

# Prolonging the storage of agri-waste by mixing with fibreboard waste

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## Research background

Intensive farming techniques are used in the Nantes region to grow: tomatoes; cucumbers; leeks; salads and others. The end of the growing season generates c. 20 k tons of waste, which cannot be composted because of the high level of plastic mixed it contains. A potential solution is to use biorefinery techniques to extract high-value compounds. This requires a viable long-term storage method and agri-wastes rot very quickly because of their high water contents (WC).

The volume of MDF waste generated around the world is increasing exponentially due to the rapid expansion of installed manufacturing capacity and the relative short lifespans of products made with MDF. Rather worryingly, there is no commercially viable method of recycling MDF.

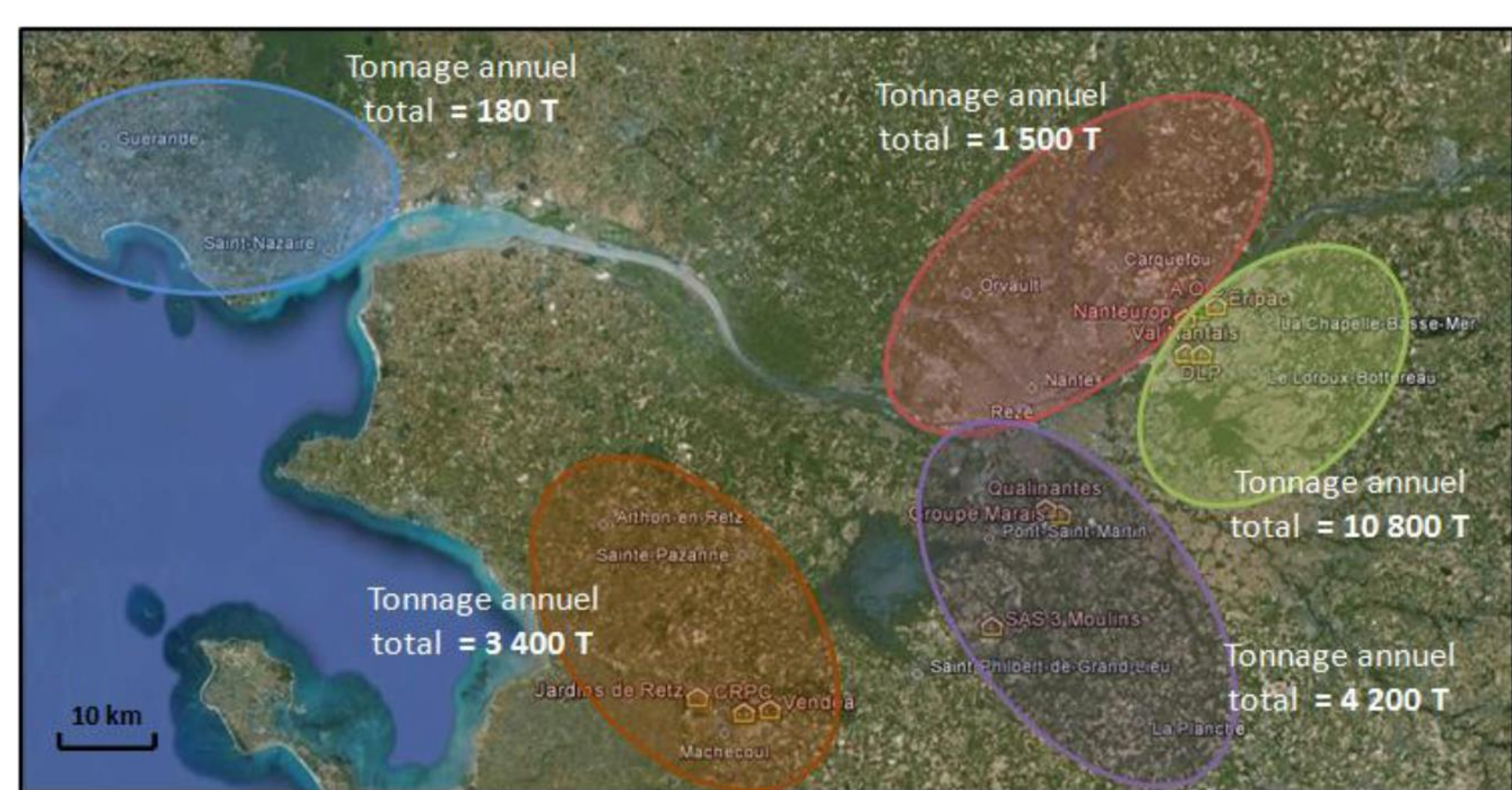


Figure 1: The main agri-waste producing areas.

