

Egg Washing Field Trials

studies indicate clean unwashed eggs are most suitable for satisfactory storage

F. W. Lorenz

Washing eggs before storage is a risky business. The only safe eggs to store are clean eggs produced clean and unwashed.

Unwashed light dirties are apparently almost as safe, but any washed eggs are utterly unpredictable at present. If washed eggs are put into storage, there is no way of telling whether or to what extent they will spoil. Practically all of the eggs that do spoil in storage will be eggs that have been washed.

During the past year two separate egg washing field studies were carried out with approximately 79,000 eggs processed, stored, broken and examined. All eggs were segregated according to cleanliness or treatment, then oil processed and stored. Six months later they were removed and broken for examination.

Perhaps the most striking observation made in these trials was the uniformly excellent condition of the unwashed clean eggs stored as controls. In over 14,000 eggs examined only 0.2% were spoiled—less than one egg per case of 360. Unwashed light dirties had very little more spoilage, 0.4%, and from most ranches it was no greater than that of the clean eggs. Practically all of the trouble was found in the eggs that had been washed. An average spoilage of 3.6% was observed in all eggs washed during both trials by a variety of methods and under different sets of conditions.

Sacramento Trial

One of the two trials—the Sacramento trial—was intended to obtain more information on the effect of washing methods on spoilage. In this trial all of the eggs produced by a nearby poltryman during one month were used.

Three days each week the eggs were picked up as soon as gathering was completed. They were taken at once to Davis where they were segregated according to whether they were clean, light dirty or heavy dirty and were washed. On one day each week the eggs were similarly classified but were stored unwashed, and on the other three days the light and heavy dirties were washed on the ranch.

In the eggs washed at Davis, as elsewhere, the heavy dirties spoiled several times as frequently as the originally clean washed eggs. The spoilage figures have been recalculated to represent what might

be called a *standard pack*, consisting of 60% clean eggs, 30% light dirties and 10% heavy dirties, a distribution not very different from the average of the eggs as received.

The effect of water temperature was studied using a roller-type washer with towel covered rollers and sprayed water. As expected from the results of previous experiments, higher water temperatures produced less spoilage than cold water. With water striking the eggs at 70° F, 104° F, 122° F, and 140° F the spoilage of eggs coming out of storage was 2.9%, 2.3%, 0.9% and 0.8% respectively. The advantage of high water temperature may not be counted on too heavily, however, for other eggs from the same hens but washed on the ranch gave poorer results. These eggs were washed on a similar machine with water at 140° F, and 2.4% spoilage was found in the light dirties, as compared with 0.4% in the light dirties alone washed at this temperature at Davis. The reason for this discrepancy is not known.

Ranch-washed heavy dirties also had more spoilage than those washed at 140° F at Davis—4.9% and 2.4% respectively—but here the conditions were not entirely comparable because the heavy dirties washed on the ranch were presoaked in warm water before being placed on the machine. Both figures show increases in spoilage due to washing, for unwashed heavy dirties contained 1.8% rots.

There are both theoretical reasons and experimental results suggesting that eggs are more sensitive to infection if washed before they have first been thoroughly cooled. This theory was tested by holding two lots of eggs over night in a cool room and washing them the next day as above with 104° F and 140° F water. Precooling reduced the spoilage of those washed at 104° F to 0.9% but had no effect on infection of the eggs washed at 140° F.

In a single test of the use of an alkaline detergent, the use of 2% trisodium phosphate gave somewhat poorer results than did a bath of plain water.

One day's production was run through a machine with an abrasive belt to test the practice of dry cleaning. These eggs came out of storage with relatively little spoilage—0.4% for the standard pack—and most of what spoilage there was came from the originally heavy dirty eggs.

The above figures do not tell the whole story of the influence of washing on spoilage, because market eggs have time for further deterioration before they are finally consumed. Consequently, a portion of the eggs in this experiment were held on the floor of the candling room for 10 days before they were examined. The candling room offered conditions less severe than eggs must undergo in some retail markets, but they were severe enough to produce a considerable increase in spoilage. Ranch washed eggs contained 10.6% rots at the end of this period, and similar increases in eggs washed at Davis were observed. Spoilage in the unwashed heavy dirties was increased to 7.4%, but unwashed clean and light dirty eggs suffered only slight increases in spoilage to 0.6% and 1.3% respectively, and the dry cleaned eggs increased only to 1%.

Petaluma Trial

The second trial—at Petaluma—was intended to observe the effect of washing under different conditions in the field. In this trial, 28 ranches were visited, notes were made on the handling methods employed, and samples of eggs were obtained.

The samples of eggs obtained usually consisted of a case of washed eggs and one half to one case each of unwashed clean eggs and unwashed light dirties. Other—usually smaller—samples were taken of heavy dirties that had been soaked to soften the dirt before washing, where that was a practice, and a few additional samples were obtained of eggs that had been dry cleaned.

As in the Sacramento trial, dry cleaned eggs had less than 1% spoilage. The most noteworthy observations were the tremendous variations between different ranches in the spoilage of washed eggs. Samples of washed eggs from three ranches had no spoilage at all; four had less than 1% and 11 had from 1.6% to 11.6%. Samples from two ranches contained 37% and 38% spoilage.

The most striking thing about these differences was the lack of any observable reason for them. Water temperatures varied from 78° F to 148° F but the highest temperature was used by the

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EGG WASHING

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ranch that had the worst spoilage. This ranch was also the only one using fresh sprayed water. Detergents were used by some of the ranches with the best samples but also by some of those with poor samples. Towel-covered rollers were used by the best as well as by the poorest ranches, but rubber or rubber and brush rollers were used only on ranches that produced poor samples.

There was no apparent relation to the average cleanliness of the eggs. The three best ranches produced 1% to 5% heavy dirties and the two poorest also produced 1% and 5%. The ranch with the dirtiest eggs—25% heavy dirties—had a sample with less than 1% spoilage. The amount of spoilage in washed eggs could also not be predicted from the amount of spoilage in the unwashed clean eggs from the same ranch. The poorest sample of unwashed cleans contained 1.1% spoiled eggs and the washed eggs from this ranch were 7.9% spoiled. But the ranch with the poorest washed eggs had no spoilage in the unwashed cleans.

Four ranches used the cleaning method of presoaking and hand washing. Of these, two washed heavy dirties only. None of these ranches had appreciable spoilage. When heavy dirties were presoaked in conjunction with machine washing, the presoaked eggs were worse than those that were machine washed only, in every instance. In seven ranches on which such a comparison could be made the average spoilage of the eggs that were machine washed only was 3.2% and of the presoaked eggs was 15.7%.

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