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3,174,899

COMPOSITION FOR THE MANAGEMENT OF POST ANTIBIOTIC ENTERITIS

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This invention relates to and has for its object the provision of novel compositions (and methods for their preparation), useful for the treatment and/or prevention of infections involving post antibiotic enteritis, such as intestinal moniliasis, caused by species of *Candida*, usually *C. albicans*, or other diarrheas, such as those caused by *B. proteus* and *Enterococcus* species, etc. These compositions are made containing (1) an antibiotic, (2) a member selected from the group consisting of 1:7- and 4:7-phenanthroline-5:6-quinones (particularly 4:7-phenanthroline-5:6-quinones, especially 4:7-phenanthroline-5:6-quinone) and (3) 5-chloro-8-hydroxy-7-iodoquinoline. An equivalent intestinal antiseptic may be used in place of the 5-chloro-8-hydroxy-7-iodoquinoline and a spasmolytic agent, such as diethyl (2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate or an equivalent compound may be added.

One of the difficulties which is often encountered as a result of the prolonged administration of antibiotics is alteration of the intestinal flora and resultant secondary infection. This may also occur from administration of the antibiotic even when repeated use is not necessary. One of the common infections resulting from antibiotic administration is intestinal moniliasis. This condition, evidenced by the increased number of intestinal yeasts, is highly susceptible to treatment with the compositions of the invention, as are diarrheas caused by other microorganisms, which may act as secondary invaders, as indicated above.

The antibiotics used in the invention are those having antibacterial, not antifungal, effect and include, inter alia, penicillin in any of its therapeutically effective forms, such as penicillin, penicillin AT, penicillin BT, penicillin G, penicillin SP, penicillin S, penicillin V, phenethicillin, etc., the tetracyclines, such as tetracycline, chlortetracycline, oxytetracycline, desmethylchlortetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin, etc. Many of these antibiotics are utilized in acid-addition salt or ester form and the invention includes the use of these salts or esters. Most of these forms are described in "New and Nonofficial Drugs," Lippincott Co., Philadelphia, Pa., 1960, pages 70-142, which disclosure is incorporated herein by reference with respect to oral antibacterial antibiotics. The phenanthroline-5:6-quinones which may be used include those covered in U.S. Patent No. 2,706,197 or equivalent compounds.

In the compositions of the invention the proportions may vary and one may have, per 10-6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, the daily dosage of antibiotic plus 1-5 mg. 4:7-phenanthroline-5:6-quinone and, if desired, 1-2 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate. The daily dosages of the antibiotics are, of course, known. Thus, the penicillins may be administered daily as 1-1.5 million units;

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the tetracyclines as 1-1.5 grams; the erythromycins as 1-1.5 grams; the chloramphenicols as 1-1.5 grams; the neomycins as 1-1.5 grams; kanamycin as 3-4 grams; cycloserine as .25-.50 gram; bacitracin as 80,000-120,000 units; carbomycin as 1-2 grams; the oleandomycins as 1-2 grams; etc.

For making up the preparations of the invention there can be employed substances which do not react with the new compounds, such as gelatine, lactose, starches, stearic acid, magnesium stearate, stearyl alcohol, talc, vegetable oils, benzyl alcohols, gums, propylene glycol, polyalkylene glycols or any other known carrier for medicaments. The pharmaceutical preparations may be in the solid form, for example, as capsules, tablets or dragees, or in liquid form, for example, as suspensions or emulsions. If desired, they may contain auxiliary substances, such as preserving agents, stabilizing agents, wetting or emulsifying agents. They may also contain, in combination, other therapeutically useful substances. The dose level at which these compounds are used may vary considerably depending upon the condition of the patient, but the desirable dosage may be easily determined by the practicing physician.

