CLAIMS

1. Asphalt mixture composition comprising ~~a~~, at least one, binder, aggregate and additive, characterized by said, at least one, additive being digestate, wherein digestate additive replaces the binder up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% by weight of the asphalt mixture composition and wherein the softening point of a binder modified with polymer and digestate additive is between about 1 ºC and about 10 ºC higher than that of the binder modified only with a polymer, and wherein the digestate is obtained by a method of providing a bioliquid from municipal solid waste (MSW) comprising:

    a) subjecting waste to a combined enzymatic and microbial treatment in a bioreactor, wherein the microbial treatment comprises lactic acid producing bacteria;

    b) subjecting the treated waste from step a) to one or more separation step(s), whereby a bioliquid fraction is provided; and

    c) subjecting said bioliquid fraction to anaerobic digestion (AD).~~.~~

~~2. Asphalt mixture composition according to claim 1 wherein digestate additive is obtained from an anaerobic digestion process, preferably Renescience digestate additive, sewage sludge digestate additive and/or food waste digestate additive.~~

~~3. Asphalt mixture composition according to claims 1-2 wherein said additive is Renescience digestate or a derived fraction thereof.~~

~~4. Asphalt mixture composition according to claims 1-3 wherein said additive is Renescience digestate additive, comprising both solids and liquids, low water content, non-degradable organics by anaerobic digestion, suspended solids and dissolved matter such as dissociated salts, has alkaline pH and is obtained~~

~~by Renescience® technology, mixing waste comprising organic matter, such as ordinary unsorted and/or sorted/partially sorted household waste, with water, enzymes and optionally microorganisms in order to liquefy and/or saccharify organic waste such as food waste, cardboard, paper, labels and similar, and turn it into a bioliquid that can be used for production of biogas via an anaerobic digestion process.~~

~~5.~~2. Asphalt mixture composition according to the previous claims wherein the binder is a bituminous binder, preferably petroleum bitumen, paving grade bitumen, hard paving grade bitumen, cutback bitumen, bitumen emulsion, modified bitumen and/or a bitumen mixture.

~~6. Asphalt mixture composition according to the previous claims, wherein digestate additive replaces the binder up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% by weight of the asphalt mixture composition~~

~~7.~~3. Asphalt mixture composition according to the previous claims, wherein the binder is modified with at least one polymer, preferably polymer modified bitumen (PmB), and replaced up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% by weight of said asphalt composition comprising said binder modified with a, at least one, polymer.

~~8. Asphalt mixture composition according to claim 6, wherein the softening point of a binder modified with polymer and digestate additive is between about 1 ºC and about 10 ºC higher than that of the binder modified only with a polymer.~~

~~9.~~4. Asphalt mixture composition according to the previous claims, such that when the binder comprises up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% of digestate additive by

weight of said asphalt mixture composition, said binder shows change in penetration of -80% to +80% relative to a comparable asphalt mixture composition where the binder comprises 0% of digestate additive by weight.

~~10.~~5. Asphalt mixture composition according to the previous claims, such that when the binder comprises up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% of digestate additive by weight of said asphalt mixture composition, said binder shows a change in softening point of between -30% to 40% relative to a comparable asphalt mixture composition where the binder comprises 0% of digestate additive by weight.

~~11.~~6. Asphalt mixture composition according to the previous claims, said asphalt mixture composition comprising up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% of digestate additive by weight of said asphalt mixture composition and showing a change in stiffness modulus between 5% and 400% relative to a comparable asphalt mixture composition where the binder comprises 0% of digestate additive by weight.

~~12.~~7. Asphalt mixture composition according to the previous claims, wherein said composition comprises up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% of digestate additive by weight of said asphalt mixture composition and shows a rut depth up to 70% lower relative to a comparable asphalt mixture composition where the binder comprises 0% of digestate additive by weight.

~~13.~~8. Asphalt mixture composition according to the previous claims wherein Renescience digestate ash is a filler.

~~14.~~9. Method to manufacture an asphalt mixture composition comprising digestate additive, comprising the following steps:

a) Providing the digestate additive, wherein the digestate is obtained by a method of providing a bioliquid from municipal solid waste (MSW) comprising:

a) subjecting waste to a combined enzymatic and microbial treatment in a bioreactor, wherein the microbial treatment comprises lactic acid producing bacteria;

b) subjecting the treated waste from step a) to one or more separation step(s), whereby a bioliquid fraction is provided; and

c) subjecting said bioliquid fraction to anaerobic digestion (AD);

b) Providing the aggregate(s);

c) Providing the binder(s);

d) Mixing the aggregate(s) and binder(s) with digestate additive to obtain an asphalt mixture composition,

characterized in, at least, one or more of:

~~(i) the digestate additive, preferably Renescience digestate additive, food waste digestate additive and/or sewage sludge additive, is obtained by anaerobic digestion; and in that~~

(i) aggregates comprise less than 5%, less than 10%, less than 15% or less than 20% (w/w) moisture content;

(ii) binder is heated to its reference compaction temperature (±25°C), between 1 to 12 hours, preferably between 4 to 8 hours and stirred;

(iii) digestate additive achieves the desired concentration, up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% of digestate additive by weight of said asphalt mixture composition;

(iv) mixing is performed until the aggregate(s) is/are entirely coated with said binder(s).

~~15.~~10. Asphalt mixture composition characterized by being obtained directly from the method as claimed in claim 9~~14~~.

~~16.~~11. Use of digestate additive characterized by said digestate additive replacing up to about 0.5%, 1%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65% or 70% by weight of said asphalt mixture composition and being used in the manufacturing of asphalt mixture compositions for building roads, pavements and paved areas, roofing, vehicle parking areas, house-drives, footways, recreation areas preferably tennis courts or playgrounds, agricultural uses preferably farm roads or animal cubicles, airfields, runways and access roads, hard standings, storage areas, hydraulic applications preferably dam construction, coastal protection or other.

~~17.~~12. Use of asphalt mixture composition as claimed in claims 1-8~~13~~ and/or obtained according to claim 9~~14~~ for building roads, pavements and paved areas, roofing, vehicle parking areas, house-drives, footways, recreation areas preferably tennis courts or playgrounds, agricultural uses preferably farm roads or animal cubicles, airfields, runways and access roads, hard standings, storage areas, hydraulic applications preferably dam construction, coastal protection or other.