CLAIMS:

1. A method for inhibiting an ethylene response in an agricultural product comprising:
   providing dilute hydrogen peroxide (DHP) gas at a final concentration of up to 10.0 parts per million (ppm) to an enclosed environment containing said agricultural product; and
   maintaining said concentration of DHP gas in said enclosed environment for a period of time wherein said inhibited ethylene response is selected from the group consisting of ripening, senescence, abscission, growth inhibition, growth stimulation, branching, tillering, seed development, flower development, seed germination, and breaking of seed dormancy.
2. The method of claim 1, wherein said inhibited ethylene response is selected from the group consisting of ripening, senescence, and abscission.
3. The method of claims 1 or 2, wherein said agricultural product is selected from the group consisting of roots, tubers, rhizomes, bulbs, corms, stems, branches, leaf stems, bracts, leaf sheaths, leaves, needles, blooms, buds, flowers, petals, fruits, seeds, and edible fungi.
4. The method of any one of claims 1 to 3, wherein said agricultural product is selected from the group consisting of achoccha, amaranth, angelica, anise, apple, arrowroot, arrugula, globe artichoke, Jerusalem artichoke, asparagus, atemoya, avocado, balsam apple, balsam pear, bambara groundnut, bamboo, banana, plantains, barbados cherry, beans, beet, blackberry, blueberry, bok choy, boniato, broccoli, Chinese broccoli, raab broccoli, Brussels sprouts, bunch grape, burdock, cabbage, cabbage, sea-kale, swamp cabbage, calabaza, cantaloupes, muskmelons, capers, carambola (star fruit), cardoon, carrot, cassava, cauliflower, celeriac, celery, celtuce, chard, chaya, chayote, chicory, Chinese jujube, chives, chrysanthemum, chufa, cilantro, citron, coconut palm, collards, comfrey, corn salad, corn, cuban sweet potato, cucumber, cushcush, daikon, dandelion, dasheen, dill, eggplant, endive, eugenia, fennel, fig, galia muskmelon, garbanzo, garlic, gherkin, ginger, ginseng, gourds, grape, guar, guava, hanover salad, horseradish, huckleberry, ice plant, jaboticaba, jackfruit, jicama, jojoba, kale, kangkong, kohlrabi, leek, lentils, lettuce, longan, loquat, lovage, luffa gourd, lychee, macadamia, malanga,

mamey sapote, mango, martynia, melon, casaba, melon, honeydew, momordica, muscadine grape, mushroom, muskmelons, mustard, mustard collard, naranjillo, nasturtium, nectarine, okra, onion, orach, oranges, papaya, paprika, parsley, parsley root, parsnip, passion fruit, peach, plum, peas, peanuts, pear, pecan, pepper, persimmon, pimiento, pineapple, pitaya, pokeweed, pomegranate, potato, sweet potato, pumpkin, purslane, radicchio, radish, rakkyo, rampion, raspberry, rhubarb, romaine lettuce, roselle, rutabaga, saffron, salsify, sapodilla, sarsaparilla, sassafrass, scorzonera, sea kale, seagrape, shallot, skirret, smallage, sorrel, soybeans, spinach, spondias, squash, strawberries, sugar apple, swamp cabbage, sweet basil, sweet corn, sweet potato, swiss chard, tomatillo, tomato, tree tomato, truffles, turnip, upland cress, water celery, waterchestnut, watercress, watermelon, yams, and zucchini.

5. The method of claim 1, wherein said enclosed environment is selected from the group consisting of a storage container, a shipping container, a vehicle, a distribution center, a storage facility, a wholesale center, a controlled environment agriculture (CEA) facility, a greenhouse, a cold frame, a hoop house a retail store, a kitchen, a restaurant, a flower shop, a barn, a food processing area, a market storage area, and a market display area. (5)

6. A method for inhibiting the ripening process of an agricultural product during shipping comprising:

    providing an enclosure for shipping an agricultural product;

    placing an agricultural product in said enclosure;

    providing dilute hydrogen peroxide (DHP) gas at a concentration of up to 10 parts per million (ppm) to said enclosure; and

    maintaining said DHP gas concentration during said shipping to inhibit the ripening process of said agricultural produce.

7. The method of claim 6, wherein said enclosure for shipping is selected from the group consisting of a storage container, a shipping container, a vehicle, a distribution center, a storage facility, a wholesale center, a controlled environment agriculture (CEA) facility, a retail store, a market storage area, and a market display area.

8. A Generally Recognized as Safe (GRAS) method for controlling an infestation of a pathogen on a fruit or vegetable comprising:

providing dilute hydrogen peroxide (DHP) gas at a final concentration of up to 10 parts per million (ppm) to an enclosed environment containing said infested plant or plant product; and

maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) in said enclosed environment for a time period sufficient to control said pathogen

wherein said pathogen is a virus, a viroid, a virus-like organism, a bacterium, a phytoplasma, a protozoa, an algae, a nematode, or an oomycete and said DHP gas comprises 0.015 parts per million (ppm) of ozone or less.

