15. The process of any of the preceding claims, wherein the distillation column has a total number of theoretical trays of N(1) from the top to the bottom, where $5 \leq N(1) \leq 15$.

16. The process of claim 15, wherein the number of theoretical trays from the third location to the fourth location is N(2), where $1/12 \cdot N(1) \leq N(2) \leq 2/3 \cdot N(1)$.

17. The process of claim 16, wherein $3 \leq N(2) \leq 5$.

18. The process of any of the preceding claims, wherein the absolute pressure inside the distillation column at the fourth location is in a range from Pam – 50 kPa to Pam + 50 kPa, where Pam is the pressure of ambient air.

19. A device for removing water and/or oxygen from a crude organic liquid stream, comprising a distillation column shell, packing material and/or trays housed inside the distillation column shell, and the following:

(A) a first inlet on the shell at a first location on a side of the distillation column configured for accepting the crude organic liquid stream into the distillation column;

(B) a second inlet on the shell at a second location on the side below the first location configured for accepting a stream of dry nitrogen gas into the distillation column;

(C) a first outlet on the shell at a third location on the side between the first location and the second location configured for drawing a side effluent stream comprising water at a concentration higher than in the crude organic liquid stream;

(D) a second outlet at a fourth location on the shell in the vicinity of the top of the distillation column configured for drawing a gas effluent stream comprising nitrogen, oxygen, and benzene;

(E) a heat exchanger configured for providing heat to the liquid in the distillation column at a fifth location in the vicinity of the bottom of the distillation column;

(F) a third outlet at a sixth location on the shell in the vicinity of the bottom of the distillation column configured for drawing a purified organic liquid stream having lower concentrations of water and oxygen than the crude organic liquid stream; and

(G) a settling vessel configured for accepting at least a portion of the side effluent stream, allowing fluid therein to separate to form an upper organic phase and a lower aqueous phase.

20. The device of claim 19, wherein the device further comprises:

(H) a third inlet on the shell at a seventh location between the first location and the third location configured for accepting at least a portion of the organic phase recycled to the distillation column; and

(I) a conduit configured for delivering at least a portion of the upper organic phase to the third inlet.

21. The device of any of the preceding claims 19 to 20, further comprising:

(J) a temperature sensor configured for measuring the temperature of the distillation column at the height of the third location; and

(K) a controller configured to control the amount of heat provided by the heat exchanger based on the temperature measured by the temperature sensor.

22. The device of any of the preceding claims 19 to 21, wherein the distillation column has a total number of theoretical trays of N(1) from the top to the bottom, where $5 \leq N(1) \leq 15$.

23. The device of claim 22, wherein the number of theoretical trays from the third location to the fourth location is N(2), where $1/12 \cdot N(1) \leq N(2) \leq 2/3 \cdot N(1)$.

24. The device of claim 23, wherein $3 \leq N(2) \leq 5$.