The compositions of the invention may also be incorporated in feeds or administered in any other standard way for animal use. When incorporated in feeds, the feed compositions may contain the usual feed components, such as grains, protein supplements, mineral supplements, grain feed vitamin supplements, and other supplements in ratios and proportions known to be best adaptable to the particular bird or animal being fed. Examples of suitable feed constituents include barley, barley meal, buckwheat, corn, cornmeal, kafir, oats, oat groats, ground oats, rolled oats, rye, wheat, wheat bran, wheat shorts, wheat middlings, milk, bone meal, meat scrap, corn gluten meal, oil cake meal, soybean meal, fish meal, alfalfa, dehydrated alfalfa meal, clover, lawn clippings, cabbage, kale, cod liver oil, and similar nutrients, as well as mineral supplements, such as di-calcium phosphate, calcium carbonate, iodized salt, manganese sulfate and the like, vitamins, e.g., vitamin A, niacin, calcium, pantothenate, thiamine, riboflavin, vitamin B₁₂, ascorbic acid, vitamin D and the like, other essential supplements, e.g., butylated hydroxy-toluene, methionine and the like, as well as other growth stimulants, such as reserpine or derivatives thereof, e.g., esters or ethers of compounds having the basic reserpine structure.

For veterinary use, it may be preferable to prepare a composition of the invention, together with a suitable blender, e.g., wheat middlings or any other suitable blender. The medicated feed is prepared according to standard procedures by adding the premix in amounts to make up the desired concentration of the active compound in the final medicated feed. A premix contains from about 0.1 to about 20 percent, more especially from 0.5 to about 10 percent of the inventive composition, together with a suitable blender. The content of the pharmacologically active ingredients may depend on the type of treatment intended, e.g., short term or prolonged medication. With respect to the therapeutic composition, the feed materials obviously represent an inert pharmaceutical carrier.

An animal feed, containing the composition of Example

5, infra (Therapeutic Composition A), may be prepared as follows.

Premix: G.
Therapeutic Composition A ----- 800.000
Wheat standard middlings, 30-80 mesh - 10,200.00 5

Total weight ----- 11,000.000

Feed formula:

Corn meal ----- 1,062.875 10
Fat ----- 80.000
Fish meal, 60% protein ----- 100.000
Soybean meal, 50% protein ----- 500.000
Corn gluten meal ----- 100.000
Dehydrated alfalfa meal ----- 50.000 15
Corn distiller solubles ----- 40.000
Di-calcium phosphate ----- 28.000
Calcium carbonate ----- 20.000
Iodized salt ----- 10.000
Vitamins A and D (1,000,000 A and 250,000 D/pound) ----- 4.000 20
Calcium pantothenate ----- 0.250
Butylated hydroxy toluene ----- 0.250
Choline chloride, 25% ----- 2.500
Riboflavin conc. (24 g. per pound) ----- 0.125 25
Vitamin B₁₂ (0.02 g. per pound) ----- 1.000
Methionine ----- 0.500
Manganese sulfate ----- 0.500

Total weight ----- 2,000.000 30

The premix is made by adding Therapeutic Composition A to the wheat and then mixing until uniformity is obtained.

The feed formula is prepared as follows: A portion of the corn meal is introduced into the blending machine (about half of the amount to be added). The remaining corn meal, previously blended with the pre-heated, liquified fat, is added thereto and mixing is continued until uniformity is obtained. The manganese sulfate, di-calcium phosphate, calcium carbonate and iodized salt are then added with mixing, followed by the addition of the fish meal, soy bean meal, corn gluten meal and corn distiller solubles. After a uniform mixture has been obtained, vitamins A and D, calcium pantothenate, choline chloride, riboflavin, vitamin B₁₂ and methionine are added in that order. Mixing is continued after the addition of butylated hydroxy toluene, and maintained until a uniform product is obtained.

The premix is added to the feed formula prepared as described above.

Following are specific working examples, showing procedures which may be used for preparing the compositions of the invention. It is to be understood that these procedures are merely illustrative and are in no way intended to limit the invention. Throughout the specification and claims, where parts or proportions or percentages are designated, they are always parts, proportions or percentages by weight, unless otherwise specified. Sieve sizes are U.S. Standard sieve sizes.

Example 1

Core: 150 mg.—10/32"	150 mg.	10,000 Tablets
Dimethyl (2-hydroxyethyl) methylammonium bromide α -phenyl-cyclohexaneglycolate.	2.0 mg.-----	20.0 grams.
4:7-phenanthroline-5:6-quinone	20.0 mg.-----	200.0 grams.
5-chloro-8-hydroxy-7-iodoquinoline	30.0 mg.-----	300.0 grams.
Wheat Starch	19.5 mg.-----	195.0 grams.
Lactose	77.7 mg.-----	777.0 grams.
Magnesium Stearate	0.8 mg.-----	8.0 grams.
3A Alcohol	q.s.-----	q.s.
Purified Water	q.s.-----	q.s.

