# Factors Affecting Egg Quality

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Many factors affect egg quality. Sometimes the cause is not a single factor but a combination of factors. A few of these problems can be prevented or reduced by good hen management. Producers should remember that genetics, feed quality and environment play a role in egg quality. The most reliable factor is age. A young pullet produces smaller eggs with strong egg shells and albumen that stands high. As the hen ages, the shells thin, and the albumen begins to weaken and run. Hens can be molted to induce another egg cycle, which will improve egg quality, or they will need to be replaced with young pullets.

The following charts summarize factors that may affect egg quality and suggest corrective measures. As more emphasis is placed on egg quality, it is important that all possible defects be eliminated. When defects are found, consult the chart for possible causes and solutions.

| *The Shell* | | |
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| ***Condition*** | ***Causes*** | ***Corrective Measures*** |
| Thin, sandy, misshapen, rough, ridged or soft | Age of hens | Replace after 12 to 14 months of lay. |
| | Arasan (Tetrame Thylthiuram Disulfide); used to control mold and fungus growth. | Do not include arasan treated grains in the diet of layers. Law requires that treated grain be dyed. |
| | Sulfanilamide (sulfa drugs) | Use according to accepted recommendations. |
| | High constant temperatures | Control temperature. Provide plenty of water. |
| | Respiratory diseases (Newcastle, infectious bronchitis and laryngotracheitis) | Follow a recommended program for vaccination and disease prevention in poultry. |
| | High salt (NaCl) | Feed less salt. |
| | Drugs for rodent control | Keep rat bait away from poultry. |
| | Fright | Avoid sudden noises. Approach birds cautiously. |
| | Reduced calcium intake | Provide 3 percent calcium during cool weather. Provide 4 percent calcium during warm weather. |
| | Heredity | Select strains that produce eggs of good shell. |
| Abnormal color (brown to yellow) | Nicarbazine; a treatment for coccidiosis in broilers. | Do not feed to layers. |
| | Chlortetracycline (600-800 gm./ ton), Aureomycin | Use according to accepted recommendations. |
| | Gas lead in lines or burners | Maintain tight connections in gas line, keep burners in excellent working condition and provide ventilation in areas where gas is used to heat egg rooms. |
| White to brown | Iron ($FeSO_4$), ($7H_2O$) 0.1 ppm | Have iron content checked in water used for washing eggs. Keep below 0.1 ppm. |
| Faded color | Low calcium in diets of turkeys. | Raise calcium levels for increased shell color and improved shell thickness. |
| Mottling of shell (bright spots or moist appearance around pores, observed by candling) | Water retained by protein in spongy layer of the shell. | Do not mistake for a crack or cracks in the shell. Maintain 80 percent humidity in egg room. |
| Porosity | Age and breed of hens, environmental temperatures, and season of year. | Keep hen house cooler, hold eggs in cool place, sell hens after 12 to 14 months of lay or molt, and select strain bred for good shell texture. |
| Tremulous or moving air cell (observed by candling) | Rough handling | Observe and make necessary alterations in egg-handling practices. |
| Tainted shells | Paradichlorbenzene (moth repellant) | Do not feed to birds. |

| *The White (albumen)* | | |
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| ***Condition*** | ***Causes*** | ***Corrective Measures*** |
| Pink egg whites | Cottonseed meal (often found in cattle rations) | Avoid using in the diet of layers. |
| Weak, thin or watery whites | Age of hens | Replace hens after 12 to 14 months of lay. |
| | Ammonia from droppings | Better ventilation, use superphosphate on litter and manure and remove droppings regularly. |
| | Increased alkalinity, (pH)-Loss of CO2 | Use a shell coating such as oil or refrigerated temperatures (40 to 55°F). |
| | Respiratory diseases (Newcastle, infectious bronchitis, and laryngotracheitis) | Follow a recommended program for vaccination and disease prevention in poultry. |
| | Heredity | Select strains of known egg white (albumen) quality. |
| | Arasan | Do not use arasan treated grains in the diet of layers. |
| | Vanadium | Use sources of phosphorus in feeds known to have low amounts or none. |
| | High environmental temperatures | Collect eggs often (three to five times a day) and hold in refrigerated temperatures (40 to 55°F.). |
| | Sulfanilamide (sulfa drugs) | Use according to accepted recommendations. |
| Flecks or spots in albumen | Partially cooked | Avoid excessive heat when washing eggs. |
| | Blood and meat spots | Select strains known for clear egg whites (albumen). |
| Green rot and other types of microbial spoilage. | Microorganisms, including bacteria, molds, and fungi | Maintain clean nesting materials. Gather eggs frequently (three to five times a day). Use clean water for washing eggs. Maintain temperature of egg wash water (100 to 120°F.) above that of the egg at all times. Use recommended amounts of detergents and sanitizers. Keep equipment clean. Use clean packing materials. Keep eggs refrigerated. Green rot is easily detected with an ultraviolet lamp candler. Other types of advanced spoilage are easily detected with regular candling techniques. Egg wash water containing 0.4 ppm of iron can promote bacterial spoilage. |
| Cloudy white | Prompt oiling of newly laid shell eggs. | Delay oiling for one to six hours after eggs are laid. |
| | Prompt refrigeration of newly laid shell eggs at 32 to 39°F. | Keep eggs refrigerated below 45°F. |
| Off-odors and flavors | Chemicals for treating parasites. Odorous flowers, fruits, and vegetables in egg storage areas. | Use chemicals recommended for lice and mite control. Do not use materials capable of imparting odors or flavors to eggs such as BHC, Lindane or Hexaphene. Do not store flowers, fruits and vegetables in the same area with eggs. |
| Blood and meat spots | Hemorrhaging before and during ovulation. | Tranquilizers, vitamins A and K, and aureomycin |
| | Breed | Select strains with low incidence. |
| | Continuous intermittent periods of light | Use 14 hours of light. |
| | Color or pigment caused by porphyrin as found in the brown shell egg. | Select strains with low incidence. |

