OrganKits
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NUTRIHEALTH AND WELLNESS
EXTRACTION AND OBTAINING OF PLASTINATED PORTIONS OF PORCINE COLON

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ELABORATE	REVISED	APPROVED
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1. SUBJECT

Indications for obtaining portions of swine colon and its subsequent plastination process.

2. SCOPE

Procedure applicable to the extraction and plastination of a swine colon.

3. REAGENTS, PRODUCTS & MATERIALS

REAGENTS

- Formaldehyde or fixative solution

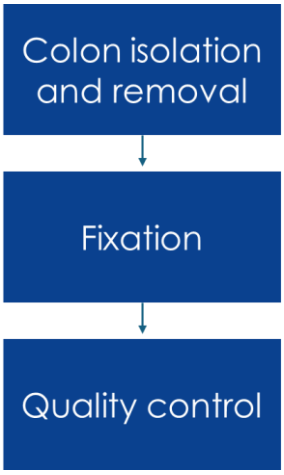
MATERIALS

- Scissors.
- Clamps.
- Forceps.
- Rope.
- Scalpel.

PERSONAL PROTECTIVE EQUIPMENT

- Scrub.
- Self-contained motorized respiratory protection system.
- Gloves.
- Protective footwear.

4. OPERATING PROCEDURE



4.1. Isolation and removal of the colon

Commonly, the starting point is a complete and fresh porcine digestive block, so the first step will be to isolate the colon from the rest of the package. The procedure to follow is:

1. **Identify the cecum.**

It is a sac-like structure located near the junction between the small intestine and the large intestine.
In pigs, the cecum is quite large and is located next to the ileum. Two clean cuts should be made on both sides of the cecum and separated from the small intestine.

2. Identify the portions of the colon

The colon is divided as follows:

- *Ascending colon:* extending from the cecum toward the transverse colon.
- *Transverse colon:* crossing horizontally from the right side of the abdomen to the left side.
- *Descending colon:* is located on the left side of the abdomen and continues to the rectum.

3. Isolation

The insertions (ligaments and tissues) that keep the colon in its anatomical position and in relation to the different structures and adjacent abdominal organs are cut.

4.2. Fixation

Before the specimen's fixation, the colon should be rinsed with water both externally and internally to remove any remaining residue.

Fixation will be performed by dilation-immersion. To do this, one of the ends of the piece will be knotted with rope and filled with a 5% formaldehyde solution until the desired volume is obtained before the remaining end is also knotted. Finally, the piece will be immersed in a 5% formaldehyde solution where it will remain for about a week.

Once the fixing period has passed, the piece will be washed with water for about 24-48 hours to remove the remains of formaldehyde and the plastination process will begin.

5. RESULTS AND QUALITY CONTROL

At the end of the process, it is expected to obtain a portion of the colon according to the requirements in terms of position and anatomical structure.

Likewise, at the end of the protocol, the piece must remain free of breakage and colour alterations due to various causes such as the absence of continuous hydration during the dissection process, the appearance of mould on the surface and/or poor storage conditions such as exposure to high temperature, humidity or light.

Quality Checklist

- Suitable color ( )
- Adequate size, no alterations due to retraction ( )
- Firm and non-greasy texture ( )
- Absence of odours ( )
- Flexible ( )

END OF DOCUMENT

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N. 2022-1-ES01-KA220-SCH-000089616

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NUTRIHEALTH AND WELLNESS
OBTAINING PLASTINATED SWINE STOMACHS

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1. SUBJECT

Indications of the modus operandi to be followed to carry out stomach dissection in the swine species.

2. SCOPE

This protocol is applicable to the dissection of stomachs of the swine species.

3. REAGENTS, PRODUCTS & MATERIALS

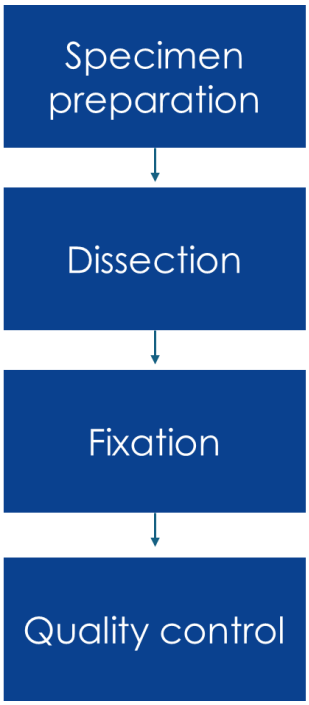
MATERIALS

- Scissors.
- Clamp.
- Forceps.
- Rope.
- Scalpel.
- Silicone tubes.

