

TRADITIONAL REARING AND SLAUGHTER OF CHRISTMAS TURKEYS IN ENGLAND

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Key words: traditional farming turkeys, slow growing lines, natural feeding system, slaughter without water, dry plucking, special evisceration system, original taste of meat

The paper is a result of student practice in Copas Traditional Turkeys Limited in Cookham in England. During Christmas time in England there is no family table without baked turkey on it. For the sake of special taste and high quality the turkeys bred in a traditional farming system become preferred by British people. The qualitative characteristic of a product is linked to the selection of slow growing turkey lines. Slaughter maturity of such lines is usually achieved later than after 175 days. Another important factor influencing the quality is processing technology as well as post slaughter storage of not eviscerated carcasses for a certain period of time. Feeding the birds includes the diet composed of natural components only, with cereals being the major part of fodder. No antibiotics or growth promoters are allowed. For the first 8 weeks of life the birds are held in open type sheds under the conditions of natural light and ventilation. Later for not less than 119 days the birds have free access to grass and woody playground. These conditions assure the maintenance of natural 24 h daily cycle and have an important impact on birds' welfare. This is a factor of special attention paid to it. The slaughter process is conducted without the use of water with special care to skin of birds, which has to remain intact. These are the key points for creating proper conditions of cold storage period until evisceration. The electrodes placed into the beaks are used for birds stunning. To avoid the damage of skin surface the trimming cut of internal blood vessels is applied instead of external slid. After trimming the beaks are clipped and waxed to protect against penetration of bacteria. There is no scalding of birds in this type of processing. For dry removing of feathers the machines are used during the first step and final picking is conducted manually. After feather removal, non eviscerated carcasses are held at 4°C. Such storage influences the special taste of meat. The storage lasts for as long as 2–3 weeks, still without undesirable sensory changes. Manual evisceration is conducted with a little help of mechanical devices only. To reduce the contact of carcass abdominal and external surfaces with water, dry cleaning is applied to these surfaces. Every particular bird is packed into a separate cardboard and wrapped with paper. Rosemary's twig and hermetically sealed giblets are put into the cardboard. Those farmers who follow the rigorous requirements of traditional breeding of the turkeys can label their products with the Golden Promise sign. This guarantees and testifies the top quality of the product.

TRADITIONAL REARING

This study is the effect of a seasonal employment at the end of 2004 in a turkey abattoir in Cookham Dean, Berkshire, England, of 5th year students preparing their Master's theses at the Department of Food Quality Management, the Agricultural University of Poznań, Poland.

The Traditional Farmfresh Turkey Association (TFTA) was founded in 1984 to preserve the original traditional method of turkey production. In Great Britain, at Christmas time turkeys coming from traditional rearing are especially valued. These preferences are caused by the specific flavour of the meat and its eating value, a different texture and its appearance. Only the traditional approach in the "farmfresh" system, where turkeys are reared until full maturity, fed a special diet and subsequently dry plucked and left hanging in the chiller for at least seven days, ensures full, specific taste resembling that of a wild pheasant and the juiciness of Christmas turkeys.

A precondition for the production of meat with appropriate quality is strict adherence to the required standards of turkey farming, concerning the selection of appropriate

breeds, the place of rearing, feeding method and animal welfare. The selection of appropriate strain lines of birds with slow growth rates is also essential. The fattening period is at least 18 weeks, frequently extending to 25 weeks, which is approx. twice as long as in the commonly adopted intensive turkey fattening system (Table 1). The basic breeds used in this type of turkey production are *Free Range Bronze* and *Barn-reared White*, i.e. dark-brown feathered turkeys for the free range farming system and white-feathered turkeys for rearing in special housing facilities. Bronze turkeys are kept in open barns with access to daylight and with natural ventilation, with free access to shaded meadows among cherry orchards. Frequently birds have access to fields with maize, which is left unharvested and ripening in the field. Access to free ranges has to be provided for the minimum fixed period of at least 17 weeks. The area of the range for the turkeys may not be smaller than 4 m²/per bird. Rearing is conducted in houses with open structures, maintaining the natural circadian cycle. The houses are only to provide shelter for the birds against adverse weather conditions. The area of the house per 1 bird is higher than in the standard intensive rearing, i.e. 25–35 kg/m², depending on the type of natural or

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Table 1. Comparison of turkeys from traditional method of production with standard intensive turkeys.

