consumers.

It has to be assumed that a person cannot claim to be knowledgeable or to be an authority on the matter of continuous type egg washing if that is not the normal commercial procedure practiced in his own country. The countries where most consumption eggs are washed are the USA, Canada, Japan, Sweden, Mexico, Russia, Saudi Arabia and Australia.

Prior to either entry into the EEC or the establishment of the EEC Egg Marketing Regulations, eggs on continuous type egg washer-dryers connected to egg sorting machines or self-driven machines were operating in Germany, France, Italy, Great Britain and Denmark. The eggs were properly sold as Grade "A" and no one objected or had any complaints. The consumer was happy to be able to purchase clean eggs.

The different approaches to egg washing in North America and Europe

The EEC minimum characteristics for Class "A" eggs is that the shell and cuticle is normal, clean and undamaged. Eggs shall not be washed or cleaned by any other method. Commercial continuous type egg washers accomplish these requirements, so in an English translation this should mean that Class "A" eggs could be used because the shell and cuticle is normal, clean and undamaged.

The United States Department of Agriculture, the U. S. Forces in Europe and the Canadian Department of Agriculture all say the same thing: Grade "A" – the shell must be clean, unbroken and practically normal.

Since the minimum characteristics are practically the same in North America and the European Common Market, why are the egg cleaning regulations very different?

Eggs meant for human consumption are washed in the United States and some other countries, and commonly not washed in the EEC. Washing has been shown to be the most practical and economic method of removing foreign materials and microbial contamination. Even though washing is not mandated by law in the U. S. (clean eggs are required by law), the procedure is regulated by law when used.

Egg grading laws in the U.S. state that consumer grades of Eggs (Class AA and A) must be clean and clean is defined as: "a shell that is free from foreign material and from stains or discolorations that are readily visible.

Dirty eggs, on the other hand are defined as: "an individual egg that has an unbroken shell with adhering dirt or foreign material, prominent stains or moderate stains covering more than 1/32 of the shell surface if localized, or 1/16 of the shell surface if scattered".

Eggs are cleaned to provide consumers with a more sanitary and aesthetically pleasing product. In the U.S., clean eggs are a requirement of the law and eggs that fail to meet these specifications are downgraded into a lower value category and are generally broken for liquid egg products and subsequently pasteurized. In the year 2000, the decrease in value for breaker eggs was estimated to be 35 cents per dozen. Obviously, it pays to provide clean, washed eggs.

Washing represents a relatively minor portion of the cost of processing and packing eggs for the shell egg market, but this cost is more than offset by the higher value received for the resulting cleaner eggs. Costs of washing include capital expenditures for equipment plus interest, electric energy to operate the equipment, labour to clean and maintain the equipment, cleaning and sanitizing

compounds, water and water disposal costs. Income, though, will be higher because of fewer downgraded eggs. When so much can be saved and profits could be better, why is there any resistance to the EEC establishing egg washing regulations?

Considerable export business to third countries has been lost because of the demands for clean eggs, which are available from suppliers in other countries where commercial egg washing is a standard practice.

European information and tests on continuous type egg washers

Concerns about damage of the cuticle on egg shells were taken away by Simons, (NL, 1966): "In practice, nevertheless, washing is widely applied for the necessary cleaning of dirty eggs. We therefore studied its effect in some detail. It was demonstrated that washing does not bring about any apparent change in the structure of the cuticular surface, as judged by the fact that no structural components have disappeared".

After several years of research, Büchli (NL, 1967) concluded that washing of consumption eggs did not at all reduce the quality of these eggs. The holding quality was the same as for clean, unwashed eggs. Clean appearing, unwashed eggs have a bacteria count of 31,000 on each shell. After washing, the count was reduced to only 50. The washing process did not damage the cuticle of the egg.

There are egg washing machines available which, when properly used, do not detrimentally affect the quality of eggs (Wich, D, 1965) Today, owing to the complete structural change in egg production, the washing of eggs is a situation that the governmental authorities cannot keep aloof from. Existing regulations in this respect should be rectified and regulations expanded to include them.

In 1965, Rauch (D) conducted tests on a continuous type egg washer and dryer. The conclusion was good cleaning results; same holding quality as unwashed, clean eggs. There was no difference regarding air cells, egg white and yolk structure, smell or taste. Also in 1965, the Bundesgesundheitsamt in Berlin tested the egg washer and dryer with similar conclusions.

In 1966-67, the British Egg Marketing Board arranged for a series of performance trials to be carried out on egg cleaning equipment. The test report indicated the cleaning operation had no adverse affect upon the appearance or the quality of the eggs. As a result, the Board established egg washing conditions (Knowles). Great Britain's entry into the EEC delayed implementing the program.

