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THE IMPACT OF ASCARIS SUUM INFESTATION IN PIGS ON THE HUMAN POPULATION

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Abstract

This paper focuses on the study of Ascaris Suum infection to a pig population in the Argeș county, Romania. The pathologies produced by this parasite in the digestive and nervous systems of pigs have a special impact in terms of public health, namely the consumption of meat by the human population. The products obtained from the slaughter of these infested animals will contain deficient nutrients, from a qualitative point of view. The research is based on the surveillance of animals from 6 households, infested and subsequently treated with Ascatrix and Dectomax in order to finally obtain effective results after the administration of Doramectin, a substance whose role is to annihilate the electrical activity of nerve and muscle cells, at nematodes and arthropods, causing paralysis and parasite death, while piperazine adipate is more effective in parasites and eliminate them in living form. All this is demonstrated in this article in order to further study the presence of morphine in female Ascaris Suum larvae, and thus increased resistance of the microorganism in the host body.

Keywords: Ascatrix, ascaris suum, dectomax, larvae, parasites

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1. Introduction

The need to know the degree of resistance of parasitic elements (EP) in the usual conditions of the environment is outlined as a pressing issue with addressability to each species of parasites, at each stage of their development, in the conditions of each geographical area and each form of relief.

Thus, it is necessary to take into account the shelters in which the animals live, the water sources from which they drink, the food sources, the feed shelters, etc. (OUG/175, 2020).

The areas where EP proliferates are multiple and difficult to control.

At the same time, these areas, which can be infested at any time, come into contact with the animals that provide food for humans, they being in the host carrier situation after the moment of infestation.

The impact that Ascaris - infested animals have is reflected in the effect they have both on the population in which they live and multiply (transmitting, of course, the parasite, to future offspring) and on the human population, which enters contact with host animals or, worse, consuming food produced by these hosts (Ballweber, 2022).

In this case, we stopped the Ascaris infection suum, which in the host body secretes morphine, triggering a reduction in the pig's ability to defend itself by reducing immunity. Against this background, the host animal's body creates favorable living conditions for the parasite, which leads to its resistance for a long time. In parallel, as Ascaris suum benefits from a long life in the host body, its action will accentuate the weakening of the animal's resistance to the invasion of other parasites, which opens a wide possibility for the appearance and manifestation of various diseases (Arenas-Gamboa et al., 2020).

The present study has emerged as a way to administer and manage the invasion of parasites in human food obtained from animals (Suñol et al., 2019).

Pigs are the animals that at least in Romania provide an important niche of food, by eating pork, by all age groups (except infants and people who are banned), all social categories, during most holidays, events, or more importantly, the presence of pork in the daily diet (Mitrea, 2011).

2. Problem Statement

In 1920, Charles-Edward A. Winslow, an American public health expert and founder of the Yale School of Public Health, defined public health as “the science and the art of preventing disease, prolonging life and promoting physical health and efficiency through organized community efforts for the sanitation of the environment…” (Winslow, 1920, p. 5).

In 1952 the WHO transmitted another definition of public health, this being considered art and science alike, in the prevention of disease, the prolongation of life, and an ever-higher level of physical and mental health of the individual and the collective. Public health encompasses all systems of health promotion, disease control and prevention, as well as the rehabilitation of organisms (Lozan et al., 2017).

Health education (Kapur, 2020) is a teaching-learning process that involves the development of individuals' ability to adapt to their usual environment and their orientation for the transformation of this environment, when its variations exceed their capabilities. Health education means working with others to find a healthier way to live together.

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3. Research Questions

By what methods and on what treatment can domestic pigs infested with Ascaris suum be treated, so that:

i. the risk of infection can be eliminated in the rest of the animal population in the household or farm where they live;
ii. the meat of these domestic pigs can be eaten by the human population without risk of disease.

4. Purpose of the Study

The mostly accurate understanding of the evolution of this parasite in pigs, organisms whose immunity can be weakened due to morphine secretion, as well as the complex effects of the action of *Ascaris suum* (Ventura et al., 2021).

