Claims

1. Plant (100) for producing at least one product comprising a first process unit (200) and at least one connected separating unit (300), wherein the process unit (200) comprises the following:
- at least one reactor (201, 202) for treating a substance mixture,
- at least one feed conduit (204) for introducing at least one reactant into the at least one reactor (201, 202),
- a connecting conduit (206) for discharging a suspension comprising at least one precipitated, solid product to the separating unit (300), wherein the separating unit (300) is configured for separating the at least one solid product and discharging of at least one harmful byproduct or inhibitor and the separating unit (300) comprises two (302, 304), three or four separation apparatuses with at least two separation apparatuses (302, 304) being serially connected via a conduit (314) and the last separation apparatus being a membrane filter press (340),
wherein
the membrane filter press (340) is connected
- via a conduit (214, 314) to a receiving and conditioning unit (400) configured for conditioning a liquefaction medium to liquefy valuable material collected as a filter cake in the membrane filter press (340), and
- via a return conduit (208) leading to the process unit (200) to recycle the at least one liquefied valuable material.

2. Plant according to claim 1, wherein the membrane filter press (340) comprising two end elements (342) and a plurality of filter elements (344), wherein a filter space which is dividable into a main space (352) and a rear back or filtrate space (356) by a filter medium (354) is in each case formed between two filter elements (342, 344, 370, 372) and associated frame sections (346, 348, 350), wherein at least one filter element (344) is formed as a membrane filter frame (370) by two filter elements (344) forming a main space (352) and comprises a fluidizable interior (358) which is delimited by at least one flexible membrane (360) in the direction of the filter space and wherein the main space (352) has at least one feed opening (374), in particular a feed opening (374) leading to at least one feed channel (362), for a substance mixture to be separated and the back or filtrate space (356) has at least one filtrate channel (364) for the filtrate (FT), in particular at least one filtrate channel (364) which leads to a collecting channel (366), wherein
the main space (352) comprises not only the feed opening (374) for a substance mixture but also at least one discharge opening (376), in particular a discharge opening (376) arranged vertically above the at least one feed channel (362).

3. Plant according to one of the preceding claims, wherein the membrane filter press (340) comprises a plurality of filter elements (344), wherein a main space (352) is in each case formed between two adjacent filter elements (304), wherein at least two main spaces (352) are connected to at least one discharge channel (378) of the membrane filter press (340) via the in each case one discharge opening (376) and wherein the discharge channel (378) is connected to the process unit (200) via return conduit (208).

4. Plant according to claims 2 or 3, wherein the feed channels (362) and the connected main spaces (352) of the membrane filter press (340) are connected
I. to a filtrate-conducting conduit (314) of an upstream separation apparatus (302),
II. via a flow path (214) to the outflow (216) of the process unit (200) and/or
III. to a receiving and conditioning unit (400) for providing a liquefaction medium.

5. Plant according to any of the preceding claims, wherein the separating unit (300) comprises two, three or four subunits comprising a precipitation reactor (330) and a subsequent filter apparatus (304).

6. Plant according to any of claims 2 to 5, wherein the at least one feed channel (362) of the membrane filter press (340) is arranged at a vertically lower frame section (346).

7. Plant according to any of claims 2 to 6, wherein the at least one discharge opening (376) of the membrane filter press (340), arranged vertically above the feed channel (362) is arranged at the vertically upper frame section (348).

8. Plant according to any of claims 3 to 7, wherein the number of the lower feed channels (362) of the membrane filter press (340) is at least one greater than the number of the discharge channels (378) arranged above.

9. Plant according to any of claims 3 to 8, wherein the ratio of the sum of the flow cross sections of the feed channels (362) to the sum of the flow cross sections of the discharge channels (378) is in the range from 1 : 3 to 2 : 1, ideally in the range from 1 : 2 to 1 : 1.

10. Process for producing at least one solid product in a plant (100), comprising the following steps:
    a. provision of a process unit (200) and a separating unit (300),
    b. introduction of at least one reactant into the process unit (200) and production of at least one solid product and byproduct in a substance mixture,
    c. separation of the at least one solid product and discharging of at least one harmful byproduct or inhibitor using two (302, 304), three or four separation apparatuses in the separating unit (300),

wherein at least two separation apparatuses (302, 304) are serially connected and the following steps are preformed:

d. collection of a first sub-amount of the separable solid product as filter cake in the first separation apparatus (302),
e. dehumidification of the first sub-amount of the solid product in the first separation apparatus (302),
f. sending the filtrate (FT) separated in the first separation apparatus (302) and comprising valuable material selected from reactants, byproducts, auxiliaries and/or end products to the last separation apparatus (304) which is configured as a membrane filter press (340),
g. collection of a separable valuable material as filter cake in the last separation apparatus (304), and
h. dehumidification of the valuable material in the last separation apparatus (304),
i. liquefaction of the valuable material collected in the membrane filter press (340) and solidified as a filter cake inside the membrane filter press (340) with a liquefaction medium, and
j. recycling of the liquefaction medium with the valuable material dissolved therein into the process unit (200).

11. Process according to claim 10, wherein the dehumidification in the first step is carried out to a residual moisture content in the separated solid product of down to 30% and the dehumidification in the last step is carried out to a residual moisture content in the separated valuable material of not more than 30%.

12. Process according to any of the preceding process claims, wherein the liquefaction medium for liquefaction of the valuable material collected inside the membrane filter press (340) is a substance mixture, a suspension and/or a filtrate from an upstream part of the plant and/or a preceding process step, in particular a conditioned substance mixture, a suspension and/or a filtrate.

13. Process according to claims 10 or 11, wherein the liquefaction medium for liquefaction of the valuable material collected inside the membrane filter press (340) is an acid or an alkali which is not a substance mixture, not a suspension and/or not a filtrate from an upstream part of the plant and/or a preceding process step.

14. Process according to any of the preceding process claims, wherein during the liquefaction the valuable material collected inside the membrane filter press (340) is subjected to a flow of the liquefaction medium from below in the gravitational direction and is discharged from the respective main space (352) and the respective filter element (344) at the top and/or above the feed channel (362) in the gravitational direction.

15. Process according to any of the preceding process claims, wherein the plant (100) for producing the at least one product or valuable material is configured according to any of Claims 1 to 9.

16. Process according to any of the preceding process claims, wherein after the dehumidification the membrane filter press (340) is emptied and/or regenerated by means of a liquefaction of the filter cake, in particular by means of an emptying and/or regeneration with a closed membrane filter press (340), and wherein after the liquefaction of the filter cake, the liquefaction medium laden with valuable material is discharged via at least one internal discharge channel (378) of the membrane filter press (340).

17. Process according to any of the preceding process claims, wherein the process is used for producing methionine.

18. Process according to claim 17, wherein at least two precipitation steps are carried out, wherein before at least two of the separation steps a precipitation step is carried out, and wherein at least one of the precipitation steps, in particular both precipitation steps, is a carbonation step, in particular a carbonation using CO_2.