Procedure.—Pass (1) the dimethyl(2-hydroxyethyl) methylammonium bromide α -phenyl-cyclohexaneglycolate 75

and the 4:7-phenanthroline-5:6-quinone through a No. 30 sieve, then mix thoroughly until uniformity has been attained, with a mixture of (2) 5-chloro-8-hydroxy-7-iodoquinoline and lactose which has been passed through a No. 20 sieve. Suspend 45 gm. wheat starch in 50 ml. water, then add 150 ml. boiling water to the starch suspension, and add this suspension to the combined active ingredient mixtures (1) and (2) and granulate. Add 120 ml. of 50% aqueous 3A alcohol to the granulation and mix until uniformity is attained, then pass the resulting mixture through a No. 8 sieve and dry at 100° F. Pass the resulting dried mixture through a No. 14 sieve and add 150 gm. wheat starch and magnesium stearate. Mix well and compress into 150 mg. core units, using 10/32" standard concave punches on the Manesty Drycota machine.

Coating: 650 mg.—15/32"	650 mg.	10,000 Tablets
5-Chloro-8-hydroxy-7-iodoquinoline	170.0 mg.-----	1,700.0 grams.
Lactose	180.0 mg.-----	1,800.0 grams.
Wheat Starch	48.0 mg.-----	480.0 grams.
Magnesium Stearate	2.0 mg.-----	20.0 grams.
Chlortetracycline HCl, powder	250.0 mg.-----	2,500.0 grams.
3A Alcohol	q.s.-----	q.s.
Purified Water	q.s.-----	q.s.

Procedure.—Pass the 5-chloro-8-hydroxy-7-iodoquinoline, 200 gm. wheat starch, chlortetracycline and lactose through a No. 20 sieve and mix until uniformity is attained. Granulate said uniform mixture with 1 liter of 70% aqueous 3A alcohol solution, then pass it through a No. 8 sieve and dry at 100° F. Pass the dried mixture through a No. 16 sieve, then add the magnesium stearate and 280 gm. wheat starch and mix until uniformity is attained. Compress a 650 mg. coating on to the core material, prepared above, using the Manesty Drycota machine with 15/32" standard concave punches.

Example 2

Core: 150 mg.—10/32"	140 mg.	10,000 Tablets
Dimethyl (2-hydroxyethyl) methylammonium bromide α -phenyl-cyclohexaneglycolate.	2.0 mg.-----	20.0 grams.
4:7-Phenanthroline-5:6-quinone	10.0 mg.-----	100.0 grams.
5-Chloro-8-hydroxy-7-iodoquinoline	30.0 mg.-----	300.0 grams.
Wheat Starch	19.5 mg.-----	195.0 grams.
Lactose	77.7 mg.-----	777.0 grams.
Magnesium Stearate	0.8 mg.-----	8.0 grams.
3A Alcohol	q.s.-----	q.s.
Purified Water	q.s.-----	q.s.

Procedure.—Pass (1) the dimethyl(2-hydroxyethyl)-methylammonium bromide α -phenyl-cyclohexaneglycolate and the 4:7 phenanthroline-5:6-quinone through a No. 30 sieve, then mix thoroughly until uniformity has been attained, with a mixture of (2) 5-chloro-8-hydroxy-7-iodoquinoline and lactose which has been passed through a No. 20 sieve. Suspend 45 gm. wheat starch in 50 ml. water, then add 150 ml. boiling water to the starch suspension, then add this suspension to the combined active ingredient mixtures (1) and (2) and granulate. Add 120 ml. of 50% aqueous 3A alcohol to the granulation and mix until uniformity is attained, then pass the resulting mixture through a No. 8 sieve and dry at 100° F. Pass the resulting dried mixture through a No. 14 sieve and add 15 gm. wheat starch and magnesium stearate. Mix well and compress into 150 mg. core, using 10/32" standard concave punches on the Manesty Drycota machine.

