TENSILE AND FLEXURAL PROPERTIES OF UNSATURATED POLYESTER (UPR) COMPOSITES FILLED WITH EMPTY FRUIT BUNCH PALM OIL (EFBPO) AND CELLULOSE

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Introduction...(1)

- Natural fibers have several advantages compared to inorganic fillers such as lower density, renewability, improvement in the mechanical properties, increase in range of applications, biodegradability, greater deformability, enhanced energy recovery and relatively lower cost

- One of natural fibers which can be potentially used is **empty fruit bunch palm oil (EFBPO)**. If EFBPO can be treated further such as by bleaching and pulping, then the cellulose inside EFBPO could be extracted and used as fillers.

Introduction…..(2)

EFBPO → Cellulose

Introduction…(3)

- Thermosetting plastic commonly consisting of a liquid mixture with relatively low molar mass reactants as monomers and/or prepolymers, which polymerise on heating to form highly-crosslinked network of polymers

- One of commercial type of thermosetting matrix which is commonly used is unsaturated polyester (UPR). UPR has various properties among the other types of thermoset such as its relative affordability, lower shringkage, moldability at room temperature, resistance of thermal and weather condition

Objective

- To investigate the effect of filler contents on different types of fillers such as EFBPO and cellulose on tensile and flexural properties of composites produced.

Materials and Methods ...(1)

Materials

- EFBPO and Cellulose as Fillers
- UPR as Matrix
- Methyl Ethyl Ketone Peroxide (MEKP) as catalyst for curing agent

Variables

- Each of prepared fibres was mixed to UPR resin in different composition (5, 10, 15, 20) wt% then MEKP as curing agent was added 1,5% by weight of the resin

Preparations

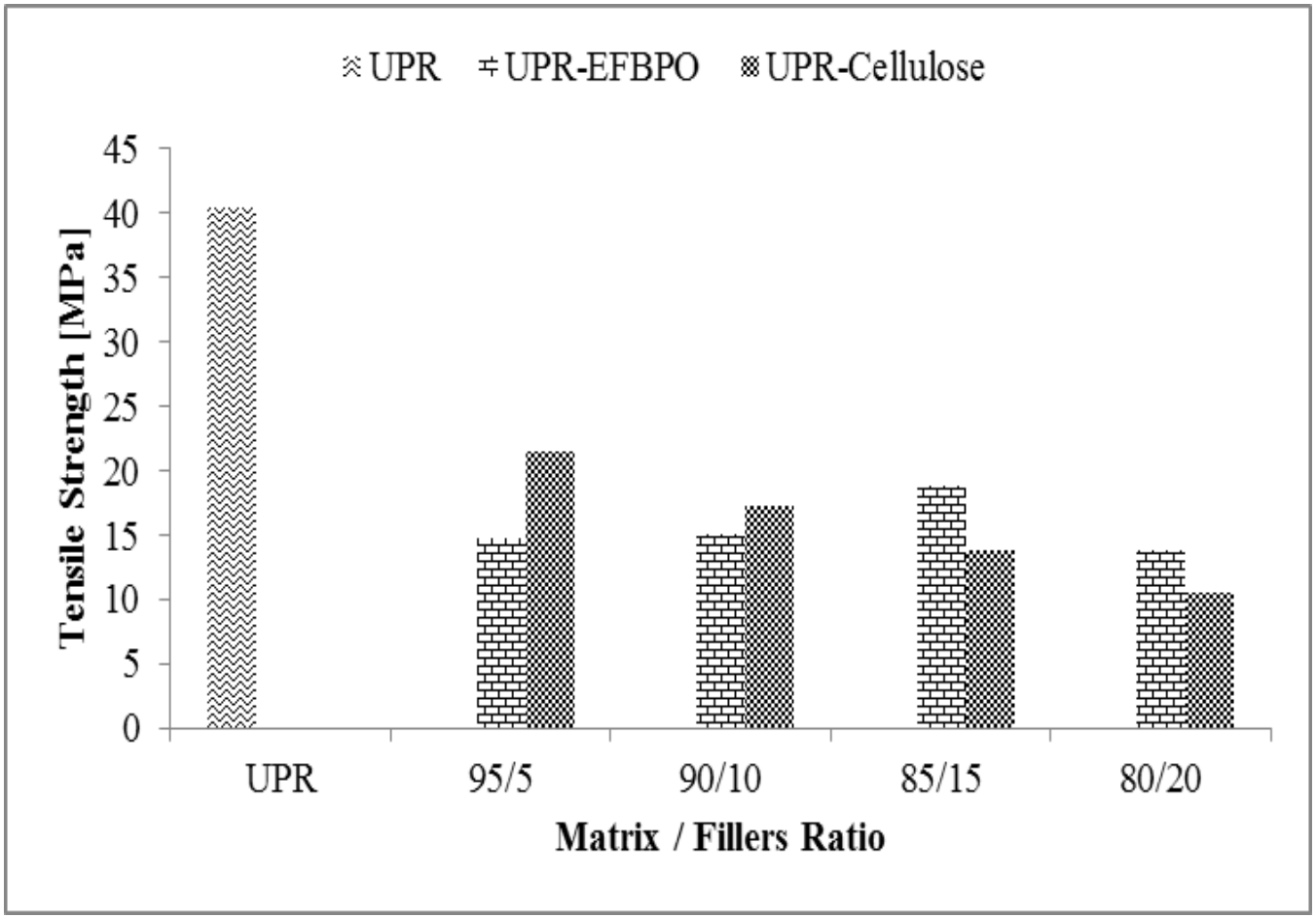
- The composites preparation was done based on hand-lay up method

