

**19<sup>th</sup>**

**International Technical Footwear Congress**

**February 03-05, 2016, Chennai, INDIA**

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**CIATEC**

# **Tannery Blue Waste as Raw Material for Plastic Composites Fabrication**

project developed by

**Dr. Sergio Alonso Romero**

and

**Dr. Roberto Zitzumbo Guzmán**



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## INTRODUCTION

**CIATEC**, since its founding 39 years ago, has responded to the needs of shoe industry in terms of technological innovation in diverse areas such as leather-footwear. Now CIATEC has also focused its attention to **materials research**, biomechanics and environmental engineering.

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**Tecnología Avanzada para la Creación de Valor**  
*Advance technology for the best value*

Proyectos de investigación para aumentar la **Productividad y Competitividad** de las empresas  
*R & D for enterprises competitiveness and productivity*

- Cuero-Calzado
- Biomecánica
- Materiales
- Ambiental

**CIATEC**

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**CONACYT**  
Consejo Nacional de Ciencia y Tecnología

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## OUTLINE

- Problem faced and alternative
- Objectives
- Metodology
- Results
- Conclusions





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## PROBLEM

## LEATHER BLUE WASTE

- The **manufacture** of leather involve **wastes**
- After the **tanning** step, the leather **thickness** should be **adjusted**, generating **blue leather** waste



- **Alternative** of use of 40 ton/day
- Environmental **benefits**



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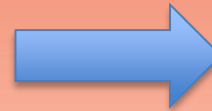
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### ALTERNATIVE

## NEW VALUE-ADDED RAW MATERIAL

- **PLASTIC + LEATHER WASTE = NEW COMPOSITE**



- **Leather** blue waste **treated and combined** with **plastic** by means of a **proprietary** process and formula
- A **variety** of **articles** can be **manufactured**



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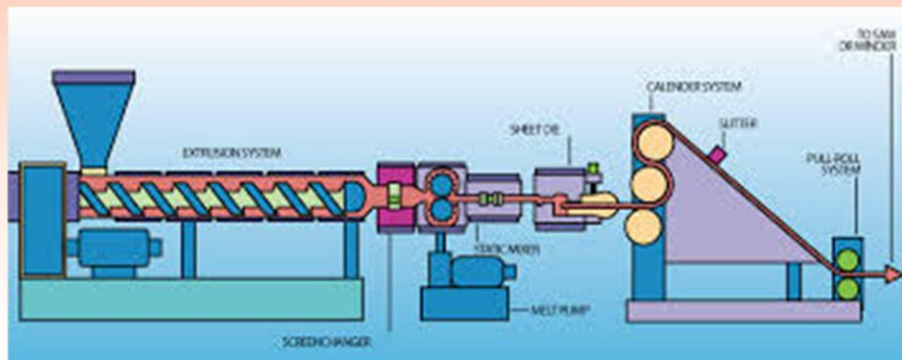
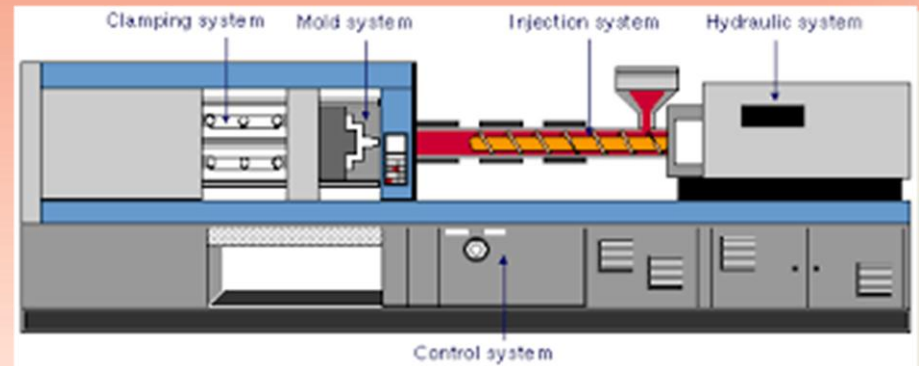
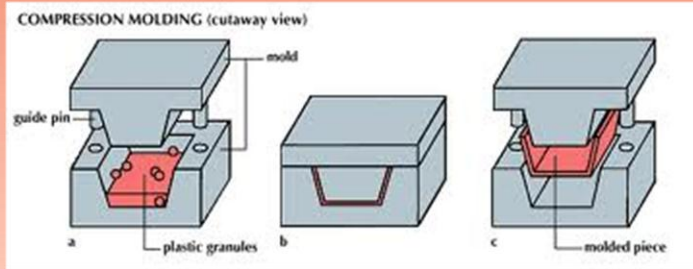
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## PROCESSING

## USEFUL PROCESSING TECHNOLOGIES

- The **composite material** can be transformed into **valuable industrial products** either by **extrusion**, **injection**, and **compression molding** processes.



