step (v) to a pH of between 3 and 10. Advantageously, the neutralization in step (v) is carried out by addition of an aqueous solution of hydrochloric acid, of hydrobromic acid, of sulfuric acid or of a mixture thereof.

According to a third example of the process that is the subject of the disclosure, step (v) is carried out by adsorption on an adsorbent material. Preferably, the adsorption material is chosen from mineral materials such as activated carbon; a silica or an alumina or a mixture thereof; organic materials such as adsorbent macrocrosslinked resins or ion-exchange resins.

According to a fourth example of the process that is the subject of the disclosure, step (v) is carried out by membrane separation to form a permeate enriched in sodium bromide and depleted in organic impurities and a concentrate depleted in sodium bromide and enriched in organic impurities. Step (v) may be carried out notably by means of one or more nanofiltration membranes. Advantageously, step (v) comprises a subsequent step (va') in which the concentrate depleted in sodium bromide and enriched in organic impurities which is obtained in step (v) is subjected to a step of diafiltration in order to recover an aqueous solution enriched in sodium bromide and depleted in organic impurities, which solution will be able to be mixed with the permeate resulting from step (v). Furthermore, step (v) may comprise a subsequent step (vb) in which the permeate enriched in sodium bromide and depleted in organic impurities which is obtained in step (v) and also, where appropriate, the aqueous solution enriched in sodium bromide and depleted in organic impurities resulting from step (va') are subjected to a second step of membrane separation.

According to another example, the disclosure also relates to a process for producing polyamide or copolyamide from said aminocarboxylic acid.

[**Description of the embodiments**]

Definition of the terms

The term “**bromide**” is understood to denote generally a compound comprising a bromine atom in the (-I) oxidation state devoid of a carbon-hydrogen bond, such as a bromide salt, notably an alkali metal bromide such as sodium bromide or potassium bromide, ammonium bromide or else hydrogen bromide or hydrobromic acid.

As mentioned above, the object of the present invention is to improve the economics of the process for producing aminocarboxylic acids such as 12-aminododecanoic acid, 11-aminoundecanoic acid or 10-aminodecanoic acid by reducing, or even preventing the provision of bromine and the fouling during the conversion of the bromine thus obtained to hydrogen bromide.

According to the invention, the process for producing an aminocarboxylic acid of formula (I) below:

NH_2-CH_2-$(CH_2)_n$-COOH (I)

CLAIMS

1. Process for producing an aminocarboxylic acid of formula (I) below:

NH_2-CH_2-$(CH_2)_n$-COOH (I)

in which n is an integer from 7 to 12, preferably from 8 to 10, comprising the following steps:

(i) reacting the unsaturated carboxylic acid of formula (II) below:

CH_2=CH-$(CH_2)_{n-1}$-COOH (II)

with hydrogen bromide (HBr) to form the ω-bromoalkanoic acid of formula (III) below:

Br-CH_2-$(CH_2)_n$-COOH (III);

(ii) reacting the ω-bromoalkanoic acid of formula (III) obtained with ammonia in aqueous solution to form a reaction mixture comprising the aminocarboxylic acid of formula (I) and ammonium bromide;

(iii) separating the reaction mixture of the aminocarboxylic acid of formula (I) and an aqueous solution rich in ammonium bromide;

(iv) bringing the aqueous solution rich in ammonium bromide obtained into contact with sodium hydroxide to form ammonia and an aqueous solution rich in sodium bromide;

(v) purifying the aqueous solution rich in sodium bromide obtained in order to eliminate organic impurities;

(vi) bringing the purified aqueous solution rich in sodium bromide obtained into contact with chlorine to form bromine and an aqueous solution rich in sodium chloride;

(vii) reacting the bromine obtained with hydrogen to form hydrogen bromide; and

(viii) recycling the hydrogen bromide obtained to step (i).

2. Process according to Claim 1, in which bromides originating from another process are added to the solution rich in ammonium bromide or sodium bromide of step (iv).
3. Process according to Claim 1 or 2, in which bromine originating from another process is added to the bromine obtained in step (vi).
4. Process according to one of Claims 1 to 3, in which step (v) of purifying the aqueous solution of bromides reduces the TOC by a factor of more than 5.
5. Process according to one of Claims 1 to 4, in which step (vi) is performed with a bromide solution having less than 2%, and preferably less than 1% and advantageously less than 0.5% of TOC.
6. Process according to one of Claims 1 to 5, in which step (v) is carried out by acidification of the aqueous solution rich in sodium bromide resulting from step (iv) followed by a decantation of the oily phase formed.

7. Process according to Claim 6, in which the aqueous solution rich in sodium bromide resulting from step (iv) is acidified by addition of acid to a pH of between 3 and 5.
8. Process according to one of Claims 1 to 7, in which step (v) comprises a subsequent step (va) in which the oily phase formed in step (v) is subjected to an extraction operation to obtain an aqueous solution enriched in sodium bromide, which is sent back to step (iv) or (vi), in particular by liquid/liquid extraction.
9. Process according to one of Claims 1 to 5, in which step (v) is carried out by neutralization of the aqueous solution rich in sodium bromide followed by a liquid/liquid extraction.
10. Process according to Claim 9, in which the aqueous solution rich in sodium bromide is neutralized in step (v) to a pH between 3 and 10, in particular by addition of an aqueous solution of hydrochloric acid, of hydrobromic acid, of sulfuric acid or of a mixture thereof.
11. Process according to one of Claims 1 to 5, in which step (v) is carried out by adsorption on an adsorbent material, in particular chosen from mineral materials such as activated carbon; a silica or an alumina or a mixture thereof; organic materials such as adsorbent macrocrosslinked resins or ion-exchange resins.
12. Process according to one of Claims 1 to 5, in which step (v) is carried out by membrane separation to form a permeate enriched in sodium bromide and depleted in organic impurities and a concentrate depleted in sodium bromide and enriched in organic impurities.
13. Process according to Claim 12, in which step (v) is carried out by means of one or more nanofiltration membranes.
14. Process according to Claim 12 or 13, in which step (v) comprises a subsequent step (va') in which the concentrate depleted in sodium bromide and enriched in organic impurities which is obtained in step (v) is subjected to a step of diafiltration in order to recover an aqueous solution enriched in sodium bromide and depleted in organic impurities, which solution will be able to be mixed with the permeate resulting from step (v).
15. Process according to one of Claims 12 to 14, in which step (v) comprises a subsequent step (vb) in which the permeate enriched in sodium bromide and depleted in organic impurities which is obtained in step (v) and also, where appropriate, the aqueous solution enriched in sodium bromide and depleted in organic impurities resulting from step (va') are subjected to a second step of membrane separation.