

Approval Date: July 21, 2004

**FREEDOM OF INFORMATION SUMMARY**  
**ORIGINAL NEW ANIMAL DRUG APPLICATION**  
**NADA 141-233**

**Ractopamine Hydrochloride (OPTAFLEXX) plus  
Monensin Sodium (RUMENSIN) plus Tylosin Phosphate (TYLAN)  
plus Melengestrol Acetate (MGA)**

Increased rate of weight gain, improved feed efficiency, increased carcass leanness, prevention and control of coccidiosis due to *Eimeria bovis* and *E. zuernii*, reduction of incidence of liver abscesses caused by *Fusobacterium necrophorum* and *Actinomyces (Corynebacterium) pyogenes*, and suppression of estrus (heat) in heifers fed in confinement for slaughter for the last 28 to 42 days on feed.

**Sponsored By:**

**Elanco Animal Health  
A Division of Eli Lilly & Co.  
Lilly Corporate Center  
Indianapolis, IN 46285**

**TABLE OF CONTENTS**

**1. GENERAL INFORMATION ..... 1**

**2. EFFECTIVENESS ..... 2**

**3. TARGET ANIMAL SAFETY ..... 3**

**4. HUMAN SAFETY ..... 4**

**5. AGENCY CONCLUSIONS ..... 7**

**6. ATTACHMENTS ..... 8**

## FREEDOM OF INFORMATION SUMMARY

### OPTAFLEXX and RUMENSIN and TYLAN and MGA for Heifers Fed in Confinement for Slaughter

#### 1. GENERAL INFORMATION:

- a. File Number: NADA 141-233
- b. Sponsor: Elanco Animal Health  
A Division of Eli Lilly & Co.  
Lilly Corporate Center  
Indianapolis, IN 46285  
Drug Labeler Code: 000986
- c. Established Names: Ractopamine hydrochloride plus monensin sodium plus tylosin phosphate plus melengestrol acetate
- d. Proprietary Names: OPTAFLEXX and RUMENSIN and TYLAN and MGA
- e. Dosage Form: Type A medicated articles
- f. How Supplied: Ractopamine – 25 lb bag  
Monensin – 50 lb bag  
Tylosin – 50 lb bag  
Melengestrol acetate – 50 lb bag (dry), 40 lb container (liquid)
- g. How Dispensed: OTC
- h. Amount of Active Ingredients: Ractopamine hydrochloride – 45.4 grams per pound (100 grams per kilogram)  
Monensin sodium – 80 grams per pound  
Tylosin phosphate – 40 and 100 grams per pound  
Melengestrol acetate – 200 and 500 mg per pound
- i. Route of Administration: Oral in feed
- j. Species/Class: Heifers fed in confinement for slaughter
- k. Recommended Dosage: Add 0.5 to 2.0 pounds per head per day of medicated feed containing 0.125 to 1.0 milligram of melengestrol acetate per pound to

provide 0.25 to 0.5 milligrams per head per day to a Type C medicated feed containing 9.8 to 24.6 g/ton ractopamine hydrochloride, 10 to 30 g/ton monensin sodium to provide 0.14 to 0.42 mg monensin/lb body weight/day up to 360 mg depending on the severity of the coccidiosis challenge, and 8 to 10 g/ton tylosin phosphate.

- l. Pharmacological Category: Beta adrenergic agonist, anticoccidial, antibacterial, and steroid hormone
- m. Indications: Increased rate of weight gain, improved feed efficiency, increased carcass leanness, prevention and control of coccidiosis due to *Eimeria bovis* and *E. zuernii*, reduction of incidence of liver abscesses caused by *Fusobacterium necrophorum* and *Actinomyces (Corynebacterium) pyogenes*, and suppression of estrus (heat) in heifers fed in confinement for slaughter for the last 28 to 42 days on feed.

