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**Department of Textile Technology**

**Title of The Project: Design and Development of Anti-Diabetic Herbal Sutures Using Bamboo yarn**

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**Outcome of the UGC Minor Project 2021**

The present study was achieved to articulate a new herbal based suture for the diabetic potential patients and to assess its care through enhancing to Wister albino rats. *Trigonella Foenum-Graecum.L* (Fenugreek) Seeds, *Eclipta prostrata* leaves, *Aloe vera*, chitosan and honey were selected for this investigation and it was based on phytochemical, bioactive components and antioxidant properties. Herbal sutures were designed and developed into herbal hydrogel through preparation of various trials. Potential antioxidant, medicinal compounds was identified through screening test and GCMS study. Various amino acids were identified by the TLC paper chromatography in Fenugreek extract. The results of these investigation concluded that the HPLC chromatograms of 4-hydroxyisoleucine in fenugreek seed extract were very much closer to the standard reference both retention time value of the standard found to be 7 min 8 sec and the retention time of the 4-hydroxyisoleucine in the extract sample exhibited retention time 7 min 9 sec which is very much closer to reference standard. The results of FTIR analysis of FECAH hydrogel coated herbal sutures are confirming and containing OH, CO groups of phenolic acid compounds, carbohydrates, unconjugated ketone, carbonyl, and aliphatic xylan and aromatic rings, and CH groups of hemicellulose, cellulose, and lignin and comparing with normal suture without hydrogel coating which results of no more strong peaks. From the results of water uptake test, it was observed that the hydrogel coated herbal suture with higher porosity possess a good hydration and maintain good structural integrity capability, the water uptake ratio increased whereas normal suture having lower porosity and less water uptake. Due to this reason, the medicinal compound from the hydrogel released and enhancing the curing and wound contraction. The results showed that antibacterial activity is already in the bamboo yarn due to the presence of “Bamboo kun”. These results also indicate that the developed herbal suture and developed fenugreek hydrogel may be suitable to be used as wound barrier with antibacterial properties. The results of wound closure rate 100% was achieved on 17<sup>th</sup> and 20<sup>th</sup> day. It was achieved by the presence of 4-hydroxyisoleucine amino acid present in the FECAH hydrogel which stimulate the pancreas, which was balanced the blood glucose level and other medicinal compounds were increasing the wound closure rate.