A SCAFFOLD OF NANOFIBROUS MATRIX AS A DIABETIC WOUND DRESSING

IITM Technology Available for Licensing

Problem Statement

- In the present subject matter, the **problem** in **electrospinning agarosecurdlan blend** is that agarose & curdlan are soluble in hot aqueous solution at higher temperature, however they gel/solidify at room temperature and hence such **a blend could not** be employed **for the production of nanofibers** by means of electrospinning.
- The present invention addresses said problem and provides a **means for the production of scaffold**.

Technology Category/ Market

Technology: Scaffold of nanofibrous matrix;
Industry & Application Biotechnology & pharmaceutical companies; Biomedical Device;
Market: The global **scaffold technology** market is projected to grow **USD 5.09Bn by 2031,** at a **CAGR of 18%** during the forecast period **(2024-31)**

Technology

- Present patent is related to a **scaffold** comprising **a matrix of nanofibers**, which is meant for **healing chronic wounds** and is prepared from a blend of biocompatible polymers using an **electrospinning** technique.
- Further, said patent explains a **method** for producing a scaffold for chronic wound healing.
- Present Patent comprises a **matrix of nanofibers** of **biocompatible polymers** comprising agarose, curdlan, polyvinyl alcohol with or without antibacterial drug.
- Said **nanofibers** are a blend of biocompatible polymers comprising
- **1%-10%** w/v of agarose in formic acid or DMSO;
- **1%-5%** w/v of curdlan in formic acid or DMSO; and
- **10%-12%** w/v of polyvinyl alcohol in water,
- wherein the ratio of combination of agarose in formic acid or DMSO and curdlan in formic acid or DMSO to polyvinyl alcohol in water in the blend ranges from **1:2 to 1:4.**

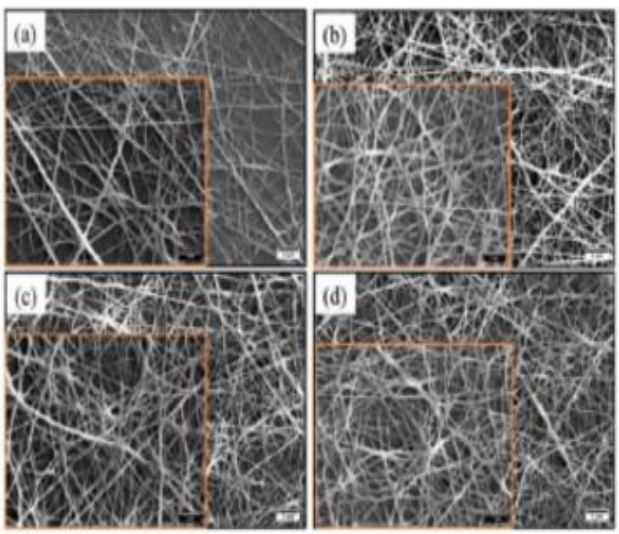

Fig.1 illustrates the scanning electron microscopy images (Scale- 1µm) (a) ACP, (b) ACP1%CFX, (c) ACP3%CFX, (d) ACP5%CFX

Intellectual Property

IITM IDF Ref. 2427;
IN Patent No. 523793 (Granted)

TRL (Technology Readiness Level)

TRL-3, Experimental proof of concept;

Research Lab

Prof. Sampath Kumar T S;
Dept. of Metallurgical and Materials Engg.
Prof. Mukesh Doble;
Dept. of Biotechnology

CONTACT US
Dr. Dara Ajay, Head TTO
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
https://ipm.icsr.in/ipm/

Email: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
Phone: +91-44-2257 9756/ 9719

Images

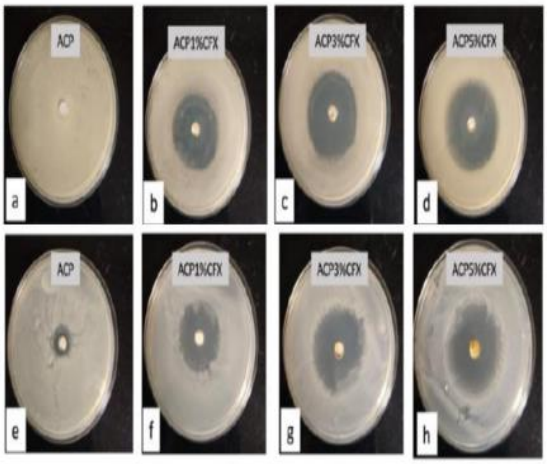

FIG.2: Depicts the Disc diffusion assay showing antibacterial efficacy of fabricated scaffold against E. coli
(a, b, c, and d for ACP, ACP1%CFX, ACP3%CFX, & ACP5%CFX respectively) and S. aureus(e, f, g, and h for ACP, ACP1%CFX, ACP3%CFX, and ACP5%CFX respectively).

