



**Hungarian University of Agriculture and Life Science  
Szent István Campus**

**Master Science in Mechanical Engineering**

**THESIS TITLE**

**Natural fibre reinforcement in composite polymer materials for additive  
manufacturing**

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## Summary

Now a days, additive manufacturing (3D printing) is gaining more popularity day by day due to its unique advantages and printing characteristics. In this research the main aim was to investigate the effect of natural fiber (jute fiber) reinforcement in the PETG filaments. The results of this research have shown significant increase in UTS of the reinforcement filaments after tensile tests. The main steps and findings of this research is given below:

- The research objective, needs and steps were redefined before starting the actual work.
- A wide range of literature was reviewed regarding the additive manufacturing technology, additive manufacturing processes, materials used in additive manufacturing, applications of additive manufacturing in different industries, etc.
- According to the research requirements a few machines were collected and developed. In our experiment we used a newly designed special machine, filament maker, which was used to make recycled and natural fiber reinforced filaments. Also, a filament cutter and mixture, a tensile test machine, a microscope, a FDM 3D printer was used.
- A few types of filament test including original PETG filament test, recycled PETG filament test, jute fiber reinforced filament test and FDM 3D printed standard test were carried out to compare the results.
- After all the test, the results were analyzed, the overall result shows that the jute reinforcement has increased the UTS of the PETG materials.