5. Research Methods

The personal research focused on the clinical and coproparasitological study of a number of 52 pigs, in households in the area presented below.

Of the 52 animals sampled, 21 were infected with *Ascaris suum*, which is why treatment and observation were carried out.

Area: households with pigs from Băiculești commune, Tutana village, Argeș county.

The samples for analysis and study were taken from pigs raised in the household system from Tutana village, Băiculești commune, Argeș county.

Target group: 52 pigs, weighing between 30 and 200 kg, of which 20 females (4 of them pregnant sows) and the remaining 32, males.

5.1. Research objectives:

i. detection and identification of parasitic carriers (Ascaris suum);
ii. more easily eliminate the Ascaris Suum larvae existing in the visited households, following the treatment with Dectomax;
iii. the stronger detection of parasites, following the administration of Ascatrix, by its action of paralysis on nematodes, and their elimination by feces in the form of live roundworms and without harming the animal.

The conducting staged research:

a. Faecal sampling: faecal samples taken from pigs in households in Tutana-village, Baiculești, Argeș county, were brought to the Faculty of Veterinary Medicine in Bucharest to be analyzed in the Parasitology Laboratory of the faculty;

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b. Materials: fecal samples were taken from a number of 52 pigs, weighing between 30 and 200 kg, of both sexes, of which 20 females (4 pregnant sows) and 32 males.

During the clinical examination, pathological signs were observed in more than half of the specimens, which showed a slight weakening, respiratory disorders, digestive disorders, diarrhea.

Also, following the anamnesis, we were informed that a large part of these animals also have nervous disorders in the form of epileptioform seizures that they manifest during the day.

Research methods:

Willis-Hung method

For the detection of roundworms, the lifting of parasitic elements from a hypertonic liquid medium was used (flotation principle: Willis-Hung Method) (Mihăilescu & Popa, 2015).

This method is recommended for the detection of light helminth eggs (Taenia, Hymenolepis).

Technique used in the Willis-Hung method:

- place 1 g of faeces in a glass vial over which a small amount of Willis solution is added;
- mix well with a glass rod, then fill the vial completely with Willis solution until a slight meniscus is formed;
- apply a glass slide over the bottle;
- leave for 10-15 minutes, then lift the slide vertically and apply with the face with which it has been in contact with the liquid on a slide;
- the preparation obtained is examined immediately under a microscope to avoid drying and crystallization of the saturated solution on the slide (according to standard procedures) (Miron, 2002).

Mc Master method

The McMaster method (Ballweber et al., 2014) uses its own technique:

- a counting chamber which allows the microscopic examination of a known volume of faecal suspension (2x0.15 ml);
- thus, if a known faecal weight and a known volume of flotation fluid are used to prepare the suspension, the number of eggs per gram of faeces can be calculated (e.p.g.);
- the quantities are chosen in such a way that the number of faecal eggs can be easily derived by multiplying the number of eggs in the areas marked by a simple conversion factor.

The McMaster room has two compartments, each with an engraved grille on the top surface. When filled with a slurry in the flotation fluid, much of the debris will sink as the eggs float to the surface, where they can be easily seen, and those under the grid are counted.

Equipment list:

two glasses or plastic containers

Libra

tea filter, gauze or napkin dental

cylinder graduated

mixing device (fork, spatula, tongue depressor)

Pasteur pipettes and rubber drums

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floating fluid (chosing the substance depending on the species expected to be present and availability reagents)

McMaster counting camera

microscope compound

Operations carried out in application of the Mc Master method:

1. - weigh 4 grams of faeces and place in a container;

2. - add 56 ml of flotation fluid;

3. - mix the contents of the vessel well with a fork, tongue depressor or spatula;

4. - filter the faecal suspension through a tea strainer or a double layer of gauze or a tissue in the second container;

5. - mix the filtrate in container 2 with a Pasteur pipette;

6. - use a pipette to extract a subsample when the filtrate is stirred;