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## OBJECTIVES

## GENERAL AND SPECIFIC OBJECTIVES

- To **investigate** the **mechanical properties** of the leather blue waste – plastic **composite** to better **understand** the material behavior.
- ***Specific objectives***
  - To **characterize** the material under different **waste concentrations**.
  - To **characterize** the material under different **processing** technologies
  - To envisage the possible applications of the composite

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## METHODOLOGY

## PROCESSING TECHNOLOGIES AND FORMULAS

- Composition: **virgin plastic, 15% and 25% blue waste concentrations**

- **Processing technologies:**

- Virgin plastic: **injection** =

|

- Virgin plastic and composite: extrusion + **injection** =

|+E

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## TRACTION TEST

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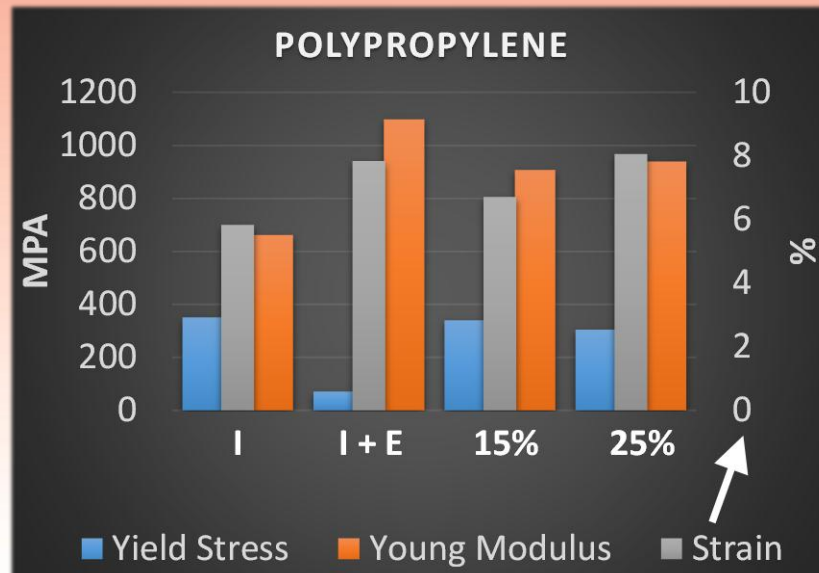
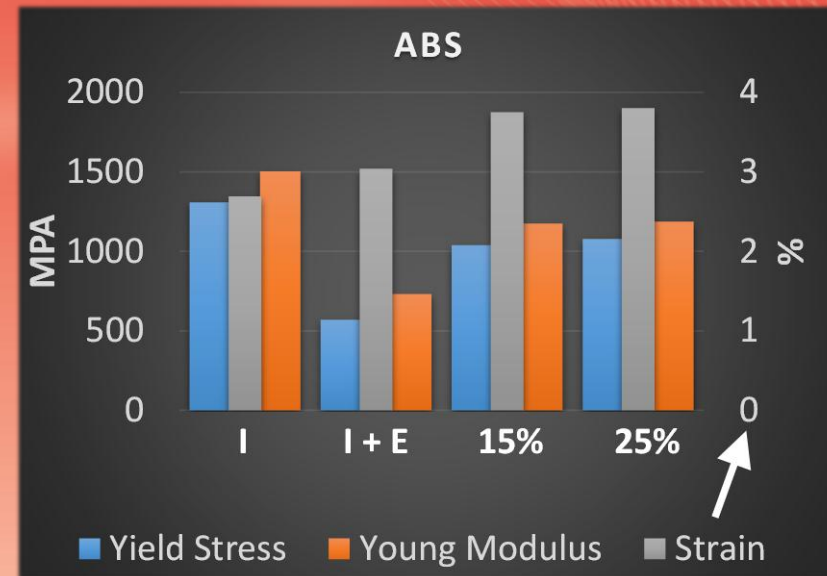
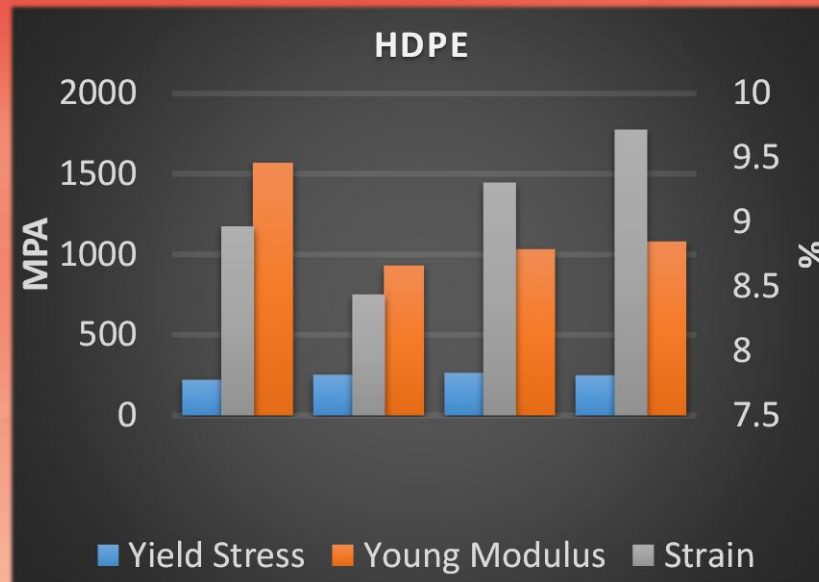


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### IZOD TEST

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