

Patent claims

1. Reactive rectification column for production of a methionine salt,
~~wherein~~comprising the weir height ~~is~~ in the range from 100 to 1000 mm,
~~the~~a plate spacing ~~is~~ in the range from 500 to 1000 mm,
~~the~~a ratio of column diameter to weir length ~~is~~ in the range from 1.1 to 1.3,
~~the~~a ratio of ~~the~~ cross-sectional area to ~~the~~an area through which gas flows
~~is~~ in the range from 1.5 to 2 and
~~the~~a number of plates ~~is~~ in the range from 15 to 25, preferably in the range
from 18 to 20, and
wherein the column is configured to remove allyl components at the top of
the column.
2. Reactive rectification column according to Claim 1, wherein the weir height
is in the range from 150 to 700mm.
3. Reactive rectification column according to Claim 1 or 2, wherein the
reactive rectification column is a sieve plate column, perforated plate
column, valve plate column or bubble plate column.
4. Reactive rectification column according to one of the preceding claims,
wherein the ratio of total area of all holes / area through which gas flows is
in the range from 0.04 to 0.08 and
the diameter of the individual holes in the sieve plate is in the range from 5
to 10 mm.
5. Reactive rectification column according to one of the preceding claims,
wherein the weir heights ensure an average residence time of the
respective mixture of less than 0.5 min per plate.
6. Reactive rectification column according to one of the preceding claims,
wherein zirconium is used as material for parts in contact with the product.
7. Method for continuous production of a methionine salt, wherein the
method is carried out in a reactive rectification column according to one of
Claims 1 to 6 and wherein allyl components are removed at the top of the
reactive rectification column.

8. Method according to Claim 7, wherein the following steps are carried out
 - reaction of 3-methylmercaptopropionaldehyde and hydrogen cyanide or of a component that can be produced therefrom, wherein a solution containing 5-(2-methylmercaptoethyl)-hydantoin is obtained;
 - alkaline hydrolysis of the 5-(2-methylmercaptoethyl)-hydantoin obtained to a methionine salt in a reactive rectification column, wherein only the solution containing 5-(2-methylmercaptoethyl)-hydantoin is fed on the topmost plate of the reactive rectification column and an alkaline circulating solution is fed on a plate located under that, preferably on the 2nd plate from the top.
9. Method according to Claim 8, wherein the alkaline circulating solution contains an alkali metal carbonate, preferably potassium carbonate.
10. Method according to one of Claims 7 to 9, wherein allyl alcohol is removed at the top of the reactive rectification column.
11. Method according to one of Claims 7 to 10, wherein water, ammonia and CO_2 are removed from the top of the reactive rectification column and the NH_3 removed is condensed completely or partially and used in the synthesis of 5-(2-methylmercaptoethyl)-hydantoin.
12. Method according to one of Claims 7 to 11, wherein the concentration of ammonia in the bottom of the rectification column is less than 120 ppm, preferably less than 100 ppm and most preferably less than 80 ppm.
13. Method according to one of Claims 7 to 12, wherein the alkaline hydrolysis is carried out at a temperature in the range from 160°C to 190°C.
14. Method according to one of Claim 13, wherein the temperature of the reaction mixture at the outlet of the reactive rectification column is in the range from 180°C to 190°C.
15. Method according to Claim 13 or 14, wherein the temperature of the gas phase at the top of the reactive rectification column is in the range from 160°C to 170°C.

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16. Method according to Claims 7 to 15,
wherein alkaline hydrolysis is carried out at a pressure in the range from
8 bar(gauge) to 10 bar(gauge).
17. Method according to one of Claims 7 to 16, wherein steam is used as
heating and stripping medium in the reactive rectification column.