7. - mix the fluid and fill the first compartment of the McMaster counting chamber with the subsample; shake the liquid again and fill the second chamber with another sample;

8. - leave the counting chamber to stand for 5 minutes - it is important to let the chamber stand to allow the eggs to float to the surface and the debris to reach the bottom of the chamber;

9. - examine the subsamples to be filtered under a compound microscope at a magnification of 10 x 10;

10. - identify and count all eggs in the engraved area of both chambers;

11. - the number of eggs per gram can be calculated as follows: calculate the number of eggs in the grid in each room, ignoring those outside the squares, then multiply the total by 50 - this results in eggs per gram of feces, each operation followed the standard procedure (e.p.g.) (Huynh et al., 2022).

Medications administered

ASCATRIX

- *Pharmacotherapeutic action*: Ascatrix is piperazine adipate, ie the salt of piperazine with adipic acid. In the intestine, piperazine adipate is doubled by releasing piperazine, which has a deworming and slightly parasympathomimetic effect, which helps eliminate worms;

- *Indications:* it is recommended in roundworms, heterachidosis, capillaries in birds, strongylatosis in cats, hookworms in dogs and cats, roundworms in pigs and calves; it is not administered to female carnivores in the second half of gestation.

- *Method of administration and doses: i*n young pigs, a daily dose of 0.30 g per kg of live weight is used for 2 consecutive days, mixed with 1/4 of the morning secretion, which is administered 4-5 hours later than usual; the treatment is repeated once every 18-21 days.

In sows with body weights over 80-100 kg the dose will be reduced to 0.15-0.20 g/kg body weight, administered according to the same procedure.

Ascatrix tablets are used in dogs and cats, calculating 0.20 g/1 kg live weight, ie one 0.30 g Ascatrix tablet for 1.5 kg live weight. One hour after administration of Ascatrix, an oily purgative (castor oil) is administered.

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In massive infestations, a single administration of Ascatrix does not eliminate all helminthes (Lungu, 2022). Therefore, treatment should be repeated every 5-7 days. Also, in order to eliminate the young forms that come later in the intestine from the migration cycle, it is necessary to perform a treatment after 18-21 days from the first treatment. This treatment is mandatory regardless of whether or not the treatment is repeated every 5-7 days.

-*Waiting time:* the meat of slaughtered animals is given for consumption 3 days after the last treatment (Romeo, 2013).

DECTOMAX

- *Composition:* Doramectin 1 g, oily excipient qsp 100 ml.

- *Properties:* this medicine contains doramectin as an active substance, an avermectin found by PFIZER. Doramectin is a new fermentation-derived product of the avermectin class, being an antiparasitic agent with a wide spectrum of activity and high efficiency. Doramectin is isolated by fermentation of a genetically modified strain of Streptomyces avermitilis.

- *Mode of action*: Doramectin, like avermectins, adheres to membrane receptors that increase the membrane permeability of nerve and muscle cells to chlorine ions. They inhibit the electrical activity of nerve and muscle cells in nematodes and arthropods, causing paralysis and death of parasites. In mammals, the neuronal receptors to which avermectins adhere are located in the central nervous system (CNS). Because Doramectin does not penetrate the central nervous system of mammals, it has a high safety margin in use in animals.

- *Indications for treatment and control of parasites sensitive to doramectin in pigs:*

- gastrointestinal nematodes (adults and L4 larvae): Hyostrongylus rubidus, ascaris suum, Strongyloides ransomi, Oesophagostomum dentatum, Oesophagostomum quadrosipinulatum, Trichuris suis;

- Pulmonary strongyls: Metastrongylus spp;

- renal parasites (adults): Stephanurus dentatus;

- lice: Haematopinus suis;

- Itching: Sarcoptes scabies.

- *Method of administration and dosage:*

a. Pigs - intramuscular administration:

- the animals will be restrained and a sterile needle of size 18-20 will be used to inject the product in the neck area;

- when the temperature of the product is below 50C, the viscosity of the product increases a lot and hence the increased effort to perform the injection; the viscosity can be improved by slightly heating the vial and the instrument to 150C.

b. Pigs - dosage:

- 300 micrograms doramectin/kg Live weight (1ml/33kg g.v.).

