What is claimed is:

[Claim 1] A process to remove impurities comprising phytosterols, sterol glucosides and/or acylated sterol glucosides from triacylglycerol oil, comprising the steps of:

mixing the oil and a fluidic agent to form a fluidic mixture having an oil phase and a water phase, wherein the fluidic agent is water comprising 0.1-10% v/v of the fluidic mixture;

pumping the fluidic mixture through a single- or multi-stage, flow-through hydrodynamic cavitation apparatus;

creating hydrodynamic cavitation in the fluidic mixture by pumping the fluidic mixture at a pre-determined inlet pump pressure;

maintaining the hydrodynamic cavitation in the fluidic mixture for a pre-determined period of time ;

moving the impurities comprising phytosterols, sterol glucosides and/or acylated sterol glucosides from the oil phase to the water phase; and

separating the water phase from the oil phase.

[Claim 2] The process of claim 1, wherein the oil includes oil, fat, tallow or grease derived from a wild type, mutated or genetically altered unicellular or multicellular algae, plant, animal or mixture thereof.

[Claim 14] The process of claim 1, further comprising the step of immobilizing reagents, oxides, nitrides, ceramics, plastics, polytetrafluoroethylene, nanodiamonds, nanotubes, or combinations thereof onto inner walls of the hydrodynamic cavitation apparatus or onto a removable insert configured for insertion into the hydrodynamic cavitation apparatus.

[Claim 15] The process of claim 1, further comprising the step of placing a selective membrane and/or bleaching earth in an end chamber of the hydrodynamic cavitation apparatus or in a chamber located downstream of the hydrodynamic cavitation apparatus.

[Claim 16] The process of claim 1, wherein the oil is degassed prior to performing the pumping, creating and/or maintaining steps.

[Claim 17] The process of claim 1, further comprising the step of subjecting the fluidic mixture to acoustic cavitation.

[Claim 18] The process of claim 1, further comprising the step of subjecting the fluidic mixture to an external electric and/or magnetic field to enhance hydrodynamic cavitation-assisted purification.

~~[Claim 19] The process of claim 1, wherein the impurities comprise phytosterols, sterol glucosides and/or acylated sterol glucosides.~~

~~[Claim 20] The process of claim 19, wherein the fluidic agent is water comprising 0.1-10% v/v of the fluidic mixture.~~

[Claim ~~21~~ 19] The process of claim ~~20~~1, wherein the water is distilled, de-ionized, reverse osmosis-purified, soft water or conditioned water.

[Claim ~~22~~ 20] The process of claim ~~19~~1, wherein the fluidic agent is a solution of an alkali hydroxide comprising sodium hydroxide or potassium hydroxide, an inorganic base, an organic base or a mixture thereof.

[Claim ~~23~~ 21] The process of claim ~~19~~1, wherein the fluidic agent is a solution of phosphoric acid, citric acid, acetic acid or a mixture thereof.

[Claim ~~24~~ 22] The process of claim ~~19~~1, wherein the separating step, as it relates to phytosterol impurities, is carried out contemporaneously with the maintaining step.

[Claim ~~25~~ 23] The process of claim ~~19~~1, wherein the separating step, as it relates to sterol glucosides, acylated sterol glucosides and/or derivative-enriched concentrates of the same, further comprises the steps of:

liquefying the separated sterol glucosides, acylated sterol glucosides and/or derivative-enriched concentrates thereof by preheating and/or treating the same with solvents and/or liquefying agents;

adding enzymes or chemical agents to the liquefied sterol glucosides, acylated sterol glucosides and/or derivative-enriched concentrates thereof; subjecting the liquefied sterol glucosides, acylated sterol glucosides and/or derivative-enriched concentrates thereof combined with enzymes or chemical agents to flow-through hydrodynamic cavitation; and releasing entrapped oil in the liquefied sterol glucosides, acylated sterol glucosides and/or derivative-enriched concentrates thereof.