Materials and Methods...(2)

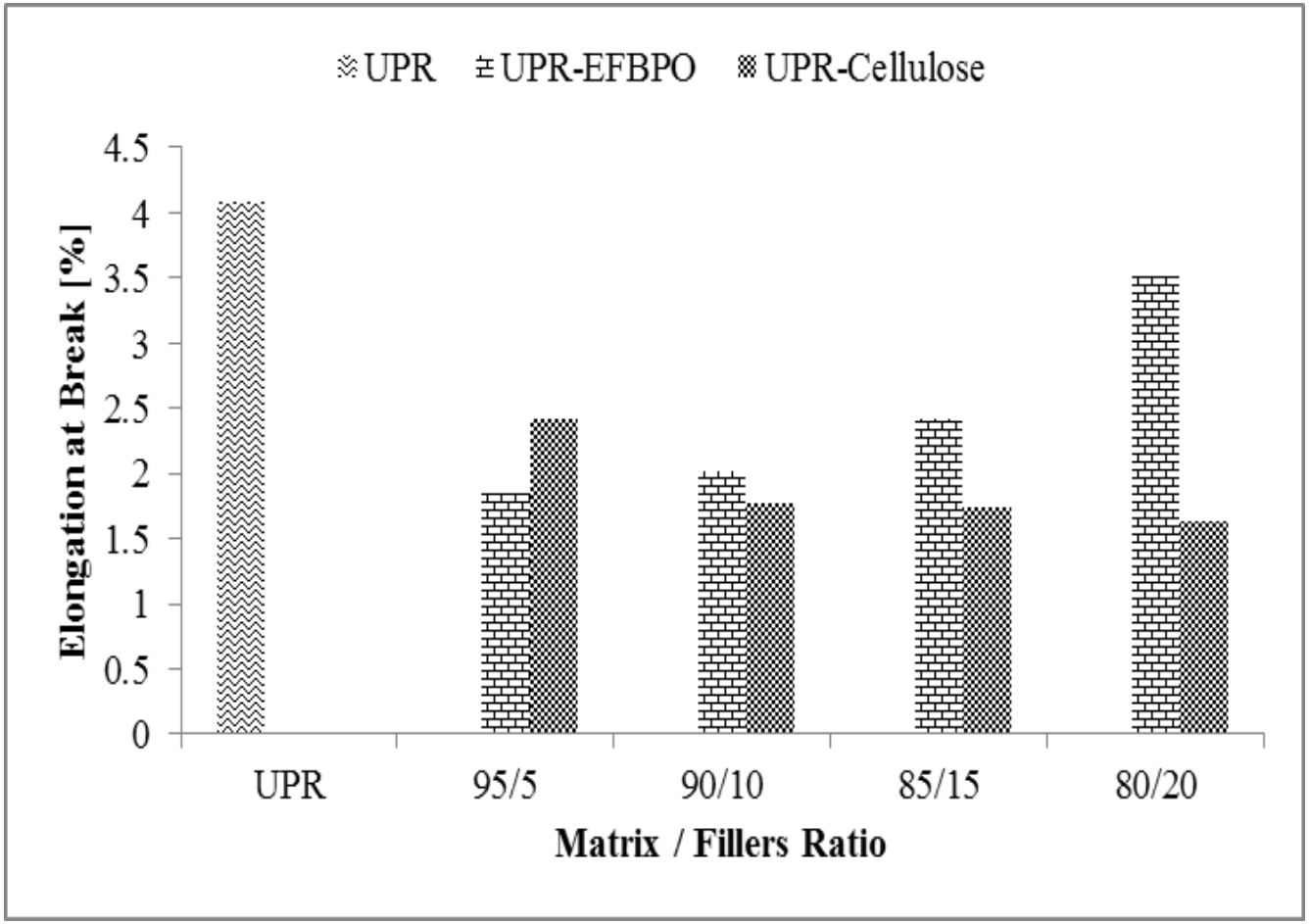
ASTM D-638

ASTM D-790

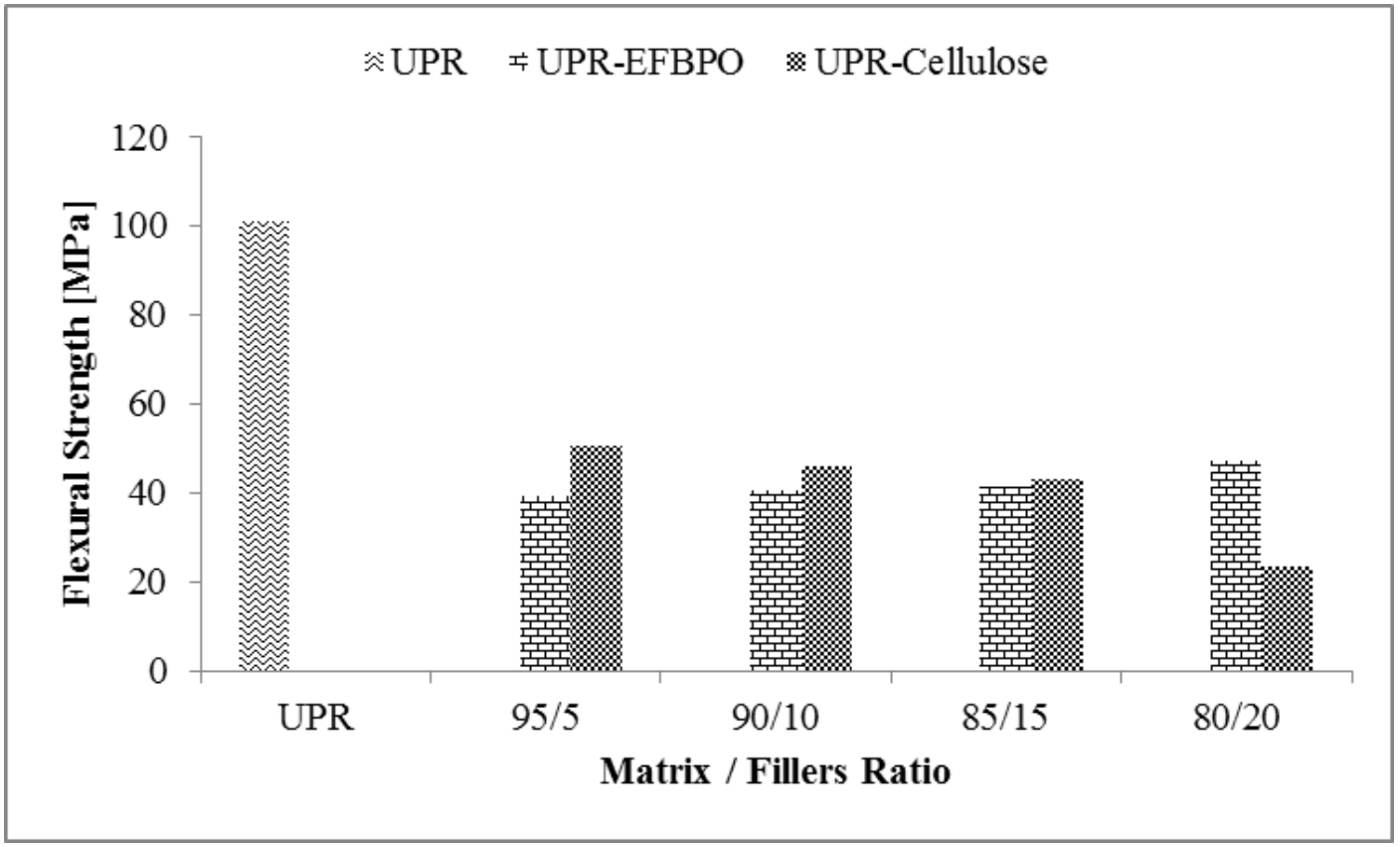
Results : Tensile Strength



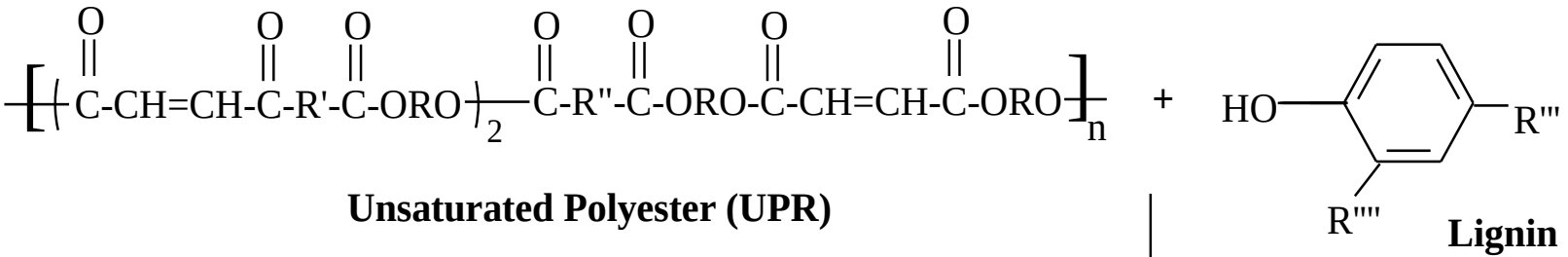
Results : Elongation at Break