## 2. **EFFECTIVENESS:**

In accordance with the Federal Food, Drug, and Cosmetic Act (FFDCA), as amended by the Animal Drug Availability Act of 1996, if the animal drugs/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, FDA 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/drug intended only for the same use as another active ingredient/animal drug in 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/animal drug, there is a substantial evidence that each of the nontopical antibacterial active ingredients/animal drugs makes a contribution to the labeled effectiveness

Ractopamine as provided by Elanco Animal Health, has previously been separately approved for use in cattle for increased rate of weight gain, improved feed efficiency, and increased carcass leanness in cattle fed in confinement for slaughter during the last 28 to 42 days on feed (21 CFR 558.500(e)(2)). Monensin, as provided by Elanco Animal Health, has previously been separately

approved (in a supplemental approval dated December 12, 2003) for use in cattle fed in confinement for slaughter for prevention and control of coccidiosis due to *Eimeria bovis* and *E. zuernii* (21 CFR 558.355(f)(3)(vii)(a)). Tylosin as provided by Elanco Animal Health, has previously been separately approved for use in cattle fed in confinement for slaughter for reduction of incidence of liver abscesses caused by *Fusobacterium necrophorum* and *Actinomyces (Corynebacterium) pyogenes* (21 CFR 558.625(f)(1)(i)(b)). Melengestrol acetate as provided by Pharmacia and Upjohn Company, has previously been separately approved for use in cattle for increased rate of weight gain, improved feed efficiency, and suppression of estrus (heat) in heifers fed in confinement for slaughter (21 CFR 558.342(e)(1)). Effectiveness of each drug, ractopamine, monensin, tylosin, and melengestrol acetate when administered alone in accordance with its approved uses and conditions of use, is demonstrated in Elanco Animals Health's approved NADA 141-221 for ractopamine, NADA 95-735 for monensin, NADA 12-491 for tylosin, and Pharmacia and Upjohn's NADAs 39-402 and 34-254 for melengestrol acetate, to which Elanco Animal Health has right of reference.

Ractopamine, monensin, tylosin, and melegestrol acetate are each intended for a different use therefore the NADA need not demonstrate, by substantial evidence, that ractopamine, monensin, tylosin, or melengestrol acetate contributes to the labeled effectiveness of the combination. Ractopamine, monensin, tylosin, and melengestrol acetate provide appropriate concurrent use because these drugs are intended to treat different conditions likely to occur simultaneously in heifers fed in confinement for slaughter during the last 28 to 42 days on feed. (Ractopamine, for increased carcass leanness; Monensin, for prevention and control of coccidiosis due to *Eimeria bovis* and *E. zuernii*; Tylosin for reduction of incidence of liver abscesses caused by *Fusobacterium necrophorum* and *Actinomyces (Corynebacterium) pyogenes*); and Melengestrol acetate for increased rate of weight gain, improved feed efficiency, and suppression of estrus (heat).

### **3. TARGET ANIMAL SAFETY:**

In accordance with the FFDCA, as amended by the Animal Drug Availability Act of 1996, if the animal drugs/active ingredients intended for use in combination in animal feed have previously been approved separately for the particular uses and conditions of use for which they are intended for use in combination, FDA 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 FDA 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 FDA finds that the application fails to show that the combination is safe.

Ractopamine as provided by Elanco Animal Health, has previously been separately approved for use in cattle for increased rate of weight gain, improved feed efficiency, and increased carcass leanness in cattle fed in confinement for slaughter during the last 28 to 42 days on feed (21 CFR 558.500(e)(2)). Monensin, as provided by Elanco Animal Health, has previously been separately approved (in a supplemental approval dated December 12, 2003) for use in cattle fed in

confinement for slaughter for prevention and control of coccidiosis due to *Eimeria bovis* and *E. zuernii* (21 CFR 558.355(f)(3)(vii)(a)). Tylosin as provided by Elanco Animal Health, has previously been separately approved for use in cattle fed in confinement for slaughter for reduction of incidence of liver abscesses caused by *Fusobacterium necrophorum* and *Actinomyces (Corynebacterium) pyogenes* (21 CFR 558.625(f)(1)(i)(b)). Melengestrol acetate as provided by Pharmacia and Upjohn Company, has previously been separately approved for use in cattle for increased rate of weight gain, improved feed efficiency, and suppression of estrus (heat) in heifers fed in confinement for slaughter (21 CFR 558.342(e)(1)).

Under the provisions of ADAA, this original approval allows for the combination of ractopamine, monensin, tylosin (as provided by Elanco Animal Health), and melengestrol acetate acetate (as provided by Pharmacia and Upjohn Company). Target animal safety of each drug, ractopamine, monensin, tylosin, and melegestrol acetate when administered alone in accordance with its approved uses and conditions of use, is demonstrated in Elanco Animal Health's approved NADAs 141-221, 95-735, and 12-491, respectively, and Pharmacia and Upjohn's NADAs 39-402 and 34-254 for melengestrol acetate, to which Elanco Animal Health has right of reference. The Agency has found no substantiated scientific issue relating to the target animal safety of ractopamine, monensin, tylosin, and melengestrol acetate 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. Thus, pursuant to FFDCAs, as amended by the Animal Drug Availability Act of 1996, no specific target animal safety studies are required for approval of NADA 141-233.