Coating: 600 mg.—15/32"	600 mg.	10,000 Tablets
5-Chloro-8-hydroxy-7-iodoquinoline	120.0 mg.-----	1,200.0 grams.
Lactose	180.0 mg.-----	1,800.0 grams.
Wheat Starch	48.0 mg.-----	480.0 grams.
Magnesium Stearate	2.0 mg.-----	20.0 grams.
Chlortetracycline HCl, powder	250.0 mg.-----	2,500.0 grams.
3A Alcohol	q.s.-----	q.s.
Purified Water	q.s.-----	q.s.

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Procedure.—Pass the 5-chloro-8-hydroxy-7-iodoquinoline, 200 gm. wheat starch, chlortetracycline and lactose through a No. 20 sieve and mix until uniformity is attained. Granulate said uniform mixture with 1 liter of 70% aqueous 3A alcohol solution, then pass it through a No. 8 sieve and dry at 100° F. Pass the dried mixture through a No. 16 sieve, then add the magnesium stearate and 280 gm. wheat starch and mix until uniformity is attained. Compress a 600 mg. coating on to the core material prepared above, using the Manesty Drycota machine with 15/32" standard concave punches.

Example 3

Core: 150 mg.—1/32"	150 mg.	10,000 Tablets
4:7-Phenanthroline-5:6-quinone.....	20.0 mg.....	200.0 grams.
5-Chloro-8-hydroxy-7-iodoquinoline.....	30.0 mg.....	300.0 grams.
Wheat Starch.....	19.5 mg.....	195.0 grams.
Lactose.....	79.9 mg.....	799.0 grams.
Magnesium Stearate.....	0.6 mg.....	6.0 grams.
Wheat Starch.....	15.0 mg.....	150.0 grams.
3A Alcohol.....	q.s.....	q.s.
Purified Water.....	q.s.....	q.s.

Procedure.—Pass (1) the 4:7-phenanthroline-5:6-quinone through a No. 30 sieve, then pass (2) the 5-chloro-8-hydroxy-7-iodoquinoline and lactose through a No. 20 sieve and mix thoroughly until uniformity is attained. Suspend 45 gm. wheat starch in 50 ml. water, then add this suspension to the combined active ingredient mixtures (1) and (2) and granulate. Add 120 ml. of 50% aqueous 3A alcohol to the granulation and mix until uniformity is attained, then pass the resulting mixture through a No. 8 sieve, and dry at 100° F. Pass the resulting dried mixture through a No. 14 sieve and add 15 gm. wheat starch and magnesium stearate. Mix well and compress into 150 core, using 10/32" standard concave punches on the Manesty Drycota machine.

Coating: 650 mg.—15/32"	650 mg.	10,000 Tablets
5-Chloro-8-hydroxy-7-iodoquinoline.....	170.0 mg.....	1,700.0 grams.
Lactose.....	180.0 mg.....	1,800.0 grams.
Wheat Starch.....	48.0 mg.....	480.0 grams.
Magnesium Stearate.....	2.0 mg.....	20.0 grams.
Chlortetracycline HCl, powder.....	250.0 mg.....	2,500.0 rams.
3A Alcohol.....	q.s.....	q.s.
Purified Water.....	q.s.....	q.s.

Procedure.—Pass the 5-chloro-8-hydroxy-7-iodoquinoline, 200 gm. wheat starch, chlortetracycline and lactose through a No. 20 sieve and mix until uniformity is attained. Granulate said uniform mixture with 1 liter of 70% aqueous 3A alcohol solution, then pass it through a No. 8 sieve and dry at 100° F. Pass the dried mixture through a No. 16 sieve, then add the magnesium stearate and 280 gm. wheat starch and mix until uniformity is attained. Compress a 650 mg. coating on to the core material, using the Manesty Drycota with 15/32" standard concave punches.

Example 4

Core: 150 mg.—10/32"	150 mg.	10,000 Tablets
4:7-Phenanthroline-5:6-quinone.....	10.0 mg.....	100.0 grams.
5-Chloro-8-hydroxy-7-iodoquinoline.....	30.0 mg.....	300.0 grams.
Wheat Starch.....	19.5 mg.....	195.0 grams.
Lactose.....	77.2 mg.....	772.0 grams.
Magnesium Stearate.....	0.8 mg.....	8.0 grams.
3A Alcohol.....	q.s.....	q.s.
Purified Water.....	q.s.....	q.s.