- Contraindications and precautions:

- not to be used in lactating animals for human consumption, in pregnant cows 60 days before parturition;

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- not to be kept within reach of children and wash hands after use;

- not to be administered orally.

- waiting period for meat and meat products in pigs: 28 days (Ibidem).

CASUISTRY

Out of the 52 faecal samples, a number of 21 tested positive (out of the 4 pregnant sows, 2 were found with a positive result) for the Ascaris suum infestation, we will continue to present some representative data about animals. Pigs are subjects (eg. Pig1= S1).

Household no.1:

-3 positive tests

- animal feed is made with corn, barley, oats, sunflower meal.

S1: M, weight: 48 kg, age: 6 months

Clinical examination: well-maintained condition, anemia, diarrhea, weight loss, temperature– 38,7C

S2: F, weight: 40-50 kg, age: 4 months

Clinical examination: tachycardia, tachypnea, apathy, heavy movement, temperature 38,5C

S3: M, weight: 40-50 kg, age: 3 months

Clinical examination: poor maintenance, refusal of food, prolonged lying down, moderate rickets, temperature 38,6C

Household no.2

- 6 positive tests

- animal feed is made with soybeans, soy flour, sunflower meal

S1: F, weight: 70-80 kg, 8: months

Clinical examination: loss of appetite, weight loss, bloating, temperature 39 C

S2: F, weight: 40 kg, age: 4 months

Clinical examination: well-maintained condition, difficulty moving, refuses food, seizures, temperature 38,8C

S3: F, weight: 120 kg, age:12 months-pregnant sow

Clinical examination: loss of appetite, increased abdominal tenderness, prolonged pruritus, temperature 39,2 C

S4: F, weight: 40 kg, age: 3 months

Clinical examination: weight loss, rickets, poor respiratory signs, prolonged pruritus, temperature 38,5C

S5: M, weight: 60 kg, age: 6 months

Clinical examination: proper maintenance, apathy, anemia, jaundice, seizures, temperature 39 C

S6: M, weight: 50-60 kg, age: 4 months

Clinical examination: refuses food, difficulty moving, prefers supine position, bloating, increased abdominal tenderness, temperature 39,4 C

Household no. 3:

-1 positive test

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- animal feed is made with corn kernels and boiled leftovers

S1: M, weight: 30 kg, age: 3 months

Clinical examination: well-maintained, pallor, tachycardia, diarrhea, prolonged lying down, temperature 39,5 C

Household no. 4:

- 2 positive tests

- animal feed is made with corn grains, potatoes, porridge

- S1: F, weight: 50-55 kg, age: 5 months

- Clinical examination: well-maintained, loss of appetite, tachycardia, anorexia, weight loss, temperature 39 C

- S2: M, weight: 60 kg, age: 6 months

- Clinical examination: heavy movement, increased abdominal tenderness, diarrhea, prolonged pruritus, nail infections, temperature 39,5C

Household no. 5:

- 4 positive tests

- animal feed is made with oats, barley, peas, porridge

S1: M, weight: 60-70 kg, age: 6 months

Clinical examination: maintenance, loss of appetite, tachycardia, tachypnea, ejaculation, anorexia, weight loss, temperature 39,2 C

S2: M, weight: 57 kg, age: 6 months

Clinical examination: heavy movement, increased sensitivity in the abdominal region, prolonged pruritus, nail infections, temperature 38,5C

S3: F, weight: 50-60 kg, age: 6 months

Clinical examination: difficulty moving, tachypnea, vomiting, loss of appetite, anorexia, temperature 38,9 C

S4: F, weight: 70 kg, age: 5 months

Clinical examination: proper maintenance, anorexia, pressure sores, diarrhea, increased abdominal tenderness, temperature 39,3 C

Household no.6:

-3 positive tests

- Animal feed is made with grass, potatoes and carrots

S1: M, weight: 30-40 kg, age: 4 months

Clinical examination: proper maintenance, vomiting, tachycardia, tachypnea, urticaria, prolonged pruritus, difficulty moving, bloating, temperature 38,7C

S2: M, weight: 60 kg, age: 6 months

Clinical examination: poor maintenance, poor microclimate, food refusal, anorexia, seizures, temperature 39,6 C

S3: F, weight: 60-70 kg, age: 7 months

Clinical examination: vomiting, constipation, refusal food, prolonged lying down, temperature 39 C

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Household no. 7:

-2 positive tests

- animal feed is made with barley, peas, sunflower meal and boiled leftovers

S1: F, weight: 150 kg, age: 2 years-pregnant sow

Clinical examination: proper maintenance, tachypnea, anorexia, deviation, difficulty moving, vomiting, temperature 39,8 C

S2: F, weight: 100 kg, age: 9 months-pregnant sow

Clinical examination: proper maintenance, increased abdominal tenderness, bloating, constipation, pale mucous membranes, deviation, temperature 40 C.

Differentiated treatment applied to subjects

Of the 21 specimens that tested positive for coproparasitology for Ascaris suum infestation we formed 2 lots, 2 heterogeneous groups, which were divided into:

10 animals treated with Ascatrix

11 animals treated with Dectomax

Lot no. 1, treated with Ascatrix consists of:

- Household 1-S1, S2, S3;
- Household 2- S1, S2, S3, S4, S5, S6;
- Household 3-S1.

Lot no. 2, treated with Dectomax consists of:

- Household 4 - S1, S2;
- Household 5 - S1, S2, S3, S4;
- Household 6 - S1, S2, S3;
- Household 7 - S1, S2.

6. Findings

After the administration of the 2 anthelmintics, certain changes were observed both in terms of aspects of the clinical examination and those of the coproparasitological examination.

The coproparasitological examination was performed 3 and 7 days, respectively, after the administration of the treatment.

Clinically, the animals were observed on the day of administration of the drugs at equal intervals of 2 hours.

household 1, household 2...etc = H1, H2...etc.

pig1, pig2...etc = S1, S2...etc.

Thus, Lot no. 1, treated with Ascatrix, was as follows:

a). 2 hours after Ascatrix administration:

- all 10 animals were presented as before treatment;

b). 4 hours after Ascatrix administration:

- H1/S2 - general condition slightly improved;
- H1/S3 - general condition significantly improved
- H2/S6 - slightly improved general condition

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- H3/S1 - general condition significantly improved
- the other animals were unchanged from the initial time, or showed insignificant signs of change;

c). 6 hours after Ascatrix administration:

- H1/S1 - diarrhea
- H1/S2 - good general condition
- H1/S3 - vomiting, diarrhea
- H2/S1 - good general condition
- H2/S2 - epileptiform seizures
- H2/S3 - pruritus
- H2/S4 - weakening
- H2/S5 – convulsive seizures
- H2/S6 - good general condition
- H3/S1 - good general condition

The Table 1 shows the condition of the animals in lot no. 1, treated with Ascatrix, after a period of 6 hours, as well as temperature changes that occurred after administration of the medicine (the temperature can be seen to be 10 C, except for 4 exceptions), where T10C is the temperature measured before Ascatrix treatment, and T2oC is the temperature measured after Ascatrix treatment for each animal/household.

