CLAIMS

1. An effervescent composition in a powder or a tablet, formulated for dissolving into a nutritional product suitable for administration to an individual having dysphagia, the effervescent composition comprising an acid compound, an alkaline compound, a thickening agent, and a trigeminal ingredient, wherein the trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickening agent comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage.

2. The effervescent composition according to Claim 1, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

3. The effervescent composition according to Claim 1 or 2, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate.

4. The effervescent composition according to any of Claims 1 to 3 further comprising at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

5. The effervescent composition according to any of Claims 1 to 8, wherein the effervescent composition is in a tablet.

6. The effervescent composition according to any of Claims 1 to 5, wherein the nutritional product is in an administrable form selected from the group consisting of a pharmaceutical formulation, a nutritional formulation, a medical food, a dietary supplement, a functional food and beverage product, and a ready-to-drink (RTD) beverage.

7. The effervescent composition according to Claim 1, wherein the nutritional product is carbonated.

8. The effervescent composition according to Claim 1, wherein the nutritional product is a ready-to-drink (RTD) beverage.

9. A nutritional product made by dissolving the effervescent composition of Claim 1 in a diluent.

10. A ready-to-drink (RTD) beverage made by dissolving the effervescent composition of Claim 1 in a diluent.

11. An effervescent composition in a powder or a tablet, for use in a method of preventing, alleviating, and/or compensating swallowing dysfunction in a patient in need thereof, the effervescent composition comprising an acid compound, an alkaline compound, a thickening agent, and a trigeminal ingredient, wherein the trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickening agent comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage, and the method comprising:

providing the effervescent composition;

dissolving the effervescent composition in a liquid to provide a nutritional product; and

orally administering the nutritional product to the patient.

12. The method according to Claim 11, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

13. The method according to Claim 11, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate.

14. The method according to Claim 11, wherein the thickening agent is present in an amount that provides to the nutritional product, a relaxation time, determined by a Capillary Breakup Extensional Rheometry (CaBER) experiment, of more than 10 ms at 20° C and/or a shear viscosity up to about 2,000 mPas measured at a shear rate of 50 s^{-1} at 20° C.

15. The method according to Claim 11, wherein the nutritional product further comprises at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

16. The effervescent composition for use in the method according to Claim 11 further comprising:

identifying a level of severity of the swallowing disorder in the patient; and

selecting, based on the level of severity of the swallowing disorder in the patient, an amount of the effervescent composition for dissolving in the liquid, wherein the amount of the effervescent composition is selected from a plurality of predetermined amounts that each corresponds to a different level of swallowing disorder severity.

17. The method according to Claim 16, wherein the amount of the effervescent composition is an effective amount for administration of the nutritional product to the patient to achieve at least one of (i) supplemental nutrition, (ii) hydration or (iii) replacement of one or more full meals.

18. The effervescent composition for use in the method according to Claim 11, wherein an amount of the effervescent composition provides, after dissolving in the liquid, an appropriate number, density, and/or size of CO2 bubbles that in turn, when in contact with salivary carbonic anhydrase, yields a concentration of carbonic acid effective to provide a trigeminal stimulation, which in turn improves swallowing safety.

19. An effervescent composition in a powder or a tablet, for use in a method of promoting swallowing safety and/or efficiency in a patient suffering from dysphagia, the effervescent composition comprising an acid compound, an alkaline compound, a thickening

agent, and a trigeminal ingredient, wherein the trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickening agent comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage, and the method comprising:

providing the effervescent composition;

dissolving the effervescent composition in a liquid to provide a nutritional product; and orally administering the nutritional product to the patient.

20. The method according to Claim 19, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

21. The method according to Claim 19, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate.

22. The method according to Claim 19, wherein the nutritional product further comprises at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

23. The method according to Claim 19, wherein the thickening agent is present in an amount that provides to the nutritional product a relaxation time, determined by a Capillary Breakup Extensional Rheometry (CaBER) experiment, of more than 10 ms at 20° C and/or a shear viscosity up to about 2,000 mPas measured at a shear rate of 50 s^{-1} at 20° C.

