

## DETERMINATION OF THE AGE OF SLAUGHTERED FOWLS ACCORDING TO BONE OSSIFICATION AND ACCRETION<sup>1</sup>

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**Abstract:** The study has been conducted on bone ossification and accretion at the age of 2, 4, 6, 8 and over 12 months to enable determination of age of fowl carcasses at slaughter. This also makes more reliable determination of the quality of fowl meat in carcasses or their main parts.

**Key words:** fowls, age, bones, bone ossification and accretion.

### Introduction

The most important criteria of the quality of live and slaughtered fowls are age and sex.

According to Petrović (1991), slaughter hens are divided into the following categories: young chickens (broilers) up to 56 days of age, older chickens up to 6 months, capons (castrated male fowls) younger than 10 months, hens older than 10 months and cocks older than 10 months. Mrvaljević (1995) suggests that fattening of heavy hybrids lasts for 48 days, and that light hybrids start laying eggs at 5 months of age. Mašić et al. (1994) show that hens start laying eggs at 20 weeks of age, laying lasts 52 weeks so that they are then 72 weeks old. Pavičić et al. (2005) report that fowl meat may be placed in the market as an ecological product if fowls were raised in ecological conditions for at least 10 weeks.

Badovinac and Francetić (1964) show that hens (according to US regulations) are divided, according to age and sex, to the following categories: young chickens (5 to 7 weeks of age), chickens (9 to 12 weeks), roasters (3 to 5 months of age), capons (below 8 months), cockarels (below 10 months), hens older than 10 months and cocks. According to the directives in Germany, according to the reports of Badovinac and Francetić (1964) categories of hens are as follows: broilers (up to 10 weeks of age), young fattened chickens up to 4 months, young layers to 20 months, layers older than 20 months and adult cocks older than 4 months. According to our regulations (Regulations on the quality of fowl meat, 1981, alterations and amendments 1988) slaughtering of chickens at the age to 120 days, young fowls at the age of 6 to 20 months and hens older than 20 months.

Determination of age of certain categories of slaughter chicken contributes to meat quality assessment and its traceability to the consumer.

### Materials and methods

The study has been conducted on bone ossification and accretion at the age of 2, 4, 6, 8 and over 12 months.

The degree of ossification of some bones has been determined on the basis of cartilage which has not ossified yet and accretion of certain bones.

Bones of fowl carcasses in which the changes have been monitored, were as follows: spinal column bones, scapula, pelvic bone, coracoid, keel bone, humerus, thigh bone, tibia and fibula.

Changes in cartilage and bones were determined after cooking in water and separation of muscle tissue from bones.

### Results and Discussion

According to our investigations, keel bone (*Sternum*) in broilers (up to 2 months of age) is not completely ossified. In its caudal half there can still be found non-ossified cartilage. *Processus abdominalis*, *Processus thoracalis* and *Episternalis lateralis* of the keel bone did not accrete with body of keel bone. According to Sonja Karan-Đurđić (1980), cartilage of the keel bone from carcasses of young chickens slaughtered at age up to 2.5 months, is flexible and soft. Besides, our investigations showed that pelvic bones (*Os ilium*, *Os ischi* and *Os pubis*) in the investigated broilers did not accrete. Spinal column vertebrae also did not accrete. Furthermore, lumbar part with sacral part of the spinal column formed lumbosacral bone (*Os lumbosacrale*) in which, on the ventral side there can be clearly seen borderline of vertebrae.

In chickens up to 4 months old, according to our investigations, the cartilage of the heel bone is mostly ossified. Processes of the keel bone have accreted with the body of the keel bone. Pelvic bones accreted and ischiadic opening (*Foramen ischiadicum*) has been formed. At that age of chickens we found out

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that dorsal plate-like processes of 3rd, 4th and 5th dorsal vertebrae accreted, and that lumbosacral vertebrae formed homogenous bone mass where edges of vertebrae disappeared. The research of *Badovinac and Francetić (1964)* confirm our findings. According to them, in young fattened chickens up to 4 months of age, the cartilage parts of skeleton are partly ossified and keel bone is less flexible.