PERSONAL PROTECTIVE EQUIPMENT

- Scrub.
- Gloves.
- Protective footwear.
- Self-contained motorized respiratory protection system.

4. OPERATING PROCEDURE



4.0. SPECIMEN PREPARATION

The piece is received in the form of a *gastrointestinal package*, which comprises from *the esophagus* to *the rectum* and usually includes *the pancreas* and *liver (see figure 1, plastinated piece of the canine species)*.

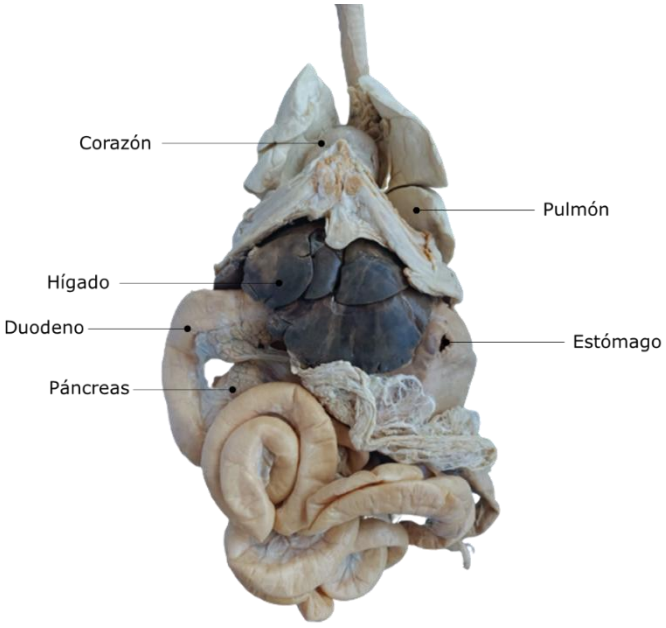


Figure 1

When isolating the stomach from the rest of the package, the position of the *esophagus* and *duodenum* must first be identified. The first will be preserved in its entirety together with the stomach, and the second will be preserved approximately 30cm by the following procedure:

1. Locate the *pyloric part* of the stomach.
2. Measure 30cm of *duodenum* from that point.
3. Perform two ligations as shown in *Figure 2*
4. Sectioning the duodenum in the intermediate area between the ligatures. Once the cut has been made, the ligature of the *duodenum segment* that remains in the piece must be undone, to later allow the stomach to be emptied and washed.

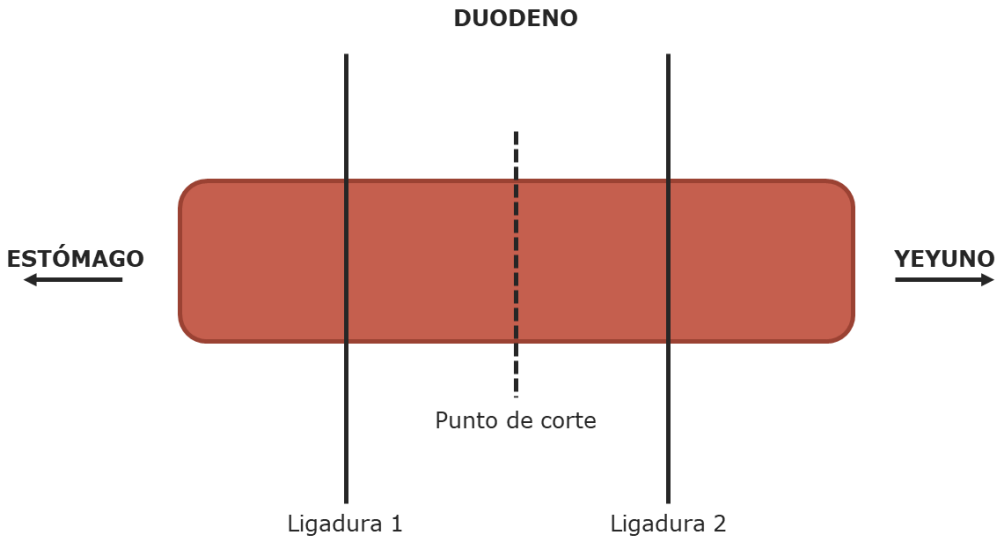


Figure 2

**Optionally, if the pancreas had been preserved entirely in the gastrointestinal packet, it could also be kept next to the stomach.*

The gastric contents will then be emptied and the specimen rinsed with water. To do this, an esophageal-gastric intubation must be performed to allow the exit of material and the entry of water (the intubation will be maintained until the end of the plastination process). Successive low-pressure stomach lavages will be performed until it is completely cleansed.

