CLAIMS

1. A process for the production of 2-alkylalkanol from an aldehyde comprising the steps of:
   (a) feeding aldehyde to a reactor operated under condensation and dehydration conditions such that reaction occurs and an unsaturated aldehyde is produced;
   (b) recovering a stream from the reactor of step (a) comprising the unsaturated aldehyde and feeding said stream to a first hydrogenation reactor operated under conditions such that at least some of the unsaturated aldehyde is converted to 2-alkylalkanol;
   (c) recovering the stream from the first hydrogenation reactor comprising the 2-alkylalkanol, one or more of unreacted acrolein, alkylalkenol and alkylalkanal and heavies;
   (d) passing the stream recovered in step (c) from the first hydrogenation reactor to a first distillation zone where at least some of the heavies are separated from the stream;
   (e) recovering a stream from the first distillation zone comprising the 2-alkylalkanol, one or more of unreacted acrolein, alkylalkenol and alkylalkanal, said stream having a reduced heavies content when compared to the stream fed to the first distillation zone, and feeding said stream to a second hydrogenation reactor operated under conditions such that at least one of the unreacted acrolein, alkylalkenol and alkylalkanal are converted to 2-alkylalkanol; and
   (f) recovering a stream from the second hydrogenation reactor comprising an increased 2-alkylalkanol content compared to the stream fed to the second hydrogenation reactor.

2. A process according to Claim 1 where the stream recovered from the second hydrogenation reactor in step (f) is passed to a second distillation zone where lights are removed, said second distillation zone having no heavies removal.

3. A process according to Claim 1 and 2 wherein the aldehyde is n-butyraldehyde and the product is 2-ethylhexanol.

4. A process according to Claim 1 and 2 wherein the aldehyde is n-valeraldehyde and the product is 2-propylheptanol.

5. A process according to any one of Claims 1 to 4 wherein the first hydrogenation reactor is operated at a temperature of from 100°C to 200°C and at a pressure of from atmospheric pressure to 15MPa.

6. A process according to any one of Claims 1 to 5 wherein a nickel catalyst is used in the first hydrogenation reactor.

7. A process according to Claim 6 wherein the first hydrogenation reactor is operated at a temperature of 150°C or below and a pressure of from 10 to 30 bara where the reaction is carried out in the liquid phase or at a temperature of from 100°C to 150°C and a pressure of from atmospheric to 5bara where the reaction is carried out in the gas phase.

8. A process according to Claim 5 or 6 wherein a copper catalyst is used in the first hydrogenation reactor.

9. A process according to Claim 8 wherein the first hydrogenation reactor is operated at a temperature of from 100°C to 150°C and a pressure of from 15 to 30 bara where the reaction is carried out in the liquid phase or at a temperature of from 135°C to 170°C and a pressure of from atmospheric to 5bara where the reaction is carried out in the gas phase.

10. A process according to any one of Claims 1 to 9 wherein the second hydrogenation reactor is operated in the liquid phase.

11. A process according to Claim 10 wherein the second hydrogenation reactor is operated at a temperature of from 80°C to 150°C and at a pressure of from 10 bara to 35 bara.

12. A process according to any one of Claims 1 to 11 wherein the bottoms temperature in the first and second distillation zone is below 175°C.

13. A process according to any one Claims 1 to 12 wherein the pressure at a top of the first distillation zone is in the region of from 0.05 bara to 0.5 bara.

14. A process according to any one Claims 2 to 13 wherein the pressure at a top of the second distillation zone is in the region of from 0.1 bara to 0.8 bara.