According to our investigations, in chickens at age up to 6 months more details have been observed. Cartilage of the keel bone is completely ossified. In the pelvic bone, obturator opening (*Foramen obturatum*) has been formed. Dorsal vertebrae (3rd, 4th and 5th) accreted and formed dorsal and ventral ridge. It should also be mentioned that in ventral ridge of dorsal vertebrae a formed opening (*foramen*) has been noticed. *Sonja Karan-Đurđić (1980)* reports that in chicken up to 6 months of age, keel bone is soft.

It was established that in 8-month old hens, scapula (*Scapula*) accreted with coracoid (*Os corasoideum*). Besides, in hens over 12 months old the last dorsal vertebra is accreted with loin-sacrum bone, and fibula (*Fibula*) is tightly accreted with tibia (*Tibia*). *Petrović (1991)* reported that in hens older than 10 months cartilage of keel bone is not flexible. *Sonja Karan-Đurđić (1980)* showed that in older and adult fowls (6 to 12 months) keel bone has hardened.

On the basis of the presented literature data, it can be noticed that the age of fowls is mostly determined using data on ossification of keel bone cartilage and keel bone hardening (*Badovinac i Francetić, 1964; Sonja Karan-Đurđić, 1980; Petrović, 1991*). Our investigations showed that at aging of hens, besides ossification of keel bone cartilage, ossification and accretion of other bones also takes place, like in: pelvic bones, spinal column, scapula, coracoid, tibia and fibula. Besides, it has been noticed that in hens older than 12 months the bones are compact, very hard, and after cooking of light brown colour.

#### Conclusions

On the basis of the results of the investigations the following conclusions may be drawn out:

61. According to the degree of ossification and accretion of bones, carcasses of slaughtered chickens (chickens and adult hens) may differ at age up to 2, 4, 6, 8 and more than 12 months;
62. At age over 12 months, bones in hens are completely ossified and accreted, they are compact and hard, and, after cooking, light brown; and
63. For determination of age of fowls the following bones may be used: keel bone (keel bone cartilage), spinal column bones, pelvic bones, coracoid, scapula, tibia and fibula.

## ODREĐIVANJE STAROSTI ZAKLANIH KOKOŠIJU PREMA OKOŠTAVANJU I SRAŠĆAVANJU KOSTIJU

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#### Rezime

U radu je prikazano okoštavanje i srašćavanje kostiju u kokoši starosti do 2, 4, 6, 8 i više od 12 meseci. Ovim je omogućeno da se i kod trupova kokoši može odrediti starost pri kojoj su životinje zaklane. Samim tim, određivanje kvaliteta mesa kokoši u trupovima ili njihovim osnovnim delovima je pouzdanije.

*Ključne reči:* kokoši, starost, kosti, okoštavanje i srašćavanje kostiju

#### References

1. BADOVINAC, J., FRANCETIĆ, M. (1964): Prilog diskusiji o kvalitetnom razvrstavanju žive i zaklane peradi na tržištu. Tehnologija mesa, 5, 4, 466-475;
2. KARAN-ĐURĐIĆ SONJA (1980): Poznavanje i obrada mesa, Poljoprivredni fakultet, Zemun – Beograd;
3. MAŠIĆ, B., ZLATICA PAVLOVSKI, VITOROVIĆ, D., MILICA VLAHOVIĆ (1994): Uticaj sistema držanja na osteometrijske i biomehaničke osobine kostiju nosilja. Tehnologija mesa, 35, (1-2), 53-57;
4. MRVALJEVIĆ, B. (1995): Stočarstvo u svetu i Jugoslaviji, Knjiga 2, Nolit, Beograd;
5. PAVIČIĆ, Ž., BALENOVIĆ, T., HADŽIOSMANOVIĆ, M., MIKULEC, Ž., TOFANT, A., VUČEMILO, M. (2005): Uzgoj peradi na ekološki prihvatljiv način. Meso, 7, (2), 38-41;
6. PETROVIĆ, V. (1991): Živinarstvo, Naučna knjiga, Beograd;
7. Pravilnik o kvalitetu mesa pernate živine. Sl. list SFRJ, br. 1, 1981;
8. Pravilnik o izmenama i dopunama pravilnika o kvalitetu mesa pernate živine. Sl. list SFRJ, br. 51, 1988;
9. SIMIĆ, V. (1990): Osnovi anatomije domaće živine, Beograd.