

Date of Approval: October 27, 2017

# FREEDOM OF INFORMATION SUMMARY

## ORIGINAL NEW ANIMAL DRUG APPLICATION

NADA 141-466

Inteprity™ and Maxiban™

avilamycin, narasin and nicarbazin

Type A Medicated Articles to be Used in the Manufacture of  
Type C Medicated Feeds

Broiler chickens

For the prevention of mortality caused by necrotic enteritis associated with *Clostridium perfringens*; and for the prevention of coccidiosis caused by *Eimeria necatrix*, *E. tenella*, *E. acervulina*, *E. brunetti*, *E. mivati*, and *E. maxima* in broiler chickens.

Sponsored by:

Elanco US Inc.

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**I. GENERAL INFORMATION**

**A. File Number**

NADA 141-466

**B. Sponsor**

Elanco US Inc.  
2500 Innovation Way  
Greenfield, IN 46140

Drug Labeler Code: 058198

**C. Proprietary Names**

Inteprity™ and Maxiban™

**D. Established Names**

avilamycin, narasin and nicarbazin

**E. Pharmacological Category**

Avilamycin: antimicrobial  
Narasin and nicarbazin: anticoccidial

**F. Dosage Form**

Type A medicated articles to be used in the manufacture of Type C medicated feeds

**G. Amount of Active Ingredients in Currently Marketed Products<sup>1</sup>**

Avilamycin: 45.4 g/lb avilamycin  
Narasin and nicarbazin: 36 g/lb narasin and 36 g/lb nicarbazin

**H. How Supplied**

Avilamycin: 55.12 lb bag  
Narasin and nicarbazin: 55.12 lb bag

**I. Dispensing Status**

VFD

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<sup>1</sup> The sponsors of these individual currently marketed Type A medicated articles may have approvals for other strengths of these products that are for use in the same species and class, for the same indications, and at the same dosages, but are not currently marketing those strengths of these Type A medicated articles. Such strengths, when legally marketed, are also approved for use in the manufacture of Type C medicated feeds that is the subject of this approval.

**J. Dosage Regimen**

13.6 to 40.9 g/ton avilamycin, 27 to 45 g/ton narasin, and 27 to 45 g/ton nicarbazin per ton of Type C medicated feed, to be fed as the sole ration for 21 consecutive days. Narasin and nicarbazin may only be sourced from Maxiban™, NADA #138-952, which provides these drugs at a 1:1 ratio.

**K. Route of Administration**

Oral

**L. Species/Class**

Broiler chickens

**M. Indication**

For the prevention of mortality caused by necrotic enteritis associated with *Clostridium perfringens*; and for the prevention of coccidiosis caused by *Eimeria necatrix*, *E. tenella*, *E. acervulina*, *E. brunetti*, *E. mivati*, and *E. maxima* in broiler chickens.

**II. EFFECTIVENESS**

In accordance with the Federal Food, Drug, and Cosmetic Act (FD&C Act), as amended by the Animal Drug Availability Act (ADAA) of 1996, if the animal drugs or active ingredients intended for use in combination in an animal feed have already been separately approved for the particular uses and conditions for which they are intended for use in combination, the Center for Veterinary Medicine (CVM) will not refuse to approve an NADA for the combination on effectiveness grounds unless the FDA finds that the sponsor fails to demonstrate that:

- there is substantial evidence to indicate that any active ingredient or animal drug intended only for the same use as another active ingredient or animal drug in the proposed combination makes a contribution to the labeled effectiveness
- each of the active ingredients or animal drugs intended for at least one use that is different from all other active ingredients or animal drugs used in the combination provides appropriate concurrent use for the intended target population
- where the combination contains more than one nontopical antibacterial active ingredient or animal drug, there is substantial evidence that each of the nontopical antibacterial active ingredients or animal drugs makes a contribution to the labeled effectiveness.

Avilamycin, as provided by Elanco US Inc., has previously been separately approved for use in feed for broiler chickens for the prevention of mortality caused by necrotic enteritis associated with *Clostridium perfringens* (21 CFR 558.68). Narasin and nicarbazin, as provided by Elanco US Inc., has previously been separately approved for use in feed for broiler chickens for the prevention of coccidiosis caused by *Eimeria necatrix*, *E. tenella*, *E. acervulina*, *E. brunetti*, *E. mivati*, and *E. maxima* (21 CFR 558.363). Effectiveness of each drug, avilamycin and narasin and nicarbazin, when administered alone in accordance with its approved uses and conditions of use, is

demonstrated in Elanco US Inc.'s approved NADAs 141-439 and 138-952 for avilamycin and narasin and nicarbazin, respectively.