Procedure.—Pass (1) the 4:7-phenanthroline through a No. 30 sieve, then mix thoroughly until uniformity has been attained, with a mixture of (2) 5-chloro-8-hydroxy-7-iodoquinoline and lactose which has been passed

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through a No. 20 sieve. Suspend 45 gm. wheat starch in 50 ml. water, then add 150 ml. boiling water to the starch suspension, then add this suspension to the combined active ingredient mixtures (1) and (2) and granulate. Add 120 ml. of 50% aqueous 3A alcohol to the granulation and mix until uniformity is attained, then pass the resulting mixture through a No. 8 sieve and dry at 100° F. Pass the resulting dried mixture through a No. 14 sieve and add 15 gm. wheat starch and magnesium stearate. Mix well and compress into 150 mg. core, using 10/32" standard concave punches on the Manesty Drycota machine.

Coating: 600 mg.—15/32"	600 mg.	10,000 Tablets
5-Chloro-8-hydroxy-7-iodoquinoline.....	120.0 mg.....	1,200.0 grams.
Lactose.....	200.0 mg.....	2,000.0 grams.
Wheat Starch.....	48.0 mg.....	480.0 grams.
Magnesium Stearate.....	2.0 mg.....	20.0 grams.
Chlortetracycline HCl, powder.....	250.0 mg.....	2,500.0 grams.
3A Alcohol.....	q.s.....	q.s.
Purified Water.....	q.s.....	q.s.

Procedure.—Pass the 5-chloro-8-hydroxy-7-iodoquinoline, 280 gm. wheat starch, chlortetracycline and lactose through a No. 20 sieve and mix until uniformity is attained. Granulate said uniform mixture within 1 liter of 70% aqueous 3A alcohol solution, then pass it through a No. 8 sieve and dry at 100° F. Pass the dried mixture through a No. 16 sieve, then add the magnesium stearate and 200 gm. wheat starch and mix until uniformity is attained. Compress a 600 mg. coating on to the core material, using the Manesty Drycota machine with 15/32" standard concave punches.

Example 5

	Grams
4:7-phenanthroline-5:6-quinone	200.0
5-chloro-8-hydroxy-7-iodoquinoline	2000.0
Dimethyl(2-hydroxyethyl)methylammonium bromide α-phenyl-cyclohexaneglycolate	20.0
Chlortetracycline HCl, powder	2500.0
Lactose	3280.0
Total	8000.0

Procedure.—Pass the ingredients through a No. 20 sieve and mix until uniformity is attained. The resulting mixture (Therapeutic Composition A) may be used as a powder for encapsulation or used as such for inclusion in animal feed compositions in the desired amount.

Example 6

	Grams
4:7-phenanthroline-5:6-quinone	200.0
5-chloro-8-hydroxy-7-iodoquinoline	2000.0
Neomycin	2500.0
Lactose	3300.0
Total	8000.0

Procedure.—Pass the ingredients through a No. 20 sieve and mix until uniformity is attained. The resulting mixture (Therapeutic Composition B) may be used as a powder for encapsulation or used as such for inclusion in animal feed compositions in the desired amount.

Example 7

	Grams
4:7-phenanthroline-5:6-quinone	200.0
5-chloro-8-hydroxy-7-iodoquinoline	2000.0
Erythromycin	2500.0
Wheat starch	675.0
Lactose	2600.0
Magnesium stearate	25.0
3A alcohol	q.s.
Purified water	q.s.