Prior to dissection, the piece will be fixed by immersing it in formaldehyde in increasing concentrations, starting from 5% formaldehyde. Before immersing the piece, the end of the *duodenum must be knotted* and, through the *esophagus*, the stomach must be filled with formaldehyde in the same concentration, so that the piece is fixed dilated and thus preserves its real morphology.

4.1. DISSECTION OF THE PART

The dissection of this piece consists only of removing excess fat and connective tissue, especially in the greater and lesser curvatures.

If the pancreas is kept in the specimen, special care must be taken in the dissection of the gland, since the tissue is extremely delicate and easily damaged.

4.2. FIJACIÓN

Usually, after the dissection, a second fixation is needed. It will be performed by immersion of the stomach in a 5% formaldehyde solution. The fixative solution will be introduced through the esophagus until the volume of the stomach increases so that it acquires the appropriate morphology and then the stomach will be immersed in a 5% fixative bath in which it will remain for approximately 3 weeks before starting the plastination process.

6. RESULTS AND QUALITY CONTROL

Once the dissection is completed, the specimen must retain an adequate morphology (*see figures 3 and 4*), maintaining its real anatomical structure.

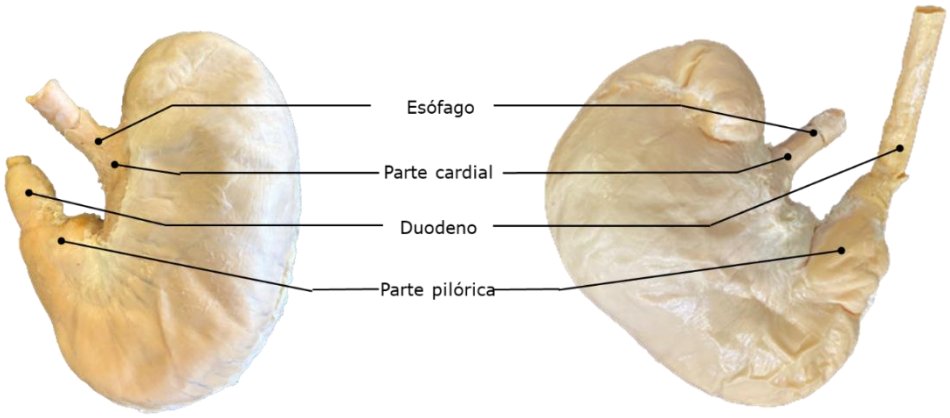


Figure 3

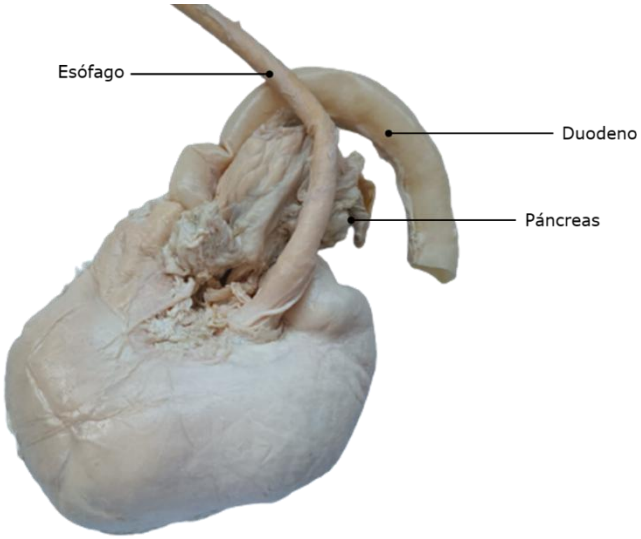


Figure 4

Checklist

- Suitable color ( )
- Adequate size, no alterations due to retraction ( )
- Firm and non-greasy texture ( )

- Absence of odours ( )
- List of structures:
- Esophagus with sufficient light for endoscope passage ( )
- Cardia ( )
- Major curvature ( )
- Minor curvature ( )
- Background ( )
- Body ( )
- Pyloric portion ( )
- Pylorus ( )
- Duodenum ( )

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REPROHEALTH AND GENDER
OBTAINING PLASTINATED PORTIONS OF PORCINE SMALL INTESTINE

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1.SUBJECT

Indications for obtaining portions of small intestine from pigs and their subsequent plastination process.

