

### **Supervisor's Opinion on Ph.D. Thesis of Mr. Muhammad Sajid Faheem, M.Sc.**

The Ph.D. thesis of Mr. Muhammad Sajid Faheem, M.Sc. is titled "Biopolymer for reduction of cotton flammability". His Ph.D. study specialization is "Textile Technic and Material Engineering". He is excellent hardworking and good at research. During his Ph.D., he validated his skill to execute high quality research with full motivation and dedication.

This Ph.D. thesis is written well and comprehensively according to the required standard format. This Ph.D. thesis fulfills the outlined objectives. The main focus of this research work study is to scrutinize the applications of a biopolymer (bovine milk casein) on cotton fabrics as green and environment-friendly flame retardant finishing material.

Biopolymers are film forming materials with interesting properties generally which will be in future used in many applications. In the case of reduction of flammability it can be a way to prepare halogen and formaldehyde free composition that can replace common chemicals for cellulosic materials. Casein protein is applied on cotton fabrics just as it alone and in combination with other environment-friendly materials for synergistic effects through non-hazardous aqueous solutions and simple industrial applicable textile finishing techniques.

He performed all his work systematically with specific objectives and on a required scientific level. He organized and analyzed the data scientifically with logical discussions of results. The language and grammar level of the thesis is good and meet the Ph.D. standard. The conclusions of the thesis are interesting, valuable, and ready to be used in practice. Overall, the work shows his ability to design a realize research and evaluate and discuss experimental results including theoretical models.

His publication activities show that he is a high level researcher. During his Ph.D. research work he has a number of publications; including of 10 articles in impact factor journal, 4 book chapters and several international conference articles. Many others of his papers are now under review.

I therefore recommend the thesis of Mr. Muhammad Sajid Faheem for final defense.

  
**Prof. Ing. Jakub Wiener, Ph.D.**

**(Supervisor)**

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