Table 1. Interpretation of results – clinical axamination Lot 1 - 6 hours post-treatment with ASCATRIX

Nr.crt.	ANIMAL IDENTIFICATION	CLINICAL SIGN	Thermometry	
			T1 ^{0}C	T2 ^{0}C
1	H1/S1	Diarrhea	38,7	37,7
2	H1/S2	Good general condition	38,5	38,5
3	H1/S3	Vomiting, diarrhea	38,6	37,6
4	H2/S1	Good general condition	39	39
5	H2/S2	Epileptic seizures	38,8	37,8
6	H2/S3	Pruritus	39,2	38,2
7	H2/S4	Weakening	38,5	37,5
8	H2/S5	Convulsive seizures	39	38
9	H2/S6	Good general condition	39,4	39,4
10	H3/S1	Good general condition	39,5	39,5

Lot no. 2, treated with Dectomax , showed significant positive changes in most of the animals under observation.

a). after 2 hours from the administration of Dectomax, the situation is as follows:

- H4/S1 - general condition with weak signs of improvement
- H4/S2 - general condition unchanged
- H5/S1 - significantly improved general condition
- H5/S2 - poorly improved general condition
- H5/S3 - general condition with average signs of improvement
- H5/S4 - general condition with signs of improvement
- H6/S1 - significantly improved general condition

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- H6/S2 - positive signs, receive food
- H6/S3 - weak signs of improvement
- H7/S1 - stationary state
- H7/S2 - promising general condition

b). 4 hours after Dectomax administration, subjects experience a promising improvement in baseline:

- H4/S2 - improved general condition
- H4/S2 - significant improvement
- H 5/S1 - improved condition
- H5/S2 - promising positive signs
- H5/S3 - significant improvement
- H5/S4 - partial improvement, total improvement
- H6/S1 - improved general condition
- H6/S2 - almost good general condition
- H6/S3 - medium improved condition
- H7/S1 - good average condition
- H7/S2 - improved overall condition

c). after 6 hours from the administration of Dectomax, a significant improvement of the condition of the subjects from group no. 2, with two exceptions, but also those that benefited from significant improvement in general:

- H4/S1 - good general condition
- H4/S2 - general condition improved, but with deviation
- H5/S1 - good general condition
- H5/S2 - good general condition
- H5/S3 - good general condition
- H5/S4 - good general condition
- H6/S1 - good general condition
- H6/S2 - good general condition
- H6/S3 - medium improved condition, with anorexic manifestations
- H7/S1 - good general condition
- H7/S2 - good general condition

The Table 2 shows the condition of the animals in lot no. 2 treated with Dectomax , after a period of 6 hours, as well as the lack of temperature changes, which did not occur after the administration of the drug, as seen in the treatment with Ascatrix. **T1 ^{0}C** represents the temperature measured ***before treatment with Dectomax,*** and **T2 ^{o}C** represents the temperature measured ***after treatment with Dectomax***, for each animal / household.

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Table 2. Clinical examination Lot2 - 6 hours post- treatment with DECTOMAX

Nr. crt.	ANIMAL IDENTIFICATION	CLINICAL SIGN	Thermometry	
			T1 ^{0}C	T2 ^{0}C
1	H4/S1	Good general condition	38,4	38,4
2	H4/S2	OFFENSE	39	39
3	H5/S1	Good general condition	39,2	39,2
4	H5/S2	Good general condition	38,5	38,5
5	H5/S3	Good general condition	38,9	38,9
6	H5/S4	Good general condition	39,3	39,3
7	H6/S1	Good general condition	38,7	38,7
8	H6/S2	Good general condition	39,6	39,6
9	H6/S3	Anorexia	39	39
10	H7/S1	Good general condition	39,8	39,8
11	H7/S2	Good general condition	40	40

COPROPARASITOLOGICAL EXAMINATION

After 3 days of treatment with the two drugs, the coproparasitological examination was performed.

Thus, from the number of lots with no. 1, treated with Ascatrix, resulted in a number of 5 subjects carrying Ascaris suum and 5 subjects with a negative result.

In the Table 3, we present the spatial arrangement of the subjects by households; as well as the result of the coproparasitological examination, after a period of three days from the administration Ascatrix.

Table 3. Coproparasitological examination Lot 1 - 3 days post-treatment with ASCATRIX

Nr. crt.	ANIMAL IDENTIFICATION	COPRO EXAM RESULT
1	H1/S1	**Positive**
2	H1/S2	**Positive**
3	H1/S3	**Positive**
4	H2/S1	Negative
5	H2/S2	**Positive**
6	H2/S3	Negative
7	H2/S4	Negative
8	H2/S5	**Positive**
9	H2/S6	**Positive**
10	H3/S1	**Positive**

The batch no.2 to which Dectomax was administered is much better after 3 days of treatment, as shown in the Table 4: out of a total of 11 subjects, only 2 subjects obtained positive results.