#### **4. HUMAN SAFETY:**

In accordance with the FFDCAs, as amended by the Animal Drug Availability Act of 1996, if the animal drugs/active ingredients or intended for use in combination in animal feed have previously been approved separately for the particular uses and conditions of use for which they are intended for use in combination, FDA will not refuse to approve an NADA for the combination on human safety grounds unless FDA 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 drug in the combination.

##### **A. Toxicity:**

Safety for this combination product has been established by data in NADA 141-221 for ractopamine, NADA 95-735 for monensin, NADA 12-491 for tylosin, and NADAs 39-402 and 34-254 for melengestrol acetate.

##### **B. Safe Concentrations of Total Residues – Calculation of the Acceptable Daily Intake (ADI) and the Safe Concentrations (SC):**

The safe concentration for total residues of ractopamine hydrochloride are 0.25 ppm in muscle, 0.75 ppm in liver, and 1.5 ppm in kidney and fat. The acceptable daily intake (ADI) for total residues of ractopamine is 1.25 micrograms ractopamine hydrochloride per kilogram of body weight per day as codified under 21 CFR 556.570. The ADI for total

residues of monensin is 12.5 micrograms per kilogram of body weight per day as codified under 21 CFR 556.420. An acceptable daily intake value for tylosin or melengestrol acetate is not established at this time.

### **C. Residue Studies:**

#### **C.1. Tissue Residue Non-Interference Study in Cattle Treated with Ractopamine, Monensin, Tylosin and Melengestrol Acetate. T4V699501**

Investigator: J.W. Moran and J.M. Buck  
Elanco Animal Health  
Greenfield, IN 46140

This study was conducted to determine non-interference in the tissue residue depletion in cattle of the ractopamine, monensin, tylosin and melengestrol acetate (MGA) combination. The cattle were fed medicated rations for 14.5 days. One treatment group of six cattle, three heifers and three steers, were fed 30 ppm ractopamine, 30 g/ton monensin, and 10 g/ton tylosin (RMT). A second treatment group of six heifers were fed 0.05 ppm MGA (0.5 mg/heifer/day) in addition to the combination of ractopamine, monensin, and tylosin (RMT+MGA). The animals were euthanized and tissues collected at practical zero withdrawal (12 hours). Liver tissue was collected and assayed for monensin and tylosin bioactive residues by microbiological methods, as well as assayed for ractopamine by high performance liquid chromatography with fluorescence detection. Fat tissue was collected and assayed for MGA residue by gas chromatography with electron capture detection.

The ractopamine residues in the liver at practical zero-time withdrawal were 0.0074 ppm and 0.0041 ppm for the RMT and RMT+MGA treatments, which is below the tolerance established for cattle at 0.09 ppm. The monensin, tylosin and MGA residue levels found in this non-interference study at practical zero withdrawal were below the limit of quantitation of the respective methods of 0.04 ppm, 0.05 ppm, and 0.01 ppm, respectively. Since the assay values were below the limit of quantitation, it demonstrated that these three values were all below the approved tolerances for monensin, tylosin, and MGA (0.05 ppm, 0.2 ppm, and 25 ppb, respectively).

These results indicate that the residue profiles of ractopamine, monensin, tylosin, and melengestrol acetate are not altered when the drugs are fed in combination at the levels tested in this study.

Assay noninterference was tested by analyzing liver samples that had been fortified with 50 ppb monensin, 150 ppb ractopamine, 200 ppb tylosin, and 25 ppb MGA and comparing the results to those obtained from liver fortified with the single drug. The recovery data satisfactorily demonstrated assay noninterference.

### **D. Tolerances and Withdrawal Times:**

For ractopamine hydrochloride, tolerances of 0.03 ppm in muscle and 0.09 ppm in liver are established for residues of ractopamine hydrochloride parent in cattle as codified under 21 CFR 556.570.

For monensin, a tolerance of 0.05 ppm is established for negligible residue of monensin in edible tissues of cattle as codified under 21 CFR 556.420.

