FUSIONWORLD

BIO-SCAFFOLD

BIO-COMPATIBLE SCAFFOLD DEVELOPED FOR FUTURE TOOTH EXTRACTION

(From left)

1) Porous scaffold developed by A*STAR

2) Alvelac Bio-scaffold

3) Insertion and placement of Bio-Scaffold

CHALLENGES

The research focus in tissue engineering scaffold is to use design to manufacture an ideal scaffold using conventional manufacturing methods such as particulate leaching and phase separation, addictive manufacturing or other similar methods. However, the current technological restrictions in process and equipment pose serious constraint in achieving the ideal scaffold design. Moreover, the use of particulate leaching or phase separation methods has limitations on porosity distribution and interconnectivity. This is due to the contrasting nature of properties, such as high porosity that compromises strength and vice versa. Human tissues are often complex. This requires such complex combination of properties for producing bio-mimicking implants that aid healing or replacement of damaged tissue without much complications. Current technologies do not have the capabilities of producing a scaffold with judicial compromise of properties.

OUR SOLUTION

Considering the challenges, we developed a disruptive combination production process for biopolymeric scaffold by identifying the intrinsic requirements such as graded properties and bio-activity required for tissue implants. This method is used to develop scaffolds with a combination of porosity and strength that could potentially bio-mimic the tissue in consideration.

BENEFITS

The processing method is disruptive which uses 3D printing of scaffolds in combination with post-printing process to produce scaffolds with strengths and porosity that would bio-mimic tissue properties. The devised process facilitates engineering the strengthporosity combinations to suit the requirements of tissue implants in various applications, which include dentistry, cosmetology and orthopedics.

APPLICATIONS

There are many application possiblities, such as scaffolds for repair of non-load bearing tissues in oral maxillofacial, dentistry, cosmetology and orthopedics. SIMTech, worked in collaboration with the NUS Faculty of Dentistry and a local company, to develop a novel application of Dental Alveolar Scaffold, Bioscaff Alvelac, which is used to address the bone loss after a tooth extraction. A*STAR has been working closely with the company to help them develop this further for other exciting applications.

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