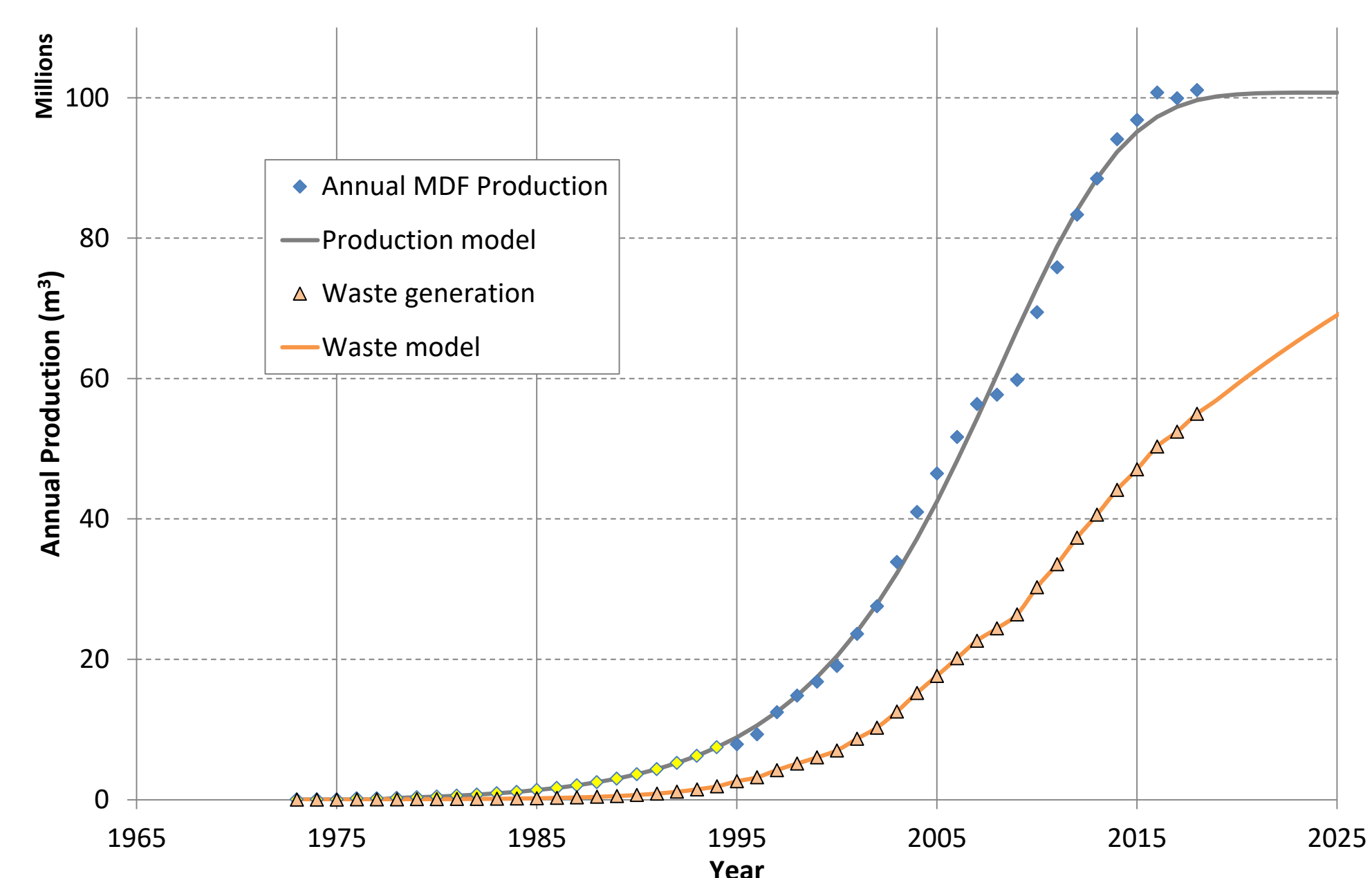


Figure 2: The global, annual production of MDF and MDF wastes.

**Aim:** The aim of this experiment was to determine if long-term storage of agri-wastes is possible by mixing them with MDF wastes.

## Material and Methods

Waste MDF was obtained from FINSA, Morcenx, France. The panels were cut into strips 7 mm wide, then passed through a garden waste chipper, followed by a laboratory grinder (Resch) without a screen. The cucumber waste was collected from Olivier S.C.A., Nantes, and then pressed to reduce its WC to approximately 84%, see Figure 3. was then mixed with waste MDF chips to give the desired water content of the mixture of 15%, 20%, 25% or 33%. The mix was formed into a mattress and pressed at approximately 8 MPa. Finally, the pressed cake was then placed in a plastic box for long-term storage.

