CLAIMS

1. A method for an enzymatic hydrolysis in which wood based material is hydrolysed by means of enzymes, wherein

- cellulose based material is used as the wood based material, and the cellulose based material is supplied to the first enzymatic hydrolysis stage,
- the cellulose based material is hydrolysed in at least two enzymatic hydrolysis stages, and the residence time of the first enzymatic hydrolysis stage is shorter than the residence time of the second or any later enzymatic hydrolysis stage, and the residence time of the second or any later enzymatic hydrolysis stage is 22 – 48 hours,
- a liquid fraction comprising carbohydrates is separated from a solid fraction in a solid-liquid separation stage after each enzymatic hydrolysis stage, and
- the solid fraction is supplied to the next enzymatic hydrolysis stage in which the solid fraction is treated, and the solid fraction is recovered after the last solid-liquid separation stage.

2. The method according to claim 1, wherein the residence time of the first enzymatic hydrolysis stage is 4 – 36 hours.

3. The method according to claim 1 or 2, wherein consistency of the wood based material is 4 - 40 % in the first enzymatic hydrolysis stage.

4. The method according to any one of claims 1 to 3, wherein the residence time of the second or any later enzymatic hydrolysis stage is 24 - 36 hours.

5. The method according to any one of claims 1 to 4, wherein consistency of the solid fraction is 10 – 40 % in the second or any later enzymatic hydrolysis stage.

6. The method according to any one of claims 1 to 5, wherein the method comprises at least one mixing stage in connection with the enzymatic hydrolysis stage.

7. The method according to any one of claims 1 to 6, wherein the wood based material or solid fraction is diluted with liquid before the enzymatic hydrolysis.

8. The method according to any one of claims 1 to 7, wherein the liquid fraction is separated from the solid fraction by means of filtration, centrifugal treatment or their combinations.

9. The method according to any one of claims 1 to 8, wherein the liquid fraction is recovered after each solid-liquid separation stage.

10. The method according to any one of claims 1 to 9, wherein the wood based material or solid fraction is fed to the enzymatic hydrolysis stage step by step or gradually.

11. The method according to any one of claims 1 to 10, wherein the enzyme is added in the second or any later enzymatic hydrolysis stage.

12. The method according to any one of claims 1 to 11, wherein the second or any later enzymatic hydrolysis stage is carried out without an enzyme addition.

13. The method according to any one of claims 1 to 12, wherein lignin is separated in a lignin separation stage from the solid fraction after the last solid-liquid separation stage.

14. A liquid fraction comprising carbohydrates obtained by the method according to any one of claims 1 to 13.

15. A solid fraction comprising lignin obtained by the method according to any one of claims 1 to 13.

16. A Use of the liquid fraction obtained by the method according to any one of claims 1 to 13, wherein the liquid fraction is used as a source material in a fermentation, hydrolysis, chemical treatment, catalytic treatment, polymerization process, depolymerization process, degradation process, enzymatic treatment, manufacture of binder, manufacture of feed, manufacture of food or their combinations.

17. A Use of the solid fraction obtained by the method according to any one of claims 1 to 13, wherein the solid fraction is used as a source material in a hydrolysis, polymerization process, depolymerization process, degradation process, chemical treatment, manufacture of a composite material, lignin composite, activated carbon, carbon fiber, binder material, polymers, resins, phenolic component, dispersion agent or absorbent material, manufacture of feed, manufacture of food, combustion process or their combinations.