

New recyclable MDF could help solve UK waste problem

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Cupboards. Credit: Andy Abbott

A new biodegradable and recyclable form of medium density fibreboard (MDF) has been created that could dramatically reduce the problem of future waste. Today (31 October), Professor Andrew Abbott is awarded the Royal Society Brian Mercer Award for Innovation 2013 that will help him make the critical step from prototype to product.

Almost one million tonnes of MDF is produced in the UK every year. It is a cheap and popular engineered wood product widely used for furniture and other products in homes, offices and retail businesses. However, as MDF cannot be recycled, waste MDF either has to be incinerated or ends up in landfill.

Professor Abbott and his team at the Department of Chemistry at the University of Leicester have developed a new wood-based product similar to MDF that uses a resin based on starch from completely natural sources, including potatoes.

Professor Anthony Cheetham, Vice President and Treasurer of the Royal Society said: "It is impressive to see someone take a material that is commonplace in all of our homes and solve its key limitations. Professor Abbott has managed to re-invent MDF, transforming it into a product that has much more relevance in an environmentally conscious society."

A significant proportion of MDF is used for short term applications in the retail sector. The use of a material which can either be recycled or composted would be a significant benefit to an industry often criticised for the amount of waste it generates.

MDF is made by breaking down bits of wood into wood fibres, which are then pressurised and stuck together with resin and wax. The resin is currently composed of urea and formaldehyde (UF), the use of which is restricted due to health concerns. Professor Abbott's new resin means that the use of UF is avoided and therefore so too are the associated concerns.

With the aid of colleagues at the Biocomposites Centre, Bangor University and the Leicestershire-based retail design company Sheridan and Co., his team have produced starch-based boards which have been

made into retail display units.

Professor Abbott's new material is easier to manufacture and easier to work with than current MDF boards.

The practical studies were led by Dr Will Wise who said: "It has been a technological challenge to develop material with the correct properties, but it is a great thrill to see the finished boards which look identical to the MDF which is so commonly used."

The new material is easier to manufacture than existing MDF as the components are easily pre-mixed and only set on the application of heat and pressure; end user feedback suggests it is also easier to work with than currently available MDF boards.

On receiving the Royal Society Brian Mercer Award for Innovation, Professor Abbott said: "The Brian Mercer Award is fundamental in enabling us to take this project forward to the next stage; it means we can now scale up our process from laboratory to the full scale manufacture of a product that I hope will revolutionise industries dependent on MDF and provide them with a more environmentally-friendly alternative."

Professor Abbott will receive £172,347, which will be used to bring the four collaborators together to create a supply chain to create prototypes for the point-of-sale market. The Brian Mercer Award for Innovation is a scheme for scientists who wish to develop an already proven concept or prototype into a near-market product ready for commercial exploitation.

Professor Abbott and his group at University of Leicester are also developing new fillers for plastics based on orange and banana peel and eggshell. These waste materials can lead to improved strength, hardness

and cost benefits.

Provided by University of Leicester

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