For tylosin, a tolerance of 0.2 ppm is established for negligible residue of tylosin in uncooked fat, muscle, liver, and kidney in cattle as codified under 21 CFR 556.740.

For melengestrol acetate, a tolerance of 25 ppb is established for residues of the parent compound, melengestrol acetate, in fat of cattle as codified under 21 CFR 556.380.

The tissue residue depletion data showed that residues of ractopamine hydrochloride, monensin, tylosin, and MGA were less than their respective tolerances at practical zero withdrawal, thereby supporting the assignment of a zero withdrawal period for the combination.

**E. Regulatory Methods for Residues:**

The analytical methods for the determination of ractopamine, monensin, tylosin, and melengestrol acetate in edible tissues are on file at the Center for Veterinary Medicine, Food and Drug Administration, 7500 Standish Place, Rockville, MD 20855.

**F. User Safety Concerns:**

The following human warnings are found on the Type B and Type C medicated feed labeling:

The active ingredient in OPTAFLEXX, ractopamine hydrochloride, is a beta-adrenergic agonist. Individuals with cardiovascular disease should exercise special caution to avoid exposure. Not for use in humans. Keep out of the reach of children. The OPTAFLEXX 45 formulation (Type A Medicated Article) poses a low dust potential under usual conditions of handling and mixing. When mixing and handling OPTAFLEXX, use protective clothing, impervious gloves, protective eye wear, and a NIOSH-approved dust mask. Operators should wash thoroughly with soap and water after handling. If accidental eye contact occurs, immediately rinse eyes thoroughly with water. If irritation persists, seek medical attention. The material safety data sheet contains more detailed occupational safety information. To report adverse effects, access medical information, or obtain additional product information, call 1-800-428-4441.

## 5. AGENCY CONCLUSIONS:

The data submitted in support of this NADA satisfy the requirements of section 512(d)(4) of the FFDCFA and 21 CFR Part 514 of the implementing regulations. Ractopamine, monensin, tylosin, and melengestrol acetate when administered by adding 0.5 to 2.0 pounds per head per day of medicated feed containing 0.125 to 1.0 milligram of melengestrol acetate per pound to provide 0.25 to 0.5 milligrams per head per day to a Type C medicated feed containing 9.8 to 24.6 g/ton ractopamine hydrochloride, 10 to 30 g/ton monensin sodium, and 8 to 10 g/ton tylosin phosphate is safe and effective for increased rate of weight gain, improved feed efficiency, increased carcass leanness, prevention and control of coccidiosis due to *Eimeria bovis* and *E. zuernii*, reduction of incidence of liver abscesses caused by *Fusobacterium necrophorum* and *Actinomyces (Corynebacterium) pyogenes*, and suppression of estrus (heat) in in heifers fed in confinement for slaughter for the last 28 to 42 days on feed.

This approval does not qualify for marketing exclusivity under section 512(c)(2)(F)(ii) of the Federal Food, Drug, and Cosmetic Act.

Pursuant to 21 CFR 514.106 (b)(2)(vi), this combination NADA approval is regarded as a Category II supplemental change which did not require a reevaluation of safety and efficacy data in the parent NADAs.

The drugs are to be fed in Type C medicated feeds, in accordance with section 1 of the FOI Summary and the Blue Bird labeling that is attached to this document.

The Center for Veterinary Medicine has concluded that, for this product, adequate directions for use by the lay person have been provided. Label directions provide detailed instruction in plain language. The drug product is not a controlled substance. Thus, the drug product is assigned OTC status, and the labeling is adequate for the intended use.

Ractopamine hydrochloride is under the following US patent numbers:

<u>U.S. Patent Number</u>	<u>Date of Expiration</u>
4,690,951	September 1, 2007
5,643,967	July 1, 2014

The approval of the labeling for this combination product is not intended to be precedent setting in any manner. The approved bluebird labels for combination products are to be on one label. However, in this particular situation, two separate bluebird labels are being used to represent a single Type C medicated feed in this approval. This situation exists only because of the uniqueness of the prior melengestrol acetate approval.

**6. ATTACHMENTS:**

Facsimile Labeling is attached as indicated below:

Type C Medicated Feed Blue Bird Label with Carcass Leanness Claim (OPTAFLEXX,  
RUMENSIN and TYLAN Plus)

Type C Medicated Feed Blue Bird Label (LIQUID HEIFER SUPPLEMENT)

Type C Medicated Feed Blue Bird Label (HEIFER SUPPLEMENT)