Results : Flexural Strength

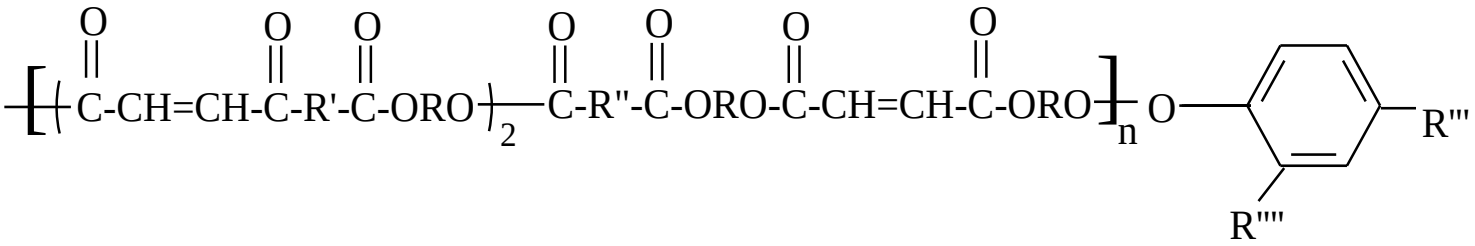


Results : Possibly Bonding



Unsaturated Polyester (UPR)

Lignin



Unsaturated Polyester (UPR)-Lignin

Conclusion

It is observed that utilization of natural fibers such as EFBPO and cellulose might not be able to increase yet the tensile and flexural strength of pure UPR. However, the elongation at break of 80/20 UPR/EFBPO composite has showed the highest elongation at break as compared to other ratios.


Thank You !