

Cost comparison between organic store-bought chickens and free grazed chickens with a chicken tractor system

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Introduction

There are many benefits to eating organic chicken meat. Some the benefits include better taste, enhanced product quality and additional nutritional benefits over conventional chicken. Raising young chickens, also known as broilers, to become certified organic meat, must follow mandatory guidelines. Organic chickens must be feed organic feed, have a longer duration of production, and be given outdoor space (Sossidou et al., 2015). The need for organic feed, longer production time, and increased demand for organic chicken meat has caused their prices to become higher than conventional chicken meat.

The goal of this project was to complete a cost comparison between organic store-bought chickens and free grazed chickens with a chicken tractor system. A chicken tractor is a mobile chicken coop that allows chickens to forage for nutrients in a field as well as have the protection of a chicken coop. By grazing in a field, the nutrients required by feed is reduced, decreasing the total amount and cost of feed. The purpose of this project was to reduce the cost of raising chickens organically with a reusable chicken tractor to become cheaper than buying certified organic chicken meat at a store while being easily constructable with readily available materials.

Materials and Methods

Twenty-five chicks were initially purchased and then put in a brooder for six weeks. The chick's initial habitat, a brooder, was constructed out of four wooden planks, an electric heater, two water troughs, and two glass doors on top. Their diet was monitored closely. After six weeks in the brooder, the chicks were moved into the chicken tractor outside into a field with grass for five weeks. The chicken tractor was moved regularly on a schedule.

A chicken tractor with a base $10.5' \times 8'$ was designed in the computer aided design software Fusion 360 (Figure 1). To reduce the cost of materials, bamboo was used as the main construction material due to its availability at the farm. After the chicken tractor was designed 23 pieces of bamboo were cut within one foot longer of the design. For the bamboo to be used outdoors for long periods of time, the bamboo needed to be treated to become weather resistant and prevent fungus growth to maintain strength. The bamboo was treated with heat from a charcoal fireplace to release a resin from within the bamboo fibers. The resin was then rubbed back into the surface with a rag to create a fungus resistant surface on the bamboo (Figure 2).

Materials and Methods (continued)

The chicken tractor (Figure 3) was lashed together at each corner with cut up recycled bicycle innertubes supported by wire threaded through the bamboo. The chicken tractor was then wrapped with two inch by four inch weld wire fence four foot tall around the sides and base to keep the chickens contained and predators from digging underneath.

The roof portion was constructed out of two exterior garage door panels seamed together with heavy gauged wire. The elevated section of the chicken tractor was wrapped with hardware cloth two feet tall and three pieces of approximately two feet long sections of garage door panels to help contain heat in the elevated portion. The chicken tractor produced has an expected life of four years and will be able to be used at least twice per year.

Around week seven, the chickens were attacked by a predator causing seven chickens to perish. After 11 weeks, the broilers were butchered. To compare costs, a United States Department of Agriculture (USDA) weekly report from January 3, 2023, around the time the broilers were butchered, was used to determine the national average cost of certified organic chicken.



Figure 1 (left): Final design of the chicken tractor designed and rendered in Fusion 360.



Figure 2 (above): Piece of bamboo being treated within a charcoal fireplace. Tin foil was placed on top to spread heat across the surface. A rag was used to apply resin into bamboo.



Figure 3 (above): Chicken tractor with chickens inside and tarps resting on top to reduce wind chill and increase insulation.

Results

Cost Category	Initial chicks	Butcher	Feed	Materials	Total
Actual cost per chicken	\$2.78	\$4.00	\$16.18	\$1.30	\$24.26
Predicted cost per chicken	\$2.00	\$4.00	\$11.65	\$0.93	\$18.58

Table 1 (above): The total cost of the project was \$447.77. The predicted costs per chicken were calculated with the assumption that all 25 chicks would be processed, however seven did not survive, producing the actual costs per chicken. The total cost of materials (\$186.52) was divided by eight for the estimated times the chicken tractor and brooder can be reused. The average actual cost per pound of the processed chickens was \$5.39 and the average predicted cost per pound was \$4.13. Each price was found by dividing the total cost by 4.5 pounds, the average weight of each chicken after processing. The average cost per pound of a chicken fryer according to the USDA is \$3.29 (Agricultural Marketing Service, 2023).

The cost per processed chicken produced using the chicken tractor system was found to be greater than the average cost of certified organic chickens found in stores.

Conclusion

The purpose of this study was partially met. For this study, the overall cost of raising chickens with a chicken tractor system was not cheaper than buying the average certified organic chicken. This was due to the incident of chickens dying prematurely from predators and unexpectedly high feed costs. Further testing is required to determine if predator attacks would be consistent or if the predator attack happened by chance. This can be found by installing and utilizing a camera system. Further research could include looking into different foliage for the chickens to eat. Other future research could include better defensive measures to protect the chickens such as hardware cloth around the sides, base, and top, or by putting an electric fence around the sides.

References

- Agricultural Marketing Service. (2023). Weekly USDA certified organic poultry and eggs. *U. S. Department of Agriculture*. https://mymarketnews.ams.usda.gov/filerepo/sites/default/files/2759/2023-01-03/664759/ams_2759_00150.pdf
- Sossidou, E. N., Bosco, A. D., Castellini, C., & Grashorn, M. A. (2015). Effects of pasture management on poultry welfare and meat quality in organic poultry production systems. *World's Poultry Science Association*, 71(2), 375–384. <https://doi.org/10.1017/S0043933915000379>