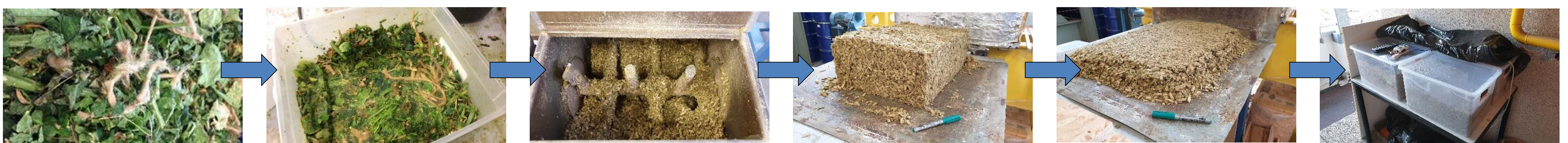


Figure 3: The main steps of making a "cake" of MDF chips and cucumber waste.

## Results

Figure 4 shows the temperature within the mixtures during storage. It would appear that the 25% and 33% mixes were warmer than the others and the ambient temperature. This could be caused by the continued metabolic processes within the cucumber and/or from metabolic processes of microbes attacking the agricultural waste. Visual assessment of the cucumber waste after nearly 1 year of storage indicates that the cucumber is in good condition, see Figure 5. The water content at the end of this storage period was 21.7%, which is sufficient to support biological attack. One possible explanation is that the concentration of formaldehyde in the air within the box prevents decay.

## Conclusion

The long-term storage of high-water content agricultural residues is possible if they are mixed with low-water content waste MDF

## ACKNOWLEDGEMENT

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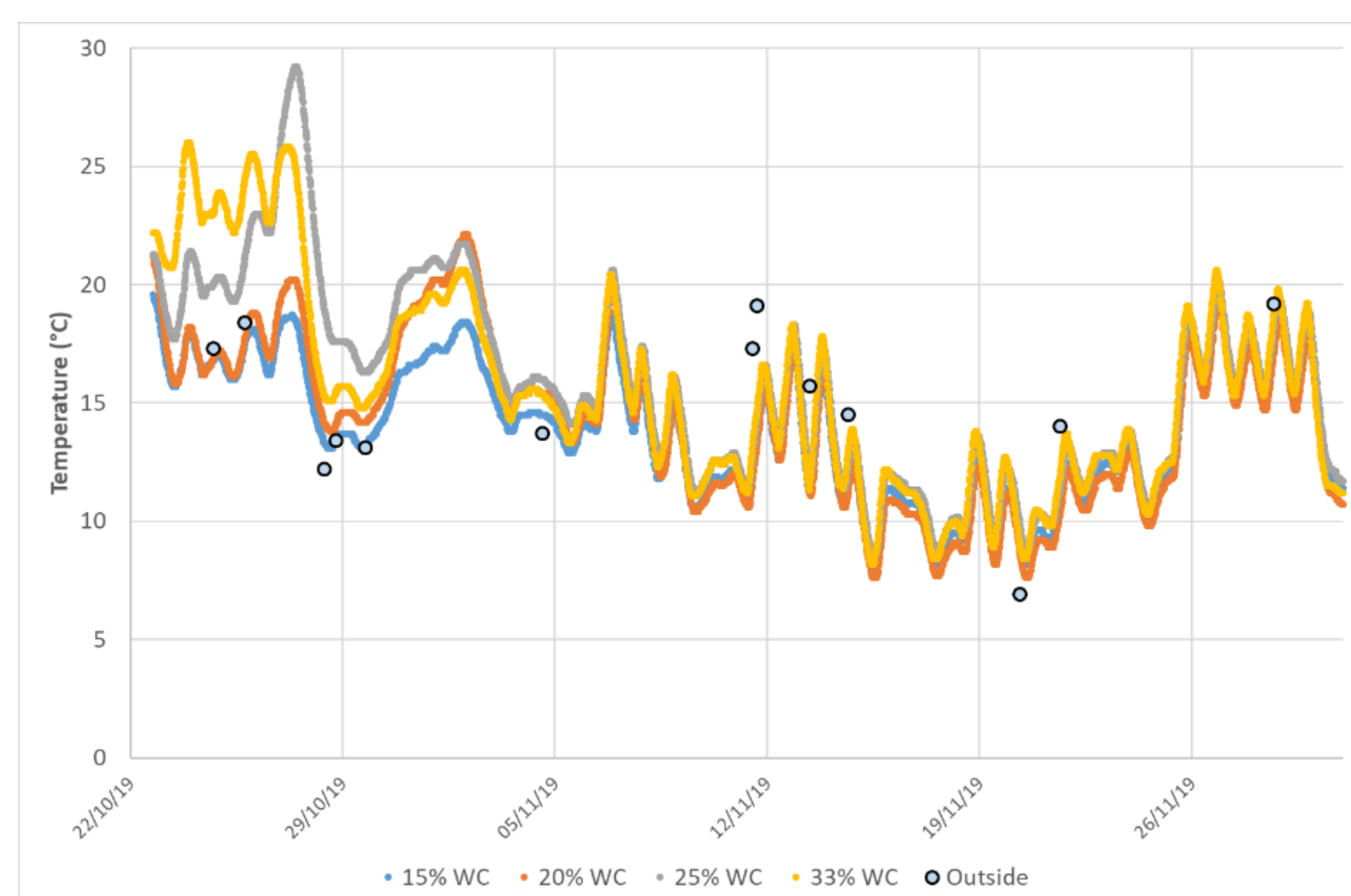