In 2003, the ADAS Poultry Team conducted a detailed assessment and a favourable report on egg washing under commercial conditions in the USA and Japan. They report that in Japan they do not use a cooling chain or refrigeration after washing eggs.

They state in countries where egg washing is permitted, this practice is seen as a fairly low risk operation. Nowadays, the practice of egg washing and equipment available on the market make the whole practice more accountable than before. The current commercial egg washing machines are friendlier on the egg. Washing of table eggs under strict surveillance should be authorized for a transitional period of three years for packing establishments, which on June 1, 2003, had been approved to this end. The European Food Safety Authority should prepare a comprehensive scientific report on washing of table eggs by December 31, 2005.

Among the EEC Member States, it is only in Sweden that table eggs are commonly washed, in order to meet a consumer preference. Even in other Member States, like UK and Italy, consumers may have the idea that a washed egg is safer. This idea in the mind of consumers has emerged because of repeated food poisoning cases, caused by eggborne Salmonella enteritidis and media campaigns on this subject. The increased use of alternative systems and the subsequently higher percentage of non-cage eggs available on the market may produce a higher number of dirty eggs. These dirty eggs must be downgraded and sold at a lower price, causing a loss of income to the producers. This explains why the washing of eggs attracts interest.

The washing of eggs has been going on in Sweden for the past forty years. The Swedish consumer attitude is to prefer washed eggs, with a strong demand upon washing from the catering sector, especially for hospitals. A little more than 50% of table eggs are washed in Sweden.

The International Egg Commission (IEC) advised the EEC in 1967 regarding the then-proposed EEC Egg Cleaning Regulations the following: "We note that Class "A" eggs do not permit cleaning whether wet or dry. Here again, we find this is contrary to acceptable commercial practice in most countries in the world today. We therefore recommend this requirement be deleted".

The Shell Egg Sub-Committee of the IEC, has for many years repeated to the EEC Commission their recommendation in favour of egg washing on a voluntary basis being carried out at approved premises with an approved method and equipment.

Discussion

The hours of labour required on egg producing farms has also increased in cost, the same as any other type of industry. It is much easier to allow a free enterprise type egg producer or packer to invest in a labour-saving, product improvement machine or equipment than it is to have the farmer or egg producer suffer financial losses, or perhaps also require Government subsidies. The egg industry should voluntarily decide whether they want to use labour-saving, product improvement type egg washers.

The IEC at the Spring 1988 meeting, with 21 member countries representing 41% of the world's egg output, discussed egg washing; it was indicated that eggs were being washed even in countries that do not have official regulations. Where it is necessary or desirable as a market requirement, however, it should be allowed, but only at packing stations and under controlled conditions.

The IEC Producers Committee agreed on the following proposal: "The IEC recommendations to National Governments and the EEC Commission that egg washing be prohibited unless carried out on licensed premises using procedures complying with officially accepted standards of hygiene and appropriate supervision".

In 1987 Peter Kemp, UK, observed moves to have the EEC regulations changed to permit washed eggs be sold as Class "A". This would mean it could only be permitted at registered EEC packing stations.

Egg oiling and cooling

It is not necessary to spray oil on eggs washed by modern methods. Since the cuticle is not removed, there is no need to provide an artificial protection by oiling. Eggs are oiled if the chain store buyer wants them in this manner. Only one U.S. gallon or four litres of oil is used for 400,000 eggs. Clear, odourless, tasteless mineral oil suitable for human consumption in a mist is applied to the egg shells after washing and drying. This treatment maintains egg quality and shelf life.

If eggs are washed, sanitized and properly dried, there is no reason to believe that bacteria of any kind will create any quality problem with sound shelled eggs. Today's sanitary conditions of production, washing and packing means refrigeration of eggs does not seem necessary (Meller, US).

When to wash

Although eggs should preferably be washed as soon as possible following collection, it is no longer necessary when applying modern continuous type egg cleaning machines. Those in use in egg packing plants may be washing eggs that are up to one week old from the time they are laid, until they are washed and packed. A possible operating procedure in egg packing plants is to receive and hold the eggs and then wash, candle, size and pack the eggs all at the same time. This method is the most labour efficient, and allows 5%-10% more eggs to be cartoned than when the egg packers run unwashed eggs, which require dirties to be picked out and lose that percentage of production.

Conclusions

There isn't any extra labour required to wash eggs, as the egg washer is actually the infeed to the egg grader or egg breaker. The rollers normally go through the egg washer and the infeed, which continually cleans both eggs and rollers. Tests prove that egg washing reduces the shellborne bacteria and *Salmonella enteritidis* by 99.98%. The cuticle is still in place. Egg washing improves egg quality and should be part of the Food Safety procedures.