24. An effervescent composition in a powder or a tablet, for use in a method of mitigating a risk of aspiration during swallowing of a nutritional product in a patient suffering from dysphagia, the effervescent composition comprising an acid compound, an alkaline compound, a thickening agent, and a trigeminal ingredient, wherein the trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickening agent comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage, and the method comprising:

providing the effervescent composition;

dissolving the effervescent composition in a liquid to provide a nutritional product; and

orally administering the nutritional product to the patient.

25. The method according to Claim 24, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

26. The method according to Claim 24, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate.

27. The method according to Claim 24, wherein the nutritional product comprises at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

28. The method according to Claim 24, wherein the thickening agent is present in an amount that provides to the nutritional product a relaxation time, determined by a Capillary

Breakup Extensional Rheometry (CaBER) experiment, of more than 10 ms at 20° C and a shear viscosity up to about 2,000 mPas measured at a shear rate of 50 s^{-1} at 20° C.

29. A method of making a nutritional product, the method comprising:

providing an effervescent composition in a powder or a tablet comprising an acid compound, an alkaline compound, a thickening agent and a trigeminal ingredient, whe trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickenin comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage;

dissolving the effervescent composition in a liquid to provide the nutritional product, wherein the thickening agent provides to the nutritional product a relaxation time, determined by a Capillary Breakup Extensional Rheometry (CaBER) experiment, of more than 10 ms at 20° C and/or a shear viscosity up to about 2,000 mPas measured at a shear rate of 50 s^{-1} at 20° C, and the nutritional product is suitable for administration to an individual having dysphagia.

30. The method according to Claim 29, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

31. The method according to Claim 29, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate

32. The method according to Claim 29, wherein the nutritional product comprises at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

33. Use of an effervescent composition in a powder or a tablet, and a liquid in preparation of an orally administrable nutritional product, the liquid is suitable for consumption by an individual without dysphagia, the orally administrable nutritional product is suitable for administration to an individual having dysphagia, the effervescent composition comprising an acid compound, an alkaline compound, a thickening agent and a trigeminal ingredient, wherein the trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickening agent comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage.

34. The use according to Claim 33, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

35. The use according to Claim 33, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate.

36. The use according to Claim 33, wherein the nutritional product comprises at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

37. A system for production of a homogenous single phase beverage for administration to an individual having dysphagia, the system comprising:

a container containing an effervescent composition in a powder or a tablet, formulated for dilution into the homogenous single phase beverage, the effervescent composition comprising an acid compound, an alkaline compound, a thickening agent and a trigeminal ingredient, wherein the trigeminal ingredient comprises cinnamaldehyde with zinc, and wherein the thickening agent comprises at least one of okra gum, beta-glucan, cactus mucilage, kiwi mucilage, psyllium mucilage, mallow mucilage, flax seed mucilage, marshmallow mucilage, ribwort mucilage, mullein mucilage, or cetraria mucilage; and

a metering device connected to the container and configured to dispense a predetermined amount of the effervescent composition.

38. The system according to Claim 37, wherein the acid compound comprises at least one of citric acid, ascorbic acid, nicotinic acid, acetylsalicylic acid, succinic acid, adipic acid, tartaric acid, fumaric acid, adipic acid, malic acid, anhydrides, or salts thereof.

39. The system according to Claim 37, wherein the alkaline compound comprises at least one of potassium carbonate, sodium carbonate, sodium bicarbonate, potassium bicarbonate, sodium glycine carbonate, calcium carbonate, arginine carbonate, potassium bitartrate, or sodium tartrate.

40. The system according to Claim 37, wherein the nutritional product comprises at least one of a protein, a fat, a fiber, a carbohydrate, a prebiotic, a probiotic, an amino acid, a fatty acid, a phytonutrient, an antioxidant, an electrolyte, or a vitamin.

41. The system according to Claim 37 further comprising a nozzle configured to dispense the homogenous single phase beverage.