TRADITIONAL TURKEYS	STANDARD INTENSIVE TURKEYS
BREEDS	
Specially selected slow-growing traditional breeds.	Modern fast-growing (cost effective) breeds.
AGE	
Fully mature adult birds, minimum of 25 weeks old, ensuring a succulent texture when cooked.	Killed when immature, on reaching the “desired” weight, often only 9 weeks old. Dry and tasteless when cooked.
WELFARE	
Reared in open barns, cherry orchards and meadows. Once old enough, free range turkeys are outside every day for a minimum of 17 weeks.	Reared under crowded intensive conditions in controlled environment housing “Free Range” birds may only be outdoors for as little as 4 weeks towards the end of their lives. Do not adhere to TFTA code.
DIET	
Natural cereal-based feeds only. No animal protein or growth promoting additives.	Use of growth promoters and artificial additives to accelerate the growth.
PRODUCTION	
Prepared on the farm premises with minimum stress to the birds. Dry plucked and hand-finished. Hung (in the same way as a game bird) for at least 10 days to develop full flavour and tenderness.	Usually transported at long distances for production. Plucked mechanically under water. Not hung for full flavour, factory-processed and then instantly frozen, chilled and/or gas-treated, often with added water.
PRESENTATION	
Oven ready turkeys are presented in individual carry-home boxes. Inside the box, each bird is wrapped in greaseproof paper, with vacuum-packed giblets, a twig of fresh rosemary, cooking timer, and recipe leaflet with cooking instructions.	Usually shrink-wrapped or packed in a polythene bag.
GUARANTEES	
Each turkey displays the “Golden Promise” guarantee of quality from the TFTA, which includes a money-back commitment in the unlikely event of dissatisfaction. All TFTA turkeys are also accredited with the EC “Certificate of Specific Character”, a guarantee from Brussels of their traditional production methods and quality.	No similar guarantees offered.

natural and enforced ventilation system. Floors of the houses are littered either with soft straw or forest undergrowth of appropriate quality. Rearing is conducted by experienced staff supervised by a farmer authorized to run such production. In terms of the above mentioned requirements, the production is supervised by inspectors of a special agency monitoring the authenticity of the product, *i.e.* the *Product Authentication Inspectorate*.

TFTA carries out its own research in the turkey feeding and farming systems. On this basis wholesome formulations of compound feeds have been developed. The applied compound feeds are composed solely of natural ingredients, with cereals constituting at least 70% their composition, which are fed from at least the age of 10 weeks. The association emphasizes the natural character of production, resulting in the inadmissibility in the fed diet of animal origin protein and fat components, as well as pharmaceuticals, including antibiotics and artificial growth promoters. Birds are provided with constant unlimited access to feed and water.

Turkeys reach the stage of finish 175 days after hatching. For the last 119 days of rearing birds are provided with access to a run throughout the day. During rearing special emphasis is put on animal welfare, especially the limitation of stress. During the period of 12 to 15 h before slaughter birds have no access to feed, but they are provided with ac-

cess to water. Transportation stress is eliminated as a result of the location of the abattoir in the nearest vicinity of turkey farms. Turkeys are driven to the designated passages leading to the abattoir by specially trained *border collies*, whose calm character in combination with their natural shepherding skills additionally minimizes stress in the birds.