Figure 4: Temperatures of the mixes and ambient conditions.

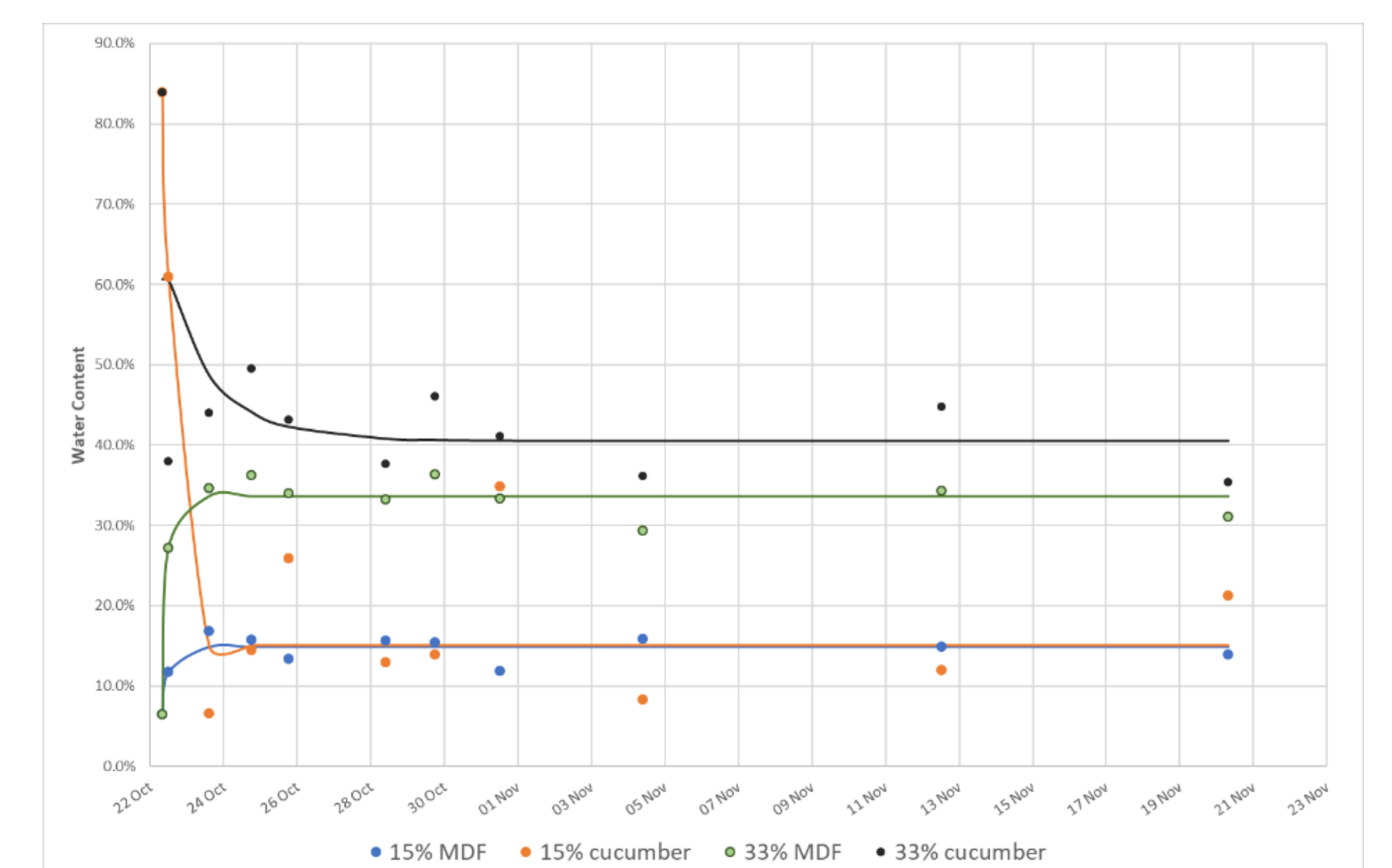


Figure 5: Changes in WC of the cucumber and MDF wastes.



Figure 6: The condition of the 33% water content mixture after nearly 1 year of storage.

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