Because avilamycin and narasin and nicarbazin each have at least one use that is different from all other animal drugs used in the combination, the NADA must also demonstrate that avilamycin plus narasin and nicarbazin provide appropriate concurrent use for the intended target population. The use of avilamycin plus narasin and nicarbazin provides appropriate concurrent use because these drugs are intended to treat different conditions (prevention of mortality associated with necrotic enteritis and prevention of coccidiosis, respectively) likely to occur simultaneously with sufficient frequency in broiler chickens. There is no more than one nontopical antibacterial contained in this combination animal drug intended for use in Type C medicated feed.

### III. TARGET ANIMAL SAFETY

In accordance with the FD&C Act, as amended by the ADAA of 1996, if the animal drugs or active ingredients intended for use in combination in animal feed have previously been separately approved for the particular uses and conditions of use for which they are intended for use in combination, CVM will not refuse to approve an NADA for the combination on target animal safety grounds unless:

- there is a substantiated scientific issue specific to an active ingredient or animal drug used in the combination that cannot adequately be evaluated based on the information contained in the application for the combination, and CVM finds that the application fails to show that the combination is safe, or
- there is a scientific issue raised by target animal observations contained in the studies submitted to the NADA for the combination, and CVM finds that the application fails to show that the combination is safe.

Avilamycin, as provided by Elanco US Inc., has previously been separately approved for use in feed for broiler chickens for the prevention of mortality caused by necrotic enteritis associated with *Clostridium perfringens* (21 CFR 558.68). Narasin and nicarbazin, as provided by Elanco US Inc., has previously been separately approved for use in feed for broiler chickens for the prevention of coccidiosis caused by *Eimeria necatrix*, *E. tenella*, *E. acervulina*, *E. brunetti*, *E. mivati*, and *E. maxima* (21 CFR 558.363).

Under the provisions of ADAA, this original approval allows for the combination of avilamycin (as provided by Elanco US Inc.) and narasin and nicarbazin (as provided by Elanco US Inc.). Target animal safety for each drug, avilamycin and narasin and nicarbazin, when administered alone in accordance with its approved uses and conditions of use, is demonstrated in Elanco US Inc.'s approved NADAs 141-439 and 138-952 for avilamycin and narasin and nicarbazin, respectively. The Agency has found no substantiated scientific issue relating to the target animal safety of avilamycin and narasin/nicarbazin when used in combination under this NADA and no scientific issue has been raised by target animal observations submitted as part of the NADA for this combination. Therefore, in accordance with the FD&C Act, as amended by the ADAA of 1996, no specific target animal safety studies are required for approval of this application.

#### IV. HUMAN FOOD SAFETY

In accordance with the FD&C Act, as amended by the ADAA of 1996, if the animal drugs or active ingredients intended for use in combination in animal feed have already been separately approved for the particular uses and conditions of use for which they are intended for use in combination, CVM will not refuse to approve an NADA for the combination on human food safety grounds unless CVM finds that the application fails to establish that:

- none of the active ingredients or animal drugs used in combination at the longest withdrawal for any of the active ingredients or animal drugs in the combination exceeds the established tolerance, or
- none of the active ingredients or animal drugs in combination interferes with the method of analysis for another active ingredient or animal drug in the combination.

##### A. Toxicology

Safety of the individual drugs in this combination product has been established by data in NADA 141-438 for avilamycin (FOI Summary dated May 8, 2015), NADA 118-980 for narasin (FOI Summaries dated August 14, 1986 and April 11, 2001), and NADA 135-468 for nicarbazin (50 FR 13561, April 5, 1985).

##### B. Residue Chemistry

###### 1. Summary of Residue Chemistry Studies

###### a. Residue Depletion Study

**Title:** Non-Clinical Laboratory Study (GLP): Residue Noninterference in Chickens Following Oral Administration of Avilamycin in Combination with Monteban and Maxiban in the Feed (Study No. 014-01414)

**Study Completion Date:** April 7, 2016

**Study Locations:** In-life phase – Las Cruces, NM; Analytical phase – Greenfield, IN

**Objective:** The objective of this GLP study was to confirm that residues of narasin in fat and nicarbazin in liver of broiler chickens following administration of avilamycin and narasin and nicarbazin (Maxiban™) are below the codified tolerances at 5 days. Only the results from the control group and treatment group 5 (TG01 and TG05, respectively) are relevant to this approval; the other groups included in the original study are not discussed in the following summary.

The control group had 30 males and 30 females. The treatment group had 10 males and 10 females. The control birds were fed a basal Type C nonmedicated ration for 38 days and then were slaughtered. The treated birds were fed nonmedicated ration for 12 days and then medicated feed containing 40.8 g/ton avilamycin, 45 g/ton narasin, and 45 g/ton nicarbazin for 28 days. The treated birds were slaughtered after 5-day

withdrawal. Liver and abdominal fat were collected from both groups. The tissue samples were analyzed with LC-MS/MS to determine the concentration of narasin and nicarbazin. Demonstration of noninterference with the analytical method was not needed due to the dissimilar chemical structures of avilamycin, narasin and nicarbazin. Narasin residues in the abdominal fat of the treated birds were less than the LOQ of 2.8 ppb. Nicarbazin residues in the livers of the treated birds ranged from 91.6 to 668 ppb.