[Claim ~~26~~ 24] ~~The process of claim 1, wherein the impurities comprise phosphatides and the fluidic agent comprises water and an enzyme.~~ A process to remove impurities comprising phosphatides from triacylglycerol oil, comprising the steps of: mixing the oil and a fluidic agent comprising water to form a fluidic mixture having an oil phase and a water phase;

pumping the fluidic mixture through a single- or multi-stage, flow-through hydrodynamic cavitation apparatus;

creating hydrodynamic cavitation in the fluidic mixture by pumping the fluidic mixture at a pre-determined inlet pump pressure;

maintaining the hydrodynamic cavitation in the fluidic mixture for a pre-determined period of time;

adding an enzyme comprising a phospholipase, a lipid acyltransferase or a mixture thereof to the fluidic mixture following the hydrodynamic cavitation;

reacting the phosphatides with the enzyme;

agitating the fluidic mixture for a pre-determined period of time so as to allow for completion of the reaction between the phosphatides and the enzyme;

moving the impurities comprising phosphatides from the oil phase to the water phase; and separating the water phase from the oil phase, including removing the reacted phosphatides.

[Claim ~~27~~ 25] The process of claim 24~~26~~, wherein the fluidic mixture is heated or cooled to a temperature in the range of 40-60 °C for optimal enzyme activity.

~~[Claim 28] The process of claim 26, wherein the enzyme comprises a phospholipase, a lipid acyltransferase or a mixture thereof.~~

[Claim ~~29~~26] The process of claim ~~28~~24, wherein the phospholipase is a wild type, mutated or recombinant bacterial, yeast, plant or animal phospholipase A, phospholipase A1, phospholipase A2, phospholipase B, lysophospholipase,

phospholipase C, phospholipase D, phosphodiesterase, lipid acyltransferase, phosphodiesterase or mixture thereof.

[Claim ~~30~~ 27] The process of claim 26~~29~~, wherein the enzyme is kosher.

~~[Claim 31] The process of claim 30, wherein the oil is mixed with water and the mixture is subjected to hydrodynamic cavitation followed by the addition of the phospolipase, lipid acyltransferase or mixture thereof.~~

~~[Claim 32] The process of claim 26, further comprising the steps of: reacting the phosphatides in the fluidic mixture with the enzyme; agitating the fluidic mixture for a pre-determined period of time to allow completion of the phosphatide reaction; and stopping the phosphatide reaction.~~

[Claim ~~33~~ 28] The process of claim ~~32~~24, wherein further comprising the step of stopping the phosphatide reaction ~~is stopped~~ by heating; changing the pH; applying an inhibitor, protease or chelating agent that forms a complex with the enzyme's co-factor; carrying out high-shear mixing; ultrasonic cavitation; and/or subjecting to hydrodynamic cavitation.

~~[Claim 34] The process of claim 32, wherein the separating step comprises the step of removing the reacted phosphatides.~~

[Claim ~~35~~ 29] The process of claim ~~34~~24, wherein the reacted phosphatides are removed by absorption, centrifugation, decantation, extraction, filtration, freezing, membrane filtration, or sedimentation.

[Claim ~~36~~ 30] The process of claim ~~34~~24, wherein the separating step, as it relates to the removed phosphatides, further comprises the steps of:

liquefying the removed phosphatides by preheating the removed phosphatides, and/or adding solvents and liquefying agents to the removed phosphatides;

subjecting the liquefied phosphatides to flow-through hydrodynamic cavitation; and

releasing entrapped neutral oils and liberating diacylglycerols and fatty acids in the liquefied phosphatides.

[Claim ~~37~~ 31] The process of claim ~~34~~24, wherein the separating step, as it relates to the removed phosphatides, further comprises the steps of:

liquefying the removed phosphatides by preheating the removed phosphatides, and/or adding solvents and liquefying agents to the removed phosphatides;

adding releasing agents and/or lipid acyltransferase, lipase, phospholipase or a mixture thereof to the liquefied phosphatides; and

releasing entrapped oils in the liquefied phosphatides.

[Claim ~~38~~ 32] The process of claim 24~~26~~, further comprising the step of immobilizing the enzyme onto a removable cartridge, grid, filter, insert, inner surface, magnet, magnetic particles, metal particles, plastic particles, nanoparticles, nanotubes, nanodiamonds, carbonaceous nanoparticles, particles and/or carriers placed at desired locations within the hydrodynamic cavitation apparatus.