**Claims**

1. A method for processing isolated fibrous cellulosic material from ~~algae~~ brown seaweed comprising:

    i) suspending the isolated fibrous cellulosic material in water to form a suspension; and

    ii) passing the suspension through a high shear homogeniser having at least one chamber ~~having a large gap~~ with a gap of 70 microns to 250 microns, ~~at a high shear~~ to produce cellulose nanofibrils;

    wherein the isolated fibrous cellulosic material is derived from fibrous cellulosic material extracted from brown seaweed together with alginate and subsequently separated from alginate and the isolated fibrous cellulosic material is not subjected to any pre-treatments to aid extraction of the cellulose nanofibrils, such as treatments with swelling, hydrolytic or oxidation agents prior to suspending in water, as required in known cellulose nanofibril production from wood-pulp; and

    wherein the suspension undergoes up to 7 passes through the at least one chamber.

~~2.~~ The method of claim 1 wherein the isolated fibrous cellulosic material is suspended in water at a concentration of from 0.5 to 5% by weight~~.~~

~~3.~~2. ~~The method of claim 1 or claim 2 wherein the fibrous cellulosic material is suspended in water at a concentration of~~, preferably from 1 to 3% by weight.

~~4. The method of any one of claims 1 to 3 wherein the at least one chamber has a gap of 70 micron to 250 microns.~~

~~5.~~3. The method of ~~any one of the preceding claims~~ claim 1 or claim 2, wherein the suspension undergoes a single pass through the at least one chamber ~~having a large gap, at a high shear~~.

~~6. The method of any one of claims 1 to 4 wherein the suspension undergoes up to 7 passes through the at least one chamber having a large gap at a high shear.~~

~~7.~~4. The method of ~~any one of claims 1 to 5~~ claim 1 or claim 2, wherein the suspension undergoes up to 5 passes through the at least one chamber, preferably up to 3 passes through the at least one chamber ~~having a large gap at a high shear~~.

~~8. The method of any one of the preceding claims wherein the suspension is passed through the at least one chamber at a low pressure.~~

~~9.~~5. The method of any one of the preceding claims wherein the suspension is passed through the at least one chamber at a pressure up to 200MPa.

~~10.~~6. The method of any one of the preceding claims wherein the water is removed from the suspension comprising the cellulose nanofibrils to produce cellulose nanofibrils in a dry form.

~~11. The method of any one of the preceding claims wherein the method is carried out in a high shear homogeniser.~~

~~12.~~7. The method of any one of the preceding claims further comprising the step of subjecting the cellulose nanofibrils to acid hydrolysis to form cellulose nanocrystals.

~~13.~~8. The method of claim ~~12~~7 wherein the acid hydrolysis uses hydrochloric acid.

~~14.~~9. The method of any one of the preceding claims wherein the cellulose nanofibrils or cellulose nanocrystals undergo surface modification.

~~15.~~ Cellulose nanofibrils derived from brown seaweed having ~~a width of from 40 to 100 nm and~~ an aspect ratio of greater than ~~50~~ 100 and~~.~~

~~16.~~10. ~~The cellulose nanofibrils of claim 15~~ being a substantially homogeneous product, wherein at least 95% of the cellulose nanofibrils are discrete entities each with two dimensions in the nano range.

~~17. The cellulose nanofirbrils of claim 15 or claim 16 having an aspect ratio of greater than 100.~~

~~18.~~11. The cellulose nanofibrils of ~~any one of claim 15 to 17~~ claim 10 having a water retention of greater than 5000%.

~~19. Cellulose nanocrystals formed by the method of claim 12 or claim 13.~~

~~20.~~12. A rheological modifier, a medical composite, a single use plastic replacement product, a medical implant or a medical mesh comprising at least one of the cellulose nanofibrils of any one of claims ~~15 to 18 and the cellulose nanocrystals of claim 19~~ 10 to 11.

~~21. A medical composite comprising at least one of the cellulose nanofibrils of any one of claims 15 to 18 and the cellulose nanocrystals of claim 19.~~

~~22. A single use plastic replacement product comprising at least one of the cellulose nanofibrils of any one of claims 15 to 18 and the cellulose nanocrystals of claim 19.~~

~~23. A medical implant or a medical mesh comprising at least one of the cellulose nanofibrils of any one of claims 15 to 18 and the cellulose nanocrystals of claim 19.~~

~~24.~~13. A method of producing a medical implant or a medical mesh comprising 3-D printing of at least one of the cellulose nanofibrils of any one of claims ~~15 to 18 and the cellulose nanocrystals of claim 19~~ 10 to 11.

~~25.~~14. Use of the cellulose nanofibrils of any one of claims ~~15~~10 to ~~18~~11 in composites, oil and gas, paints, cosmetics, foods, coatings or films.

~~26. Use of the cellulose nanocrystals of claim 19 in composites, oil and gas, paints, cosmetics, foods, coatings or films.~~