2. SCOPE

This protocol is applicable to the obtaining of portions of small intestine in the swine species

3. REFERENCE DOCUMENTATION and CONSULTATION

- Gil Cano, F., Latorre Reviriego, R., Ramírez Zarzosa, G., López Albors, O., Ayala Florenciano, M. D., Martínez Gomariz, F., Orenes Hernández, M., & Vázquez Autón, J. M. (2013). *Manual of Veterinary Anatomy Practices: Visceral Systems.* DM.
- PNT-04 Technique S10
- PNT-61 Extraction and Fixation of Pig Small Intestine

4. REAGENTS, PRODUCTS & MATERIALS

REAGENTS

- Formaldehyde or fixative solution.

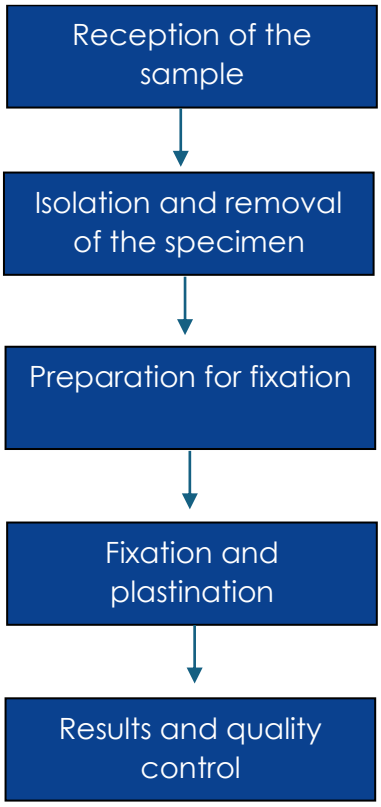
MATERIALS

- Scissors
- Clamps
- Forceps
- Rope
- Scalpel
- Pipes

PERSONAL PROTECTIVE EQUIPMENT

- Scrubs
- Laboratory coat
- Mask for air filtration
- Gloves
- Glasses
- Polyethylene sleeves
- Protective footwear

5. OPERATING PROCEDURE



5.0. Reception of the sample

The specimen is received in form of a complete gastrointestinal block so that it includes the stomach, small intestine (duodenum, jejunum, ileum), large intestine (colon, cecum, rectum) and other related structures such as liver or pancreas.

First, the condition of the piece will be verified, checking its anatomical integrity, as well as the absence of breaks, cuts and/or tears.

5.1. Isolation and removal of the part

In this case, the portion of the small intestine of our interest is the jejunum. When isolating it from the rest of the block, the following procedure is carried out:

1. Identification of the stomach and duodenum

The duodenum is the first portion of the small intestine. It is directly connected to the stomach through the pylorus and has a characteristic curvature. In relation to the duodenum we find the pancreas.

2. Identification of the ileum
For identification, the ileocecal valve, the connection point between the small intestine and the cecum, must be located.

3. Identifying the jejunum
It usually comprises the first two-thirds of the small intestine after the duodenum. Its walls are thicker and are arranged in more marked intestinal loops than in the case of the ileum.

4. Jejunal Isolation
Once the jejunum has been identified, a cut will be made at the points where it joins the duodenum and ileum, taking care not to damage the adjacent structures and jejunal vessels.

5.2. Preparation for fixation

Prior to fixation, the piece must be washed both internally and externally to remove the remains of intestinal contents.

To do this, a rubber hose will be inserted into the intestinal lumen and successive low-pressure washes will be carried out, massaging the specimen to facilitate the expulsion of contents. This step must be carried out carefully to avoid tears in the intestinal wall or rupture of the mesentery.

5.3. Fixation and plastination

Fixation will be performed by dilation-immersion. To do this, one of the ends of the sample will be knotted with rope and filled with a 5% formaldehyde solution until the desired volume is obtained before the remaining end is knotted in the same way. Finally, the sample will be immersed in a 5% formaldehyde solution in which it will remain for about a week.

Once the fixing period has passed, the specimen will be washed with water for about 24-48 hours to remove the remains of formaldehyde and the plastination process will begin, which will be carried out following the S10 silicone protocol.

6. RESULTS AND QUALITY CONTROL

At the end of the process, it is expected to obtain a portion of the small intestine according to the requirements in terms of position and anatomical structure.

Likewise, at the end of the protocol, the specimen must remain free of breakage and colour alterations due to various causes such as the absence of continuous hydration during the dissection process, the appearance of mould on the surface and/or poor storage conditions such as exposure to high temperature, humidity or light.

Quality Checklist

- Suitable color ( )
- Adequate size, no alterations due to retraction ( )
- Firm and non-greasy texture ( )
- Absence of odours ( )
- List of structures:
  - Intestinal mucosa ( )
  - Serosa ( )
  - Jejunal vessels ( )

END OF DOCUMENT

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