

## Anti-oxidant incorporated Amniotic Membrane (AM) for wound healing and method for developing thereof

### IITM Technology Available for Licensing

#### Problem Statement

- **Wounds** can lead to **oxidative stress** due to excessive Reactive Oxygen Species (**ROS**).
- Oxidative stress **delays** proper wound healing, damaging cells & inhibiting tissue regeneration.
- Existing wound healing treatments focus on anti-microbial, anti-inflammatory, and anti-oxidants but **may not effectively combat ROS**.
- There's a need for a biomaterial that can address **ROS accumulation & promote tissue regeneration**.
- The instant patent application proposes to **Develop an anti-oxidant incorporated Amniotic Membrane (AM)** that aims to provide a **more effective solution for wound healing & tissue regeneration**.

#### Technology Category/ Market

**Categories:** Biotechnology & Genetic Engineering, Drugs & Pharmaceutical Engineering

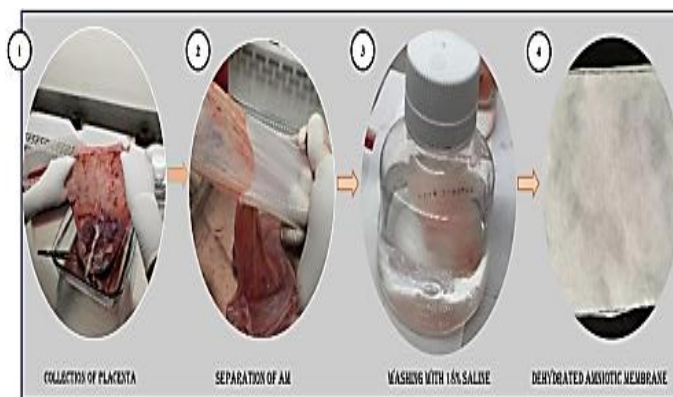
**Industry:** Biomaterials Technology, Antioxidant Technology, Regenerative Medicine, Pharmaceutical, Drug Delivery, Biomedical Engineering, Tissue Engineering, Biotechnology, Medical Devices.

**Applications:** Wound Healing, Tissue Regeneration, Dermatology, Ophthalmology, Orthopedics, Dental, Chronic Wounds, Cosmetic Medicine, Decellularization, Transplantation, Biocompatibility, Veterinary Medicine, Antioxidant Boosting Properties, Surface Modification, Versatile Concentrations.

**Market:** The global amniotic membrane (AM) market size was valued at **\$1,102.45M** in **2020**, its projected to reach **\$1,728.05M** by **2030**, registering a **CAGR of 4.6%** from **2021 to 2030**.

#### Technology

The present patent discloses a **method** for creating an **Amniotic Membrane (AM)** enhanced with the antioxidant **Embelin** for **wound healing**. The resulting AM-Embelin product offers enhanced wound healing properties, making it applicable in medicals. Refer FIG 1, 2 and 3. **FIG. 1: illustrates a step-by-step procedure for processing AM from human placental tissue.**



#### Key Features / Value Proposition

##### ❖ **User Perspective:**

- **Speedy Healing:** Get better faster.
- **Less Scarring:** Smoother healing, fewer scars.
- **Help for Tough Cases.**
- **Less Pain:** Faster healing means less discomfort.
- **Many Uses:** Useful in various medical areas.

##### ❖ **Industrial Perspective:**

- **New Market:** Explore wound care & tissue products.
- **Diverse Range:** Add unique wound care items.
- **Competitive Edge:** Has a better healing products.
- **Research Support:** Back research in tissue repair.
- **Possible Partnerships** with healthcare & research.

##### ❖ **Technology Perspective:**

- **Innovative:** A fresh way to heal and regenerate.
- **Proven Science:** Supported by research.
- **Easy to Make:** Can be made in bulk for patients.
- Combines biology, chemistry, & medical material growth.
- **Links Lab Work to Real Life:** Helps lab discoveries become real-world treatments.

#### Intellectual Property

IITM IDF No: 2290  
Patent Grant Number: 452649

#### TRL (Technology Readiness Level)

TRL - 4, Experimentally validated in lab.