Procedure.—Pass (1) the 4:7-phenanthroline-5:6-quinone and 1000 grams lactose through a No. 30 sieve, then mix thoroughly until uniformity has been attained, with a mixture of (2) 5-chloro-8-hydroxy-7-iodoquinoline, erythromycin, 275 grams wheat starch and 1600 grams lactose which has been passed through a No. 20 sieve. Suspend 100 grams wheat starch in 100 ml. water, then add 300 ml. boiling water to the starch suspension, and add this suspension to the combined active ingredient mixtures (1) and (2) and granulate after adding 1 liter of 70% aqueous 3A alcohol solution. Add 100 ml. of 50% aqueous 3A alcohol to the granulation and mix until uniformity is attained, then pass the resulting mixture through a No. 8 sieve and dry at 100° F. Pass the resulting dried mixture through a No. 16 sieve, then add the magnesium stearate, the remaining wheat starch and mix until uniformity is attained. Compress into 850 mg. tablets using concave punches of the desired size on the Manesty Drycota machine. [By substituting 20 grams dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate for 20 grams lactose in preparing mixture (1) above, modified tablets may be made.]

In the examples given above, one may obviously substitute any equivalent antibiotic in equivalent amount for the antibiotic shown in the examples. The amounts of other active ingredients may also be varied within the limits given, supra, while using identical compounding procedures.

The invention also includes the administration of the materials of the invention, said method comprising administering to the host about 1–5 parts 4:7-phenanthroline-5:6-quinone per 10–6 parts 5-chloro-8-hydroxy-7-iodoquinoline (preferably 1 part 4:7-phenanthroline-5:6-quinone per 10 parts 5-chloro-8-hydroxy-7-iodoquinoline) and an effective amount of an antibiotic (e.g., a penicillin, a tetracycline, a kanamycin, a neomycin, etc.) in an inert pharmaceutical carrier.

This invention may be variously otherwise embodied within the scope of the appended claims.

What is claimed is:

1. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone and an effective amount of an antibiotic selected from the group consisting of a penicillin, a tetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline and an inert pharmaceutical carrier.

2. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone and about 1–1.5 million units of a penicillin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

3. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone and about 1–1.5 grams of a tetracycline per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

4. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone and about 1–1.5 grams of an erythromycin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

5. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone, about 1–2 mg. dimethyl (2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and an effective amount of an antibiotic selected from the group consisting of a penicillin, a tetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

6. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone, about 1–2 mg.

dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and about 1–1.5 million units of a penicillin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

7. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone, 1–2 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and about 1–1.5 grams of a tetracycline per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

8. A pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone, about 1–2 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and about 1–1.5 grams of an erythromycin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

9. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone and an effective amount of an antibiotic selected from the group consisting of a penicillin, a tetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

10. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone and about 1–1.5 million units of a penicillin per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

11. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone and about 1–1.5 grams of a tetracycline per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

12. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone and about 1–1.5 grams of an erythromycin per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

13. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone, 1–2 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and an effective amount of an antibiotic selected from the group consisting of a penicillin, a tetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

14. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone, 1 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and about 1–1.5 million units of a penicillin per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

15. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone, 1 mg. dimethyl (2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and about 1–1.5 grams of a tetracycline per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

16. A pharmaceutical composition comprising about 1 mg. 4:7-phenanthroline-5:6-quinone and 1 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and about 1–1.5 grams of an erythromycin per 10 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

17. A process which comprises orally administering to a host, for combatting infections involving post antibiotic enteritis, a pharmaceutical composition comprising about 1–5 mg. 4:7-phenanthroline-5:6-quinone and an effective amount of an antibiotic selected from the group consisting of a penicillin, a tetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin per 10–6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

18. A process which comprises orally administering to a host, for combatting infections involving post antibiotic enteritis, a pharmaceutical composition comprising about 1-5 mg. 4:7-phenanthroline-5:6-quinone, about 1-2 mg. dimethyl(2-hydroxyethyl)methylammonium bromide α -phenyl-cyclohexaneglycolate and an effective amount of an antibiotic selected from the group consisting of a penicillin, a tetracycline, bacitracin, carbomycin, cycloserine, erythromycin, chloramphenicol, kanamycin, neomycin, oleandomycin, spiramycin per 10-6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

19. A process which comprises orally administering to a host, for combatting infections involving post antibiotic enteritis, a pharmaceutical composition comprising about 1-5 mg. 4:7-phenanthroline-5:6-quinone and about 1-1.5 grams of a tetracycline per 10-6 mg. 5-chloro-8-hydroxy-7-iodoquinoline, and an inert pharmaceutical carrier.

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