9. A Generally Recognized as Safe (GRAS) method for preventing the growth of mold on a fruit or vegetable comprising: placing said fruit or vegetable in a dilute hydrogen peroxide (DHP) gas containing environment having a DHP gas concentration of up to 10 parts per million (ppm), wherein said mold is selected from the group consisting of *Penicillium*, *Phytophthora*, *Alternaria*, *Botrytis*, *Fusarium*, *Cladosporium*, *Phoma*, *Trichoderma*, *Aspergillus*, *Alternaria*, *Rhizopus*, *Aureobasidium*, and *Colletotrichum*.

10. The GRAS method of claim 9, wherein said vegetable is selected from the group consisting of roots, tubers, bulbs, corms, stems, leaf stems, leaf sheaths, leaves, buds, flowers, fruits, seeds, and edible fungi.

11. A method for controlling a pathogen in an agricultural product during shipping comprising:

providing dilute hydrogen peroxide (DHP) gas at a concentration of at least 0.05 parts per million (ppm) to a shipping container containing said agricultural product to prepare a DHP gas containing shipping container;

shipping said DHP gas containing shipping container; and

maintaining said DHP gas concentration during said shipping, wherein said controlled pathogen is a virus, a bacterium, an oomycete, or a mold.

12. A method for protecting a fruit or vegetable from a pathogen, the method comprising:

providing dilute hydrogen peroxide (DHP) gas at a final concentration of at least 0.05 parts per million (ppm) to an enclosed environment, and

maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) in said enclosed environment, wherein said pathogen is a virus, a bacterium, an oomycete, a fungus, or a mold.

13. The method of claim 12, wherein said enclosed environment is suitable for growing a fruit or vegetable that is a greenhouse, a hydroponic environment, or an aeroponic environment.

14. The method of claim 12, wherein said protecting comprises:

preventing or inhibiting contamination of said fruit or vegetable growing in said enclosed environment by a virus or bacterium;

preventing or inhibiting damage and losses due to parasitic fungi on said fruit or vegetable growing in said enclosed environment;

preventing or inhibiting damage and losses due to parasitic fungi on the nutrient bed in which said fruit or vegetable grows in said enclosed environment

15. The method of claim 12, wherein said protecting comprises:

preventing or inhibiting contamination of said fruit or vegetable by a virus or bacterium by providing and maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) for a time period prior to introducing plants that produce said fruit or vegetable to said enclosed environment for growing;

preventing or inhibiting damage and losses due to parasitic fungi on said fruit or vegetable by providing and maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) for a time period prior to introducing said agricultural product to said enclosed environment for growing; or

preventing or inhibiting damage and losses due to parasitic fungi on the nutrient bed in which said plants that produce said fruit or vegetable by providing and maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) for a time period prior to introducing plants that produce said fruit or vegetable to said enclosed environment for growing.

16. A method of replacing pesticides and other chemicals used for the control of pathogens and pests of agricultural products during production and storage comprising:

providing dilute hydrogen peroxide (DHP) gas at a final concentration of at least 0.05 parts per million (ppm) to an enclosed environment containing said agricultural product; and maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) in said enclosed environment containing said agricultural product for a time period, wherein said pathogens are selected from the group consisting of a virus, a bacterium, an oomycete, a fungus, and a mold.

17. An organic method for crop production comprising

providing dilute hydrogen peroxide (DHP) gas at a final concentration of at least 0.05 parts per million (ppm) to an enclosed environment containing a growing agricultural product; and maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) in said enclosed environment containing said agricultural product for a time period during crop production.

18. An enclosed environment comprising dilute hydrogen peroxide (DHP) gas at a final concentration of up to 10 parts per million (ppm) for use to inhibit an ethylene response selected from the group consisting of a controlled environment agriculture (CEA) facility, a greenhouse, a storage container, a shipping container, a retail store, a distribution center, a wholesale center, a kitchen, a restaurant, a flower shop, a barn, a vehicle, food processing area, a storage facility, a market storage area, and a market display area.

19. A method from preventing premature aging of a flower during storage comprising:

providing dilute hydrogen peroxide (DHP) gas at a final concentration of up to 10 parts per million (ppm) to an enclosed environment containing said flower; and

maintaining said DHP gas at a final concentration of up to 10 parts per million (ppm) in said enclosed environment containing said flower for a time period, wherein said preventing premature aging comprises reducing the abscission of flowers, reducing abscission of foliage, and delaying wilting.

20. A method for controlling an invasive species on or in an agricultural product comprising: providing dilute hydrogen peroxide (DHP) gas at a final concentration of up to 10 parts per million (ppm) to an enclosed environment containing said agricultural product; and maintaining said DHP gas at a final concentration of at least 0.05 parts per million (ppm) in said enclosed environment for a time period sufficient to control said invasive species.

21. The method of any one of claims 1, 6, and 17, further comprising controlling a pathogen selected from the group consisting of a virus, a viroid, a virus-like organism, a bacterium, a phytoplasma, a protozoa, an algae, a nematode, a parasite, an insect, an arachnid, an oomycete, a fungus, and a mold.