Claims

1. Method for the production of a solid molded article comprising non-wood plant material, which is the whole or any part of a non-wood plant, or a non-wood part of a wood plant, the method comprising the steps of:
(a) providing one or more fresh non-wood plant materials having a moisture content from 20 % w/w to 99 % w/w with respect to the total weight of the plant material, wherein a fresh non-wood plant material is a plant material that after harvesting has not been preserved by drying;
(b) heating the fresh non-wood plant material at a temperature from 60 ºC to 140 ºC a pressure from 40 KPa to 750 KPa, and for at least 0.5 h, maintaining the moisture content of the material equal to or higher than 20 % w/w;
(c) molding the heated material obtained in step (b); and
(d) drying the molded material obtained in step (c).

2. The method according to claim 1, wherein the solid molded article comprising non-wood plant material has one or more of:
i) a density determined using a pycnometer in a range of from 100 kg/m^3 to 2000 kg/m^3;
ii) a strength determined using a nanoindenter in a range of from 6 MPa to 250 MPa; and
iii) an elasticity determined using a nanoindenter in a range of from 50 MPa to 7GPa.

3. The method according to any of claims 1-2, wherein the one or more fresh non-wood plant material of step (a) has a lignin content lower than or equal to 20 % w/w.

4. The method according to any of claims 1-3, wherein the moisture content of the fresh non-wood plant material of step (a) is from 40 % w/w to 99 % w/w.

5. The method according to any of claims 1-4, wherein the fresh non-wood plant material of step (a) is an agricultural product or agricultural by-product.

6. The method according to any of claims 1-5, wherein the fresh non-wood plant material is from a plant that belongs to a group selected from bryophytes, angiosperms and non-wood gymnosperms.

7. The method according to any of claims 1-6, wherein the step (b) is carried out without the addition of water.

8. The method according to any of claims 1-7, wherein the step (b) is performed at a temperature from 70 ºC to 120 ºC.

9. The method according to any of claims 1-8, wherein the step (b) is performed for a period of time from 0.5 h to 4 h.

10. The method according to any of claims 1-9, wherein the non-wood plant material after the heating step (b) has one or more of:

i) a moisture content in a range of from 20 % to 99 % w/w;

ii) a dewatering value determined by the Schopper-Riegler method in a range of from 20 °SR to 100 °SR; and

iii) a viscosity determined by Brookfield method in a range of from 0.001 Pa·s to 15 Pa·s;

11. The method according to any of claims 1-10, which further comprises a cutting step after step (a) and before step (b), or alternatively, after step (b) and before step (c).

12. The method according to any of claims 1-11, which further comprises after step (b) and before step (c) the step of mixing the fresh non-wood plant material with wood plant material, or alternatively, with one or more additives.

13. The method according to any of claims 1-12, which further comprises a pre-drying step after step (c) and before step (d) wherein the moisture content of the molded material is reduced to a value equal to or lower than 40 % w/w.

14. The method according to any of claims 1-13, which further comprises one or more times reprocessing the solid molded article comprising non-wood plant material to obtain a reprocessed solid molded article by a process which comprises the following steps after step (d):

(e) rehydrating the solid molded article and obtaining a rehydrated material;

(f) molding the rehydrated material obtained in step (e); and

(g) drying the molded material of step (f).