SPECIFIC CHARACTER OF TURKEY SLAUGHTERING IN THE TFTA SYSTEM

Well-finished turkeys are transferred to abattoir lines. Such a line is not automated, but only partly mechanized. In the whole process of slaughtering and postslaughter processing the contact of birds and later their carcasses with water is completely eliminated and care is taken not to damage the skin. As it has been shown, the presence of moisture on the skin surface promotes the growth of all types of microorganisms, and bacterial spoilage will be facilitated by mechanically damaged skin and muscles, as a result of released moisture and nutrients [Mead, 2004]. It is essential in the production of poultry for the uneviscerated cold storage.

The first stage after turkeys are hoisted on the conveyor is their electric stunning. The electrode, in the form of a metal rod, is placed in the beak, in this way closing the circuit with the shackles of the conveyor and the bird becomes uncon-

scious. This operation is labour- and time-consuming, but it enables eliminating the contact with water at this stage of the slaughtering process.

The next stage is severing blood vessels found in the beak cavity – internal incision. This operation is performed manually, with a cross incision, severing both jugular veins on the posterior part of the palate and the arterial system found deeper inside. At such a stunning system proper and complete debleeding is achieved. The wound is not visible from the outside, which is another essential aspect ensuring appropriate shelf-life of the carcass during cold storage.

In order to protect the carcass against air-borne microbiological contamination, complete closure of beaks is applied by their clamping followed by immersing the heads in wax.

To avoid contact with water in further processing carcass scalding before plucking is not applied. Machine dry plucking is used, followed by manual removal of the remaining feathers. This results in increased production costs due to the necessity of employing additional staff, but it is essential for the maintenance of the proper process imposed by the enforced procedural requirements.

TRADITIONAL AGEING METHOD

Plucked, uneviscerated carcasses are directed to the storage facilities. Undamaged carcasses are hoisted by both legs on racks equipped with shackles and stored for the period of 1-3 weeks at a temperature of maximum 4°C before “cold” manual evisceration is performed. Changes occurring in such hoisted uneviscerated carcasses and their muscles differ from changes taking place in their eviscerated counterparts, due to the activity of intestinal microflora. Digestive contents contain large amounts of bacteria producing hydrogen sulfide, *i.e.* a gas that slowly diffuses through muscles during storage. On the surface of the carcass it reacts with blood and muscle pigments and leads to the formation of sulfmyoglobin [Barnes & Shrimpton, 1957]. Greening, resulting from this reaction, may appear around the vent and on the abdomen, next it may occur on the ribs and along the back and neck of the carcass. At 20°C greening will become visible within one day, while at a temperature of 10°C this process spans for 5-7 days, although it takes much longer at lower temperatures. Muscles themselves seem to be free from bacteria at all storage temperatures. A significant effect of temperature and storage time is manifested on the rate of occurring changes, hence it is necessary to maintain the temperature of maximum 4°C. In practice, there are also other portals of spoilage in these types of products. The occurrence of any amount of moisture on the surface of the carcasses, such as those arising from bad storage conditions, will promote the growth of aerobic bacteria, particularly from the genus *Pseudomonas*, and in that case undesirable odour may appear. Another form of spoilage is connected with the taste produced during a period of uneviscerated storage. If such storage is prolonged, the resulting intensive aroma may not be suitable to all consumers. Barnes & Impey [1975] compared the shelf-life of eviscerated and uneviscerated chickens collected from the same production line and stored, both packed and unpacked, at a temperature of 4°C. Eviscerated unpacked carcasses had an average shelf-life of 7.9 days, before the appearance of a distinct spoilage taint, while stor-

age in polyethylene bags shortened the average shelf-life to 5.6 days, due to the higher moisture content maintained. In contrast, unpacked uneviscerated carcasses did not exhibit symptoms of spoilage until day 28 of storage.

The effect of storage on the texture and taste of uneviscerated turkeys was investigated by Griffiths *et al.* [1984]. Upon observations they found that uneviscerated storage affected to a slight extent, if at all, the texture of poultry meat. Along with a group of experts they found advantageous changes in meat between day 8 and day 23 of storage. In that time, taste was similar to the taste of pheasant meat. Starting from day 24 of storage some members of the panel indicated adverse changes in aroma. It is usually attributed to autolytic changes occurring in muscles, but the metabolism of intestinal bacteria may also play some role as they remain viable until the end of carcass ageing.

