CLAIMS

1. A method for reducing unwanted gas formation inside a storage tank containing biological feedstock for renewable hydrocarbon production, wherein at least one microorganism produces unwanted gas in presence of an aqueous phase formed so that water is separated from the biological feedstock and accumulated into a lower part of the storage tank, **characterized** in that amount of the aqueous phase contained by the storage tank is reduced (401, 402, 403, 404) by at least partial removal of the aqueous phase from the lower part of the storage tank so that a relative portion of the aqueous phase with respect to all material in the storage tank gets reduced.

2. A method according to claim 1, wherein the reducing the aqueous phase contained by the storage tank comprises:

- transferring (401) a portion comprising at least part of the aqueous phase, at least part of sludge contained by the storage tank, and part of the biological feedstock from the lower part of the storage tank to a filtering system separating at least part of the sludge from the portion,

- transferring (402) a filtered portion from which the at least part of the sludge has been separated by the filtering system from the filtering system to a water separator,

- separating (403), with the water separator, at least part of the aqueous phase from the filtered portion, and

- transferring (404), from the water separator back to the storage tank, residual of the filtered portion from which the aqueous phase has been at least partially removed.

3 A method according to claim 1 or 2, wherein the unwanted gas comprises at least one of the following: hydrogen, methane, carbon monoxide.

4. A method according to any one of claims 1-3, wherein the biological feedstock comprises at least one of the following: animal fat, animal oil, plant fat, plant oil, fish fat, fish oil, used cooking oil, palm effluent sludge.

5. A method according to claim 2, wherein the transferring the portion through the filtering system to the water separator is carried out in accordance with a predetermined timing schedule.

6. A method according to claim 2 or 5, wherein the method comprises using a first pump between the filtering system and the water separator to transfer the portion from the storage tank through the filtering system to the water separator and using a second pump between the water separator and the storage tank to transfer the residual of the filtered portion from the water separator to the storage tank.

7. A method according to any one of claims 1-6, wherein a bottom of the storage tank comprises a recession and the method comprises transferring the portion from the recession.

8. A method according to any one of claims 1-7, wherein the method comprises warming up the biological feedstock contained by the storage tank and controlling temperature of the biological feedstock contained by the storage tank to be between 50°C and 95°C.

9. A method for producing renewable hydrocarbons from biological feedstock, the method comprising:

- receiving biological material at a storage tank containing, after receiving the biological material, the biological feedstock for producing the renewable hydrocarbons, sludge, an aqueous phase, and at least one microorganism generating unwanted gas,
- carrying out a method according to any one of claims 1-8 for reducing unwanted gas formation inside the storage tank, and
- producing the renewable hydrocarbons from the biological feedstock taken out from the storage tank.

10. A method according to claim 9, wherein the producing the renewable hydrocarbons comprises pretreatment and hydrodeoxygenation of the biological feedstock and branching of hydrocarbons produced by the hydrodeoxygenation.

11. A method according to claim 9 or 10, wherein the amount of the aqueous phase contained by the storage tank is reduced by the at least partial removal of the aqueous phase from the lower part of the storage tank to reduce the unwanted gas formation, wherein the biological feedstock comprises fats and oils of biological origin and wherein the biological feedstock is stored inside the storage tank prior to the renewable hydrocarbon production at an oil refinery, the renewable hydrocarbon production comprising hydrotreatment of said biological feedstock.

12. A storage tank system comprising a storage tank (101, 201) for storing biological feedstock and containing at least one microorganism capable of producing unwanted gas in presence of an aqueous phase contained by the storage tank, **characterized** in that the storage tank system comprises the following elements configured to reduce amount of the aqueous phase contained by the storage tank to reduce unwanted gas formation inside the storage tank:

- a filtering system (102, 202),
- a water separator (103, 203), and
- a material transfer system (104, 204) configured to:
    - transfer a portion comprising at least part of the aqueous phase, at least part of sludge contained by the storage tank, and part of the biological feedstock from a lower part of the storage tank to the filtering system configured to separate at least part of the sludge from the portion,
    - transfer a filtered portion from which the at least part of the sludge has been separated by the filtering system from the filtering system to the water separator configured to separate at least part of the aqueous phase from the filtered portion, and

- transfer, from the water separator back to the storage tank, residual of the filtered portion from which the aqueous phase has been at least partially removed.

13. A storage tank system according to claim 12, wherein the storage tank system comprises a control system (105, 205) configured to activate the material transfer system to transfer the portion through the filtering system to the water separator in accordance with a predetermined timing schedule.

14. A storage tank system according to any one of claims 12-13, wherein the material transfer system comprises a first pump (107, 207) between the filtering system and the water separator and configured to transfer the portion from the storage tank through the filtering system to the water separator, and a second pump (108, 208) between the water separator and the storage tank and configured to transfer the residual of the filtered portion from the water separator to the storage tank.

15. A storage tank system according to any one of claims 12-14, wherein a bottom of the storage tank comprises a recession (116) and the material transfer system comprises a pipe (117) extending to the recession and configured to remove the portion from the recession.

16. A storage tank system according to any one of claims 12-15, wherein the storage tank system comprises a heater (109, 209) configured to warm up the biological feedstock contained by the storage tank and a temperature controller (110, 201) configured to control the heater to keep temperature of the biological feedstock contained by the storage tank between 50°C and 95°C.

17. A system for producing renewable hydrocarbons, the system comprising:

- one or more storage tank systems (331-333) according to any one of claims 12-16,

- an inlet system (330) configured to supply biological material to one or more storage tanks of the one or more storage tank systems, the one or more storage tanks containing, after the supplying the biological material,

biological feedstock for producing the renewable hydrocarbons, sludge, an aqueous phase, and at least one microorganism capable of producing unwanted gas,

- an oil refinery (335) configured to produce the renewable hydrocarbons from the biological feedstock, and

- a delivery system (334) configured to deliver the biological feedstock from the one or more storage tank systems to the oil refinery.

18. A system according to claim 17, wherein the oil refinery comprises at least one pretreatment zone (336a), at least one hydrotreatment zone (336b) configured to carry out hydrodeoxygenation, and at least one isomerisation zone (336c) configured to carry out branching of hydrocarbons produced at the hydrodeoxygenation zone.