

# Particleboard Manufacturing from Pre-Compacted Wood Particles

Electra Papadopoulou<sup>1</sup> • Sotiris Kountouras<sup>1</sup> • Costas Stathopoulos<sup>1</sup> • Gunnar Kalén<sup>2</sup> • Sylvia H. Larsson<sup>2</sup>

<sup>1</sup> CHIMAR HELLAS SA Sofouli 88, 55131, Kalamaria, Thessaloniki, Greece

<sup>2</sup> Swedish University of Agricultural Sciences, Department of Forest Biomaterials and Technology, SE-90183 Umeå, Sweden

## BACKGROUND

An important aspect of the final price of particleboards is the cost of raw materials, which depends to a large extent on transportation costs. In order to reduce this cost, a solution would be to transfer wood in a compressed form, like for example pellets.

In the framework of the EU project MOBILE FLIP, wood material from Scots pine (*Pinus sylvestris*) and Norway spruce (*Picea abies*) in the form of chips, pellets and milled pellets was tested for its suitability to produce particleboards.

### Materials and methods

The mixture of spruce and pine wood chips was hammer milled, **pelletised and further cut**. All materials were screened at the sizes of (4, 6 and 8 mm **screen-size**). Pellets were made from all three assortments as such and after Pellets from the three assortments were cutting milled (6 mm screen-size).

The materials were dried and blended with a typical Urea-Formaldehyde resin and formed into mats with dimensions of 35x35cm in order to produce particleboards with density of 650kg/m<sup>3</sup> under heating and pressure (Figures 1, 2 and 3).



Figure 1. Making particleboard from milled wood chips.



Figure 2. Particleboard made from milled wood pellets.



Figure 3. Particleboards from wood pellets.

All panels were tested and evaluated according to EU standards (Figure 4). It was found that pellets did not lose their original shape and hence the particleboard quality was very low (Figure 3)

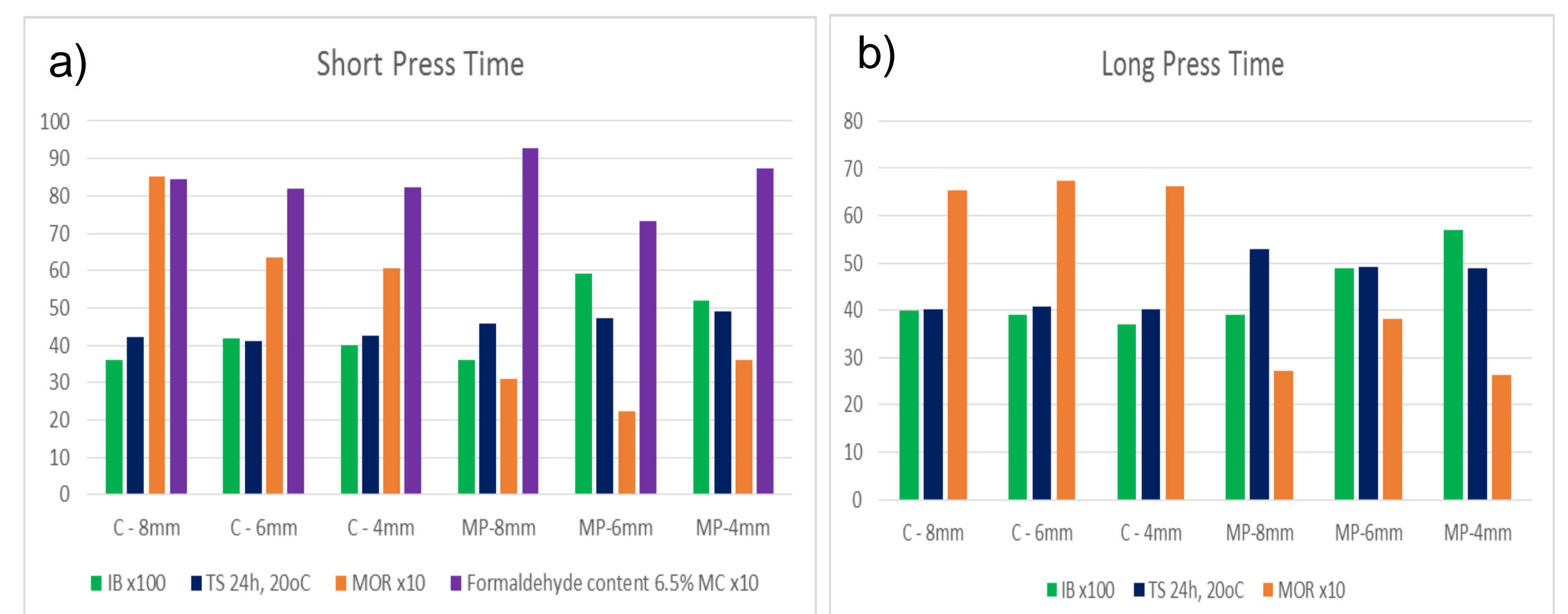


Figure 4. Internal Bond (IB), Thickness Swelling (TS), Modulus of Rupture (MOR), Formaldehyde Content at 6.5% MC for particle boards made from **milled-wood** chips (C) and milled **wood** pellets (MP).

## RESULTS

It was found that pellets is not a suitable feedstock for particleboard manufacturing. On the contrary, raw material before pelletizing (C) as well as milled pellets (MP) are good feedstock in particleboards manufacturing, no matter of the particle size. When comparing the two types, non-pelleted material gives overall better results.

## CONCLUSIONS

Making particle boards from pre-compacted biomass is an interesting idea, to improve the raw material supply chain for the particle board industry. However, we need to make more tests with other materials. Pellet making for particle board feedstock do not have to strive for making "top quality" pellets, but the focus should be on bulk density increment. Hence, there is more to explore regarding pellet quality requirements for this particular market.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 637020 –MOBILE FLIP.