Table 4. Coproparasitological examination Lot 2 - 3 days post-treatment with DECTOMAX

Nr. crt.	ANIMAL IDENTIFICATION	COPRO EXAM RESULT
1	H4/S1	Negative
2	H4/S2	Negative
3	H5/S1	Negative

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4	H5/S2	Negative
5	H5/S3	Negative
6	H5/S4	Negative
7	H6/S1	**Positive**
8	H6/S2	Negative
9	H6/S3	**Positive**
10	H7/S1	Negative
11	H7/S2	Negative

The second coproparasitological examination was performed 7 days after treatment with the two drugs**.**

Lot 1, in which Ascatrix was administered , suffered a reduction in cases that tested positive at the first coproparasitological examination, so that out of 5 subjects with *Ascaris suum*, only 3 remained (H1/S1, H2/S6, H3/S1). Therefore, the remaining 7 subjects from group no.1 which were initially found to carry *Ascaris suum*, they eliminated him (Table 5).

Table 5. Coproparasitological examination Lot 1 - 7 days post-treatment with ASCATRIX

Nr. crt.	ANIMAL IDENTIFICATION	COPRO EXAM RESULT
1	H1/S1	**Positive**
2	H1/S2	Negative
3	H1/S3	Negative
4	H2/S1	Negative
5	H2/S2	Negative
6	H2/S3	Negative
7	H2/S4	Negative
8	H2/S5	Negative
9	H2/S6	**Positive**
10	H3/S1	**Positive**

We consider it gratifying that the subject H2/S3, the pregnant sow in the H2, responded well to the treatment with Ascatrix, so it can be seen that (and) even after the first coproparasitological examination a negative result was obtained, a sign that the parasite was eliminated successfully, which is very important given that childbirth is coming.

Lot no. 2 of pigs treated with Dectomax was also subjected, after 7 days, to the second coproparasitological examination. In this case, the result was linear - negative for the entire staff of 11 subjects (Table 6).

Table 6. Coproparasitological examination Lot 2 - 7 days post-treatment with DECTOMAX

Nr. crt.	ANIMAL IDENTIFICATION	COPRO EXAM RESULT
1	H4/S1	Negative
2	H4/S2	Negative
3	H5/S1	Negative
4	H5/S2	Negative
5	H5/S3	Negative
6	H5/S4	Negative

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7	H6/S1	Negative
8	H6/S2	Negative
9	H6/S3	Negative
10	H7/S1	Negative
11	H7/S2	Negative

Not negligible, even very gratifying is the fact that both pregnant sows from H6, have eliminated the parasite and there are chances that they will give birth to healthy piglets.

7. Conclusions

Following the analyzes performed on the two groups, it was observed to obtain better results, effective for animal health in group 2, by treatment with Dectomax.

It managed to eliminate a large part of the Ascaris larvae Suum existing in the households visited.

From the actions taken in the present study, Ascatrix better highlighted the parasites, through its action of paralysis on nematodes, which it manages to eliminate through feces in the form of live roundworms and without harming the animal.

The present paper is intended to be a first step in future research aimed at removing morphine by high performance liquid chromatography methods, electrochemical detection, but also by gas chromatography/mass spectrophotometry. The morphine content of the parasite will be highlighted by the release of nitrogen monoxide and naloxone from the live parasitic forms of Ascaris that we obtained in this study.

In the future, all these results may contribute to a more complex understanding of the action of this parasite in pigs, organisms whose immunity may be weakened due to morphine secretion.

Based on the present study, the information obtained that is integrated in the literature, can be hoped for the emergence of other more effective methods of treatment and prophylaxis, which would certainly lead to increased efficiency in the work.

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