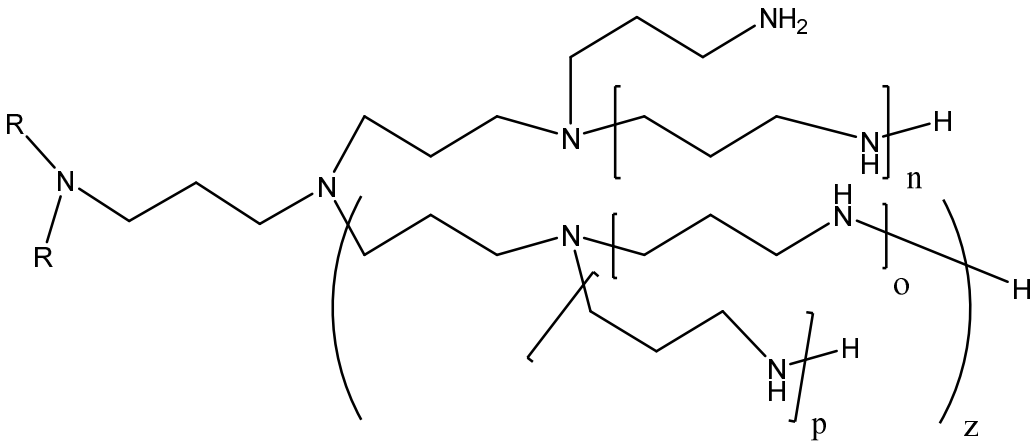
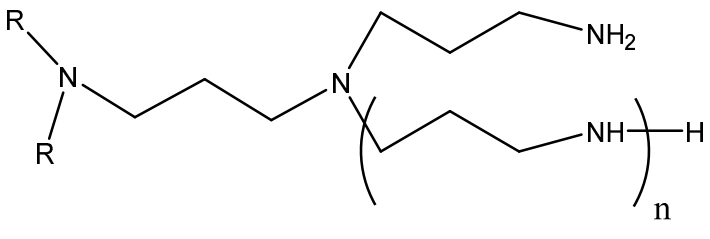
Claims

1. A polyalkylamine composition which comprises a mixture of polyalkylamines selected from products with formulae (I) and (II),



(I),



(II)

wherein each R is, independent of the other R, an alkyl or alkenyl moiety with 8-22 carbon atoms, n and z are independent of each other either 0, 1, 2, or 3, and when z>0 then o and p are independent of each other either 0, 1, 2, or 3, or methylated, and/or alkoxylated derivatives thereof, whereby said mixture comprises a) a total of at least 3 % by weight of branched compounds of formula (I) with at least one of n and z >= 1 and products of formula (II) with n >=1, and b) a total of at least 5 % by weight of products of formula (I) with n and z =0, and compounds of formula (II) with n = 0.

2. A polyalkylamine composition according to claim 1 comprising a total of at least 4 %w/w of branched compounds of formula (I) with at least one of n and z > 0 and compounds of formula (II) with n > 0.

3. A polyalkylamine composition according to claim 1 or 2 comprising at least 6% by weight of products of formulae (I) and (II) with a linear structure with n is 0 in formulae (I) and (II) and z is 0 in formula (I).

4. A polyalkylamine composition of any of the previous claims comprising derivatives of di-fatty-alk(en)yl polyalkylamines, wherein the derivatives are alkoxylates which are optionally methylated.

5. A polyalkylamine composition of any of the previous claims comprising derivatives of di-fatty-alk(en)yl polyalkylamines, wherein the derivatives are methylated.

6. A process for making polyalkylamine compositions of any one of the previous claims wherein a di-fatty-alk(en)yl alkyldiamine is reacted in two or more cycles whereby each cycle comprises a cyanoethylation step and a subsequent hydrogenation step.

7. A process of claim 6 wherein an acidic catalyst is used during the cyanoethylation steps.

8. A process of claim 6 or 7 wherein the reaction temperature during a later cyanoethylation step is higher than the temperature in an earlier cyanoethylation step.

9. A process of any one of claims 6-8 wherein more than 1 mole of acrylonitrile is used per mole of the starting polyamine.

10. A process for making the polyalkylamines compositions of any one of claims 1-5 wherein a di-fatty-alk(en)yl alkyldiamine is subjected to a cyanoethylation step and a subsequent hydrogenation step, whereby in the cyanoethylation step at least 2 mole of acrylonitrile is used per mole of di-fatty-alk(en)yl alkyldiamine and an acidic catalyst is used.

11. A process of claim 10 wherein the product is subjected to one or more further cycles comprising a cyanoethylation and subsequent hydrogenation step.

12. A process according to any one of claims 6-11 wherein one or more solvents selected from C_{1-4} alcohol and C_{2-4} diols is present in the cyanoethylation step.

13. A process of claim 12 wherein the amount of solvent is from 0.1 to 50 % by weight of the liquid reaction mixture.

14. A process to make the derivatives of claim 4 or 5, being the process of any one of claims 6-13, with an additional step wherein the di-fatty-alk(en)yl polyalkylamines are methylated, alkoxylated, or both.

15. Use of di-fatty-alk(en)yl polyalkylamine compositions of any one of claims 1-5 as demulsifiers for oil-in-water emulsions, corrosion inhibitor, fuel additive, anti-scaling agent, asphalt additive, enhanced oil recovery agent for oil-wells, cutting-oil additive, and anti-static agent.