#### Research Lab

Prof. Rama S Verma  
Department of Biotechnology

#### CONTACT US

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

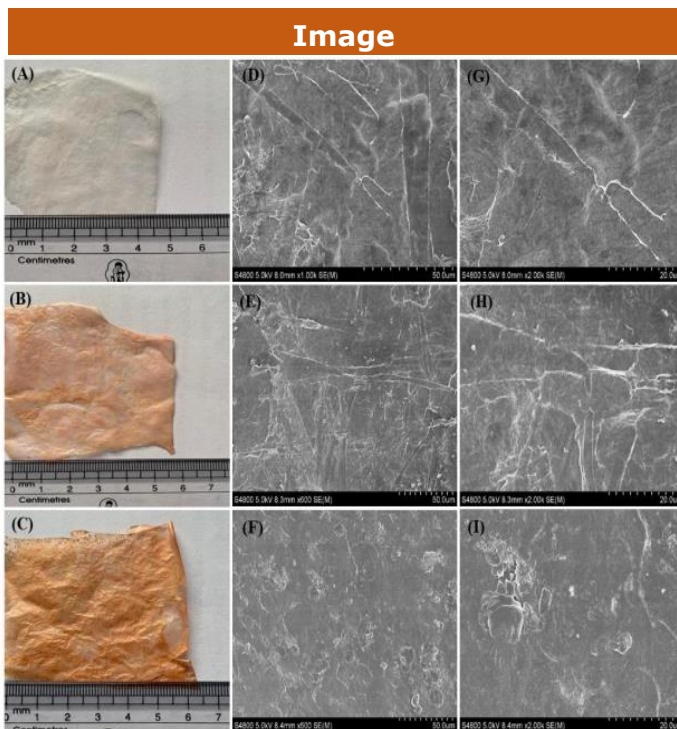
IITM TTO Website:  
<https://ipm.icsr.in/ipm/>

Email: [smipm-icsr@icsrps.iitm.ac.in](mailto:smipm-icsr@icsrps.iitm.ac.in)  
[sm-marketing@imail.iitm.ac.in](mailto:sm-marketing@imail.iitm.ac.in)

Phone: +91-44-2257 9756/ 9719

## Anti-oxidant incorporated Amniotic Membrane (AM) for wound healing and method for developing thereof

**IITM Technology Available for Licensing**



**FIG. 2A** illustrates optical image of the AM

**FIG. 2B** shows optical image of 5% Embelin coated AM

**FIG. 2C** shows optical image of 10% Embelin coated AM

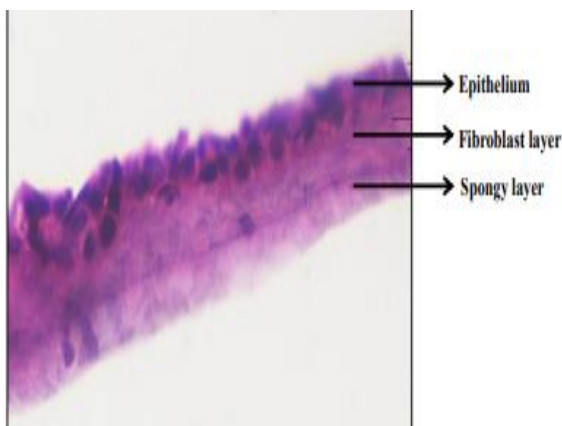
**FIG. 6D-6F** are SEM micrographs at 50μm of the AM, the 5% Embelin coated AM and the 10% Embelin coated AM respectively

**FIG. 6G-6I** are SEM micrographs at 20μm of the AM, the 5% Embelin coated AM and the 10% Embelin coated AM respectively



**FIG. 3A** illustrates an optical image of dehydrated Amniotic Membrane (dAM);

**FIG. 3B** illustrates H&E Staining of the dAM revealing integrity of membrane (40X Objective)



### Method

The method involves processing **dehydrated AM** from **human placenta**, treating it with **EDTA** for **decellularization**, preparing an **Embelin solution**, and coating the AM with this solution. **Here is the description of the method in points:**

- **Preparation:** Obtain dehydrated Amniotic Membrane (AM) from a human placenta, ensuring it's clean and sterile.

- **Decellularization:** Treat the dehydrated AM with a 0.02% Ethylene Diamine Tetra Acetic Acid (EDTA) solution for 2 hours at 37°C to remove cellular components.

- **Embelin Solution:** Prepare a solution of Embelin by dispersing it in Milli Q water at concentrations of 0.05% and 0.1%. This solution is obtained after sonication and filtration.

- **Coating:** Apply the Embelin solution evenly on the surface of the dehydrated AM.

- **Adsorption:** Allow the Embelin solution to adsorb onto the AM surface.

- **Incubation:** Incubate the treated AM-Embelin product horizontally at room temperature for 30 minutes and in a laminar hood for more 30 minutes.

- **Result:** The final product is an Amniotic Membrane incorporated with the antioxidant Embelin, ready for use in wound healing applications.

### CONTACT US

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

**IITM TTO Website:**  
<https://ipm.icsr.in/ipm/>

**Email:** [smipm-icsr@icsrpis.iitm.ac.in](mailto:smipm-icsr@icsrpis.iitm.ac.in)  
[sm-marketing@imail.iitm.ac.in](mailto:sm-marketing@imail.iitm.ac.in)

**Phone:** +91-44-2257 9756/ 9719