| *The Yolk* | | |
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| ***Condition*** | ***Causes*** | ***Corrective Measures*** |
| Olive- or salmon-colored yolks | 5 percent or more cottonseed meal (found in some cattle diets). | Avoid its use in the diet of layers. Do not allow free-range poultry to consume spilled cattle feed. |
| Platinum yolks (colorless yolks) | Possible infection (causative agent unknown) | Antibiotics. (200 gm auremycin and 2 lbs NF-180 per ton of feed for seven days.) |
| Colorless yolks | Lack of xanthophyll | Consideration should be given to the source of xanthophyll such as yellow corn meal, alfalfa leaf meal, etc. |
| Green yolks | 100 to 250 mg of sodium chlorophyllin in feed. | Avoid feeding to hens. |
| | Seed pods of Shepherd's purse and pennycress | Use clean grains in feeding programs. |
| Greenish-brown yolks | 5 gm or more of pimiento peppers daily to each hen | Use smaller amounts for a desirable color in egg yolks. |
| Orange-pink yolks | Red pepper | Avoid feeding to hens. |
| Yellow to orange yolks | Seaweed meal (algae), dehydrated alfalfa meal, corn gluten meal, flower petal meal, dried chili peppers, powdered African red peppers, dried sweet potatoes, dried carrots, corn oil products, food grade fat soluble dyes, etc. | Feed recommended levels of xanthophyll bearing materials for desired egg yolk color.<br>Yellow =13 mg of xanthophyll per lb of feed<br>Medium orange = 23 mg of xanthophyll per lb of feed<br>Orange = 34 mg of xanthophyll per lb of feed.<br>Maximum color will be present 10 days after the hens are placed on feeds for yolk color. |
| Misplaced egg yolk | Large end up with yolk in large end – thin egg white and/or fat content of yolk. Large end up with yolk in small end – thin egg white and/or water content of yolk. | Use accepted quality control practices while gathering and storing eggs in a cooled atmosphere. |
| Blood and meat spots | Hemorrhages (ovarian, may be inherited) | Select strains with low incidence. Older breeds have approximately 30 percent blood spots in eggs. |
| Mottled or blemished yolks | Nicarbazine | Do not feed to layers. |
| | Cottonseed meal | Avoid feeding to layers. |
| | Piperazine citrate | Do not use frequently or continuously. |
| | Movement of water from egg white across vitelline membrane into yolk material | Cool eggs quickly and keep cool. Use other accepted quality control practices. |
| Thick, pasty, rubbery or cheese-like | Crude cottonseed oil (malvalic acid and sterculic acid) | Avoid feeding to layers. |
| | Yolks laid internally | Remove offending birds from the flock. |
| Apparent misplaced egg yolk (observed in the whole egg by candling). | Unknown | The egg positioned with the small end down may help correct this situation. |
| Off-odors and flavors | Chemicals for treating parasites. Odorous fruits and vegetables in egg storage area. | Use of chemical recommended for the lice and mite control. Do not use materials capable of imparting odors or flavors to eggs such as BHC, Lindane or Hexaphene. Do not store flowers, fruits, vegetables or petroleum products with eggs. |
| | Chemicals or egg washing compounds | Do not place egg-washing powders or liquids directly on eggs. |
| Flat | Weak vitelline membrane | Gather eggs often (three to five times a day). Maintain temperatures of 40 to 55°F. Market often. |
| Stuck yolks | Newcastle disease | Use recommended vaccine. |
| | Storage at high temperature | Store at 40 to 55°F. |

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