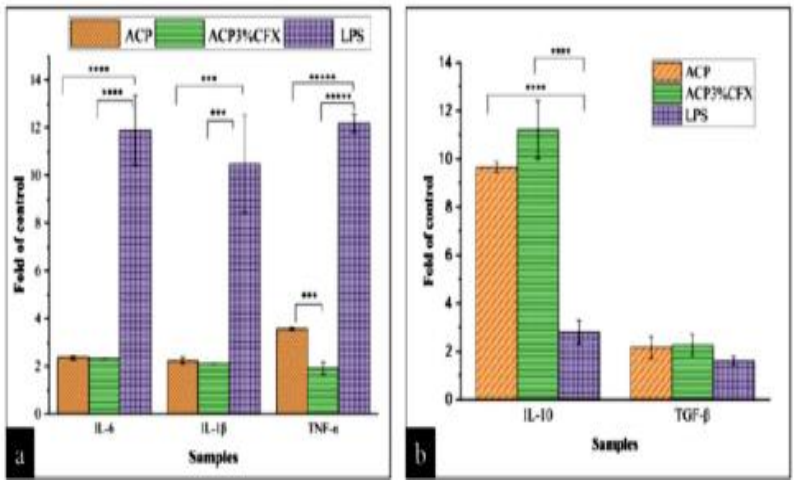

FIG.3a & 3b: Depicts In vitro gene expression levels of
(a) Inflammatory cytokines,
(b) Anti inflammatory cytokines, in THP-1 macrophages on treatment with ACP, and ACP3%

Key Features / Value Proposition

❖ ***Technical Perspective:***

Important Features:

- The nanofibers of biocompatible polymers further comprise **antibacterial drug,** and it helps combat infection and hasten the healing cascade.
- Said scaffold effectively absorbs the exude emanating from **chronic wounds** such as fungating wounds, fistulae, venous leg ulcers, and diabetic foot ulcers, and poses no exude leakage problem**,** & specifically advantageous for **healing said chronic wounds**.
- The scaffold facilitates **easy transmission into space-restricted wounds** (cavity wounds) with **greater flexibility**.
- The matrix of **nonwoven nanofibers** have diameter in the range of **115-146 nm** with effective exude absorption ability **(~ 450 – 500 % swelling**).
- **Exemplary:** Cell viability was **~90%** using mouse fibroblasts **(L929 cell line) i.e. better cell viability (Refer Fig 4a)**

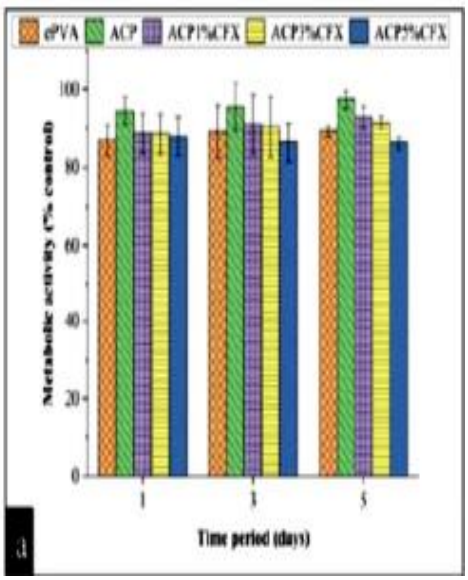

Fig. 4a: Shown Percent metabolic activity of fabricated scaffold with (a) L929 mouse fibroblasts;

CONTACT US
Dr. Dara Ajay, Head TTO
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
https://ipm.icsr.in/ipm/

Email: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
Phone: +91-44-2257 9756/ 9719