

# TECHNOLOGY AVAILABLE FOR TRANSFER

## A Novel, Zero Shrinkage Dental Composite



### Key Features

- Zero shrinkage
- Enthalpy is more than 50% less
- Self-adhesive ability (equivalent to at least that of LCGIC)
- High degree of conversion (80-99%)
- Uninhibited polymerization in the presence of oxygen
- Low cytotoxicity
- Elution of potentially harmful moieties is either nil or less

### Stage of Development

- This is a lab scale validated technology
- Biocompatibility as assessed by in-vitro tests is very favorable
- Photo-DSC was done in NETZ lab, Germany showing low enthalpy and high degree of conversion

### Applications

- Dental composites
- Bone cement

### Intellectual Property

- Patent Pending in India
- PCT application filed

### Inventor

- V. Susila Anand, Prof & Head, Dept. of Conservative Dentistry & Endodontics, Madha Dental College & Hospital
- Dr. Venkatesh Balasubramanian Professor  
Department of Engineering Design  
Indian Institute of Technology Madras



### Background

Polymeric biomaterials are used in Dental composites as restorative material or adhesives. The dental composites are widely used for filling cavity preparations, filling gaps between teeth, minor reshaping of teeth, and as inlays or onlays.

In recent years, the dental composites are used as dental restorative material. Typically, the dental composite consists of organic resin based matrix, Filler, Fluidizer and a Diluent. The organic resin based matrix mostly includes a bisphenol A-glycidyl methacrylate (Bis-GMA) or urethane dimethacrylate (UDMA) which are highly viscous and difficult to use at room temperature. Fluidizers are used to provide low viscosity such as TEGDMA/docecanediol dimethacrylate which cause shrinkage and higher elution of harmful chemicals. Shrinkage causes gaps leading to bacterial infection leading to caries and pulpitis. While elution may cause tissue damage.

Thus, there is a need for a composition of a dental composite which exhibit improved aesthetics yet provide high degree of conversion, low elution, has self-adhesive ability, low polymerization shrinkage, low cytotoxicity, and low-post operative sensitivity.

### Validation

In vitro cytotoxicity tests were done in external labs ; Photo-DSC was done in NETZ lab, Germa-

### Technology

The technology relates to polymeric biomaterials more specifically for restorative dentistry, broadly to a composition for an organic resin matrix which can be used for cementation of implants, endodontic sealers, root repair materials, root end filling materials, and luting cements.

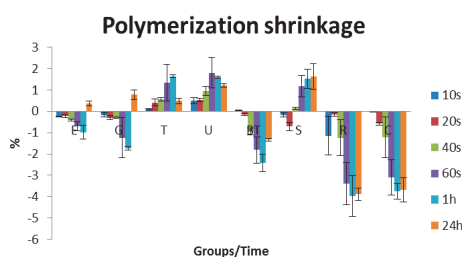
The new composite developed does not shrink or elute and hence is more biocompatible. The low cytotoxicity of the dental composite is a result of low elution of undesirable substances.

Another advantage of the new formulation is that it has more than 50% reduction in the exothermic heat of polymerization, further making it tissue friendly during the curing reaction. These properties qualify the material for other biomedical uses like bone cement apart from dental restorations.

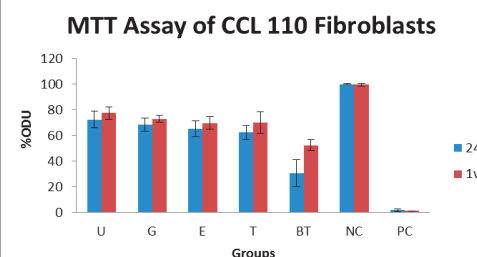
### Market

The Global Dental Restorative Materials Market has been evaluated as rapidly growing market and it is projected to grow significantly at a steady CAGR of 5.5% during 2016 to 2022. There has been a tremendous growth in the number of people getting their teeth fixed. People are becoming more aware about the aesthetic value of the perfect and healthy teeth. Damage in the teeth in most cases is directly linked with the eating habits. Children under age 12 are more prone to damage their

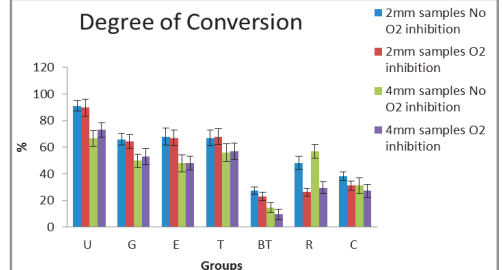
Graph 1



Graph 2



Graph 3



### Contact Us

Dr. Suchita Markan  
Assistant General Manager  
**Biotech Consortium India Limited**  
Anuvrat Bhawan, 5th Floor, 210,  
Deen Dayal Upadhyaya Marg,  
New Delhi - 110002  
Tel: +91-11-23219056 (D), 23219064-67,  
Email: suchita@biotech.co.in or info.bcil@nic.in  
Website: <http://www.bcil.nic.in>

ny. The composite material has been compared with the Conventional materials for various aspects such as degree of conversion, elution, shrinkage, cytotoxicity etc and found to be better as depicted in the graphs. The U, G, T and E are experimental compositions which clearly show higher degree of conversion, low cytotoxicity and negative shrinkage (U and T)

teeth because of the eating chocolates and sweets and not taking proper care of the teeth. Rise in the accidental cases has also heavily boosted the dental industry.

([http://www.abnewswire.com/pressreleases/dental-restorative-material-market-projected-to-grow-significantly-at-a-steady-cagr-of-55-during-2016-to-2022\\_100456.html](http://www.abnewswire.com/pressreleases/dental-restorative-material-market-projected-to-grow-significantly-at-a-steady-cagr-of-55-during-2016-to-2022_100456.html))