## 2. Target Tissue and Marker Residue Assignment

No reassessments of target tissue and marker residue were needed for this approval. Neither a target tissue nor a marker residue is codified for avilamycin in chickens. Although there is no codified marker residue for nicarbazin in chicken tissues, the monitored analyte for nicarbazin is 4,4'-dinitrocarbanilide (DNC). The marker residue for narasin is parent drug and the target tissue in chickens is abdominal fat (NADA 118-980, FOI Summary dated April 11, 2001).

## 3. Tolerance Assignments

A tolerance for residues of avilamycin in chickens is not required (21 CFR 556.68). The tolerance for narasin is 480 ppb in chicken abdominal fat (21 CFR 556.428). The tolerance for residues of nicarbazin is 4 ppm in chicken muscle, liver, skin, and kidney (21 CFR 556.445).

## 4. Withdrawal Time

A 5-day withdrawal period is assigned.

# C. Microbial Food Safety

With respect to the human food safety evaluation for these types of combination new animal drug approvals, the Agency is permitted only to evaluate whether any active ingredient or drug intended for use in the combination exceeds its established tolerance at the longest withdrawal time of any of the active ingredients or drugs in the combination, and whether any of the active ingredients or drugs of the combination interferes with the methods of analysis of another active ingredient or drug in the combination (section 512(d)(4)(A) of the FD&C Act). Therefore, we did not 1) assess the impact of this combination of avilamycin and narasin and nicarbazin on antimicrobial resistance among bacteria of public health concern in or on treated broiler chickens, or 2) assess the impact of residues of avilamycin and narasin and nicarbazin in edible food products from treated broiler chickens on human intestinal flora.

# D. Analytical Method for Nicarbazin Residues

## 1. Description of Analytical Method

An analytical method for nicarbazin in chicken tissues has been published, based on LC-MS/MS.

## 2. Availability of Method

The method is published in the following reference:

Coleman, M.R., Rodewald, J.M., Brunelle, S.L., Nelson, M., Bailey L., and Burnett, T.J. Determination and confirmation of nicarbazin, measured as 4,4-dinitrocarbanilide (DNC), in chicken tissues by liquid chromatography with tandem mass spectrometry: First Action 2013.07. Journal of AOAC International Vol 97, No 2 (2014).

## E. Analytical Method for Narasin Residues

### 1. Description of Analytical Method

An analytical method for narasin in chicken tissues has been published, based on LC-MS/MS.

### 2. Availability of Method

The method is published in the following reference:

Lombardi, K.R., Burnett, T.J., Brunelle, S.L., Ulrey, W.D., and Coleman, M.R. Determination and confirmation of narasin and monensin in chicken, swine, and bovine tissues by LC/MS/MS: Final Action 2011.24. Journal of AOAC International Vol. 96, No 4 (2013).

## V. USER SAFETY

The product labeling contains the following information regarding safety to humans handling, administering, or exposed to the Type C medicated feed:

Not for use in humans. Keep out of reach of children.

## VI. AGENCY CONCLUSIONS

The data submitted in support of this NADA satisfy the requirements of section 512 of the FD&C Act and 21 CFR part 514. The data contained in the previously approved NADAs for Inteprity™ and Maxiban™ demonstrate that, when they are used according to the label, they are safe and effective for the prevention of mortality caused by necrotic enteritis associated with *Clostridium perfringens*; and for the prevention of coccidiosis caused by *Eimeria necatrix*, *E. tenella*, *E. acervulina*, *E. brunetti*, *E. mivati*, and *E. maxima* in broiler chickens. Additionally, data demonstrate that residues in food products derived from broiler chickens treated with Inteprity™ and Maxiban™ will not represent a public health concern when the product is used according to the label.

### A. Marketing Status

A valid veterinary feed directive (VFD) is required to dispense this drug. Any animal feed bearing or containing this drug will be fed to animals only by or on a lawful veterinary feed directive issued by a licensed veterinarian in the course of their professional practice. In addition, the VFDs issued for this drug are not



refillable.

Labeling restricts this drug to use under the professional supervision of a licensed veterinarian. The decision to restrict this drug to use by or upon a lawful VFD issued by a licensed veterinarian was based on the following factors: (a) adequate directions cannot be written to enable lay persons to appropriately and safely use this product and (b) restricting this drug to use by or upon a lawful VFD issued by a licensed veterinarian should help prevent indiscriminate use, which could result in violative tissue residues.

**B. Exclusivity**

This approval does not qualify for marketing exclusivity under section 512(c)(2)(F)(ii) of the FD&C Act.

**C. Patent Information**

For current information on patents, see the Animal Drugs @ FDA database or the Green Book on the FDA CVM internet website.