POSTSLAUGHTER PROCESSING OF TURKEYS AFTER AGEING

Cold evisceration of turkeys is performed manually, with a limited use of machines. The principle here, as in the previous stages, is to minimize the contact of carcasses with water. In order to largely eliminate this factor from the process, pneumatic machines are used to complete the cleaning of body cavities. This apparatus operates on the basis of partial vacuum, which removes remains after manual evisceration and transfers them outside the production area. External surfaces are cleaned with the use of disposable paper towels.

The evisceration process occurs at a constant rate enforced by the speed of the conveyor, thanks to which the time during which carcasses remain outside the cooler is shortened to the minimum. This is to minimize the elevation of the temperature of the carcass.

The last stage of postslaughter processing involves packaging the ready-for-dispatch carcasses into individual cardboard boxes. Each turkey is wrapped in waxed paper and a twig of rosemary is placed inside the carcass. Such a package contains also a vacuum sealed bag with the neck, gizzard, liver and heart. To accompany this product *Copas* recommend their exquisite cranberry sauce.

Each day the number of eviscerated turkeys corresponds to the amount of placed orders. The “*just in time*” method is applied, thanks to which there is no overproduction, and turkeys always reach clients being fresh. A properly organized cooling chain also helps to ensure the freshness of the product. In this chain refrigerated trucks are essential.

In spite of all these reservations it would be of interest to receive the opinion of the Polish veterinary supervision on the admissibility of such a processing system, especially the method of storing uneviscerated birds after slaughter before further processing.

PROTECTION OF THE ORIGINALITY OF THE PRODUCT

Each turkey produced in this system has a “Golden Promise” certificate. It is a guarantee of excellent quality and specific flavour of the purchased product. At the same time

TFTA, granting the certificate, guarantees the return of the incurred costs if the consumer is dissatisfied with the quality of the product obtained. It needs to be mentioned here that the price of 1 kg of turkey produced according to the technology discussed in this study may be almost 4 times higher than that of a turkey coming from intensive breeding. Despite that fact, the demand for this product is large and growing from year to year both in England and outside it.

The TFTA turkey was the first product to receive the status of a product protected within the EU as a traditional specific food product. On the basis of the EEC ordinance no. 2082/92 it received the certificate of a protected product. This type of turkey is produced and sold only by TFTA under the *Golden Promise* trademark. A total of 31 products are protected in Great Britain as geographical trademarks and trade names denoting the origin of agricultural produce and foodstuffs, or their specific character and technology. The *Golden Promise* turkeys are sold by a chain of small butcher's shops, as it is difficult for small producers to compete with large companies producing cheap turkeys in the intensive farming system, which are then sold relatively cheaply by large retail chains.

The production of "traditional turkeys" is very similar in its concept to the production in the French "Label Rouge" system. A worldwide trend may be observed to restore natural methods of meat production. It is determined by the

existing consumer market. Even today consumers are willing to pay higher prices to obtain products with guaranteed high quality. Unfortunately, such a production on the Polish market is at present rather unprofitable and risky due to the prices considered too high for the consumers. In Poland there are suitable conditions for the initiation of such a production. It is our belief that soon such products will be imported to Poland and it is only the question of time for them to win a market segment.

TFTA supplies also traditional free range geese.

REFERENCES

1. Barnes E.M., Impey C.S., The shelf-life of uneviscerated and eviscerated chicken carcasses stored at 10°C and 4°C. *Brit. Poultry Sci.*, 1975, 16, 319-326.
2. Barnes E.M., Shrimpton D.H., Causes of greening of uneviscerated poultry carcasses during storage. *J. Appl. Bacteriol.*, 1957, 20, 273-285.
3. Griffiths N.M., Mead G.C., Jones J.M., Grey T.C., Effect of storage on meat quality in uneviscerated turkeys held at 4°C. *Brit. Poultry Sci.*, 1984, 25, 259-266.
4. Mead G.C., Shelf-life and spoilage of poultry meat. 2004, in: *Poultry Meat Processing and Quality* (ed. G.C. Mead). CRC Press, Woodhead Publ. Ltd. Cambridge, UK, pp. 287.

TRADYCYJNY CHÓW I UBOJ ŚWIĄTECZNYCH INDIKÓW W ANGLII

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Referat jest rezultatem zrealizowanych praktyk, w firmie Copas Traditional Turkeys Limited in Coocham w Anglii, przez studentów Katedry Zarządzania Jakością Żywności AR w Poznaniu.

Na żadnym angielskim, bożonarodzeniowym stole nie może zabraknąć pieczonego indyka. W Wielkiej Brytanii bardziej cenione są indyki pochodzące z tradycyjnego chowu, odznaczające się szczególnym smakiem i wysoką jakością.

Charakterystyka jakościowa produktu jest częściowo powiązana ze specjalną selekcją, która dopuszcza do hodowli tylko linie ptaków o wolnym tempie wzrostu, osiągające dojrzałość ubojową dopiero po 175 dniach, ale również odzwierciedla sposób, w jaki tuszki są uzyskiwane i okresowo przechowywane w stanie niepatroszonym.

Dieta ptaków złożona jest wyłącznie z naturalnych składników a jej skład w przeważającej ilości stanowią zboża. W skarmianiu nie stosuje się antybiotyków ani promotorów wzrostu.

Indyki przez pierwsze 8 tygodni przebywają w kurnikach o konstrukcji otwartej, z zachowaniem tylko naturalnego światła i wentylacji. Przez minimum 119 ostatnich dni ptaki mają swobodny dostęp do wolnego wybiegu, który stanowi teren trawiasty i zadrzewiony. Czynniki te zapewniają zachowanie naturalnego cyklu dobowego, który stanowi jeden z ważnych wyznaczników dobrostanu zwierząt. Proces uboju jest realizowany bez użycia wody i z zapewnieniem nieuszkodzenia skóry tuszki. Są to istotne wymagania dla prawidłowego przebiegu przechowywania chłodniczego, do momentu ich patroszenia. Oszałamianie ptaków odbywa się przy użyciu elektrod wprowadzanych do dziobów. By nie uszkodzić skóry stosowane jest cięcie wewnętrzne w miejsce zewnętrznego cięcia naczyń krwionośnych szyi. Aby zapewnić pełne zamknięcie tuszki i zabezpieczyć przed penetracją drobnoustrojów dzioby indyków klipsuje się a następnie zanurza w wosku. W procesie uboju nie stosuje się oparzenia, a proces usuwania upierzenia odbywa się na sucho z wykorzystaniem wstępnego mechanicznego usuwania piór. Doczyszczanie tuszek z pozostałych piór odbywa się ręcznie. Po usunięciu upierzenia tuszki przechowywane są w temperaturze 4°C w stanie niepatroszonym. Tego rodzaju zabieg w znaczący sposób wpływa na smak mięsa. Indyki mogą być w tym stanie przechowywane przez okres nawet 2-3 tygodni bez wystąpienia niekorzystnych zmian. Patroszenie tuszek odbywa się ręcznie z niewielkim stopniem wykorzystania urządzeń. Dla zapewnienia jak najmniejszego kontaktu tuszki z wodą zarówno powierzchnia zewnętrzna jak i wewnętrzna jamy ciała ptaka czyszczone są na sucho.

Każdy indyk pakowany jest w osobny karton i zabezpieczony papierem. Do każdego dodaje się również gałązkę rozmarynu i hermetycznie zapakowane droby.

Farmerzy, którzy spełniają rygorystyczne wymagania tradycyjnej produkcji mogą oznaczyć swoje wyroby znakiem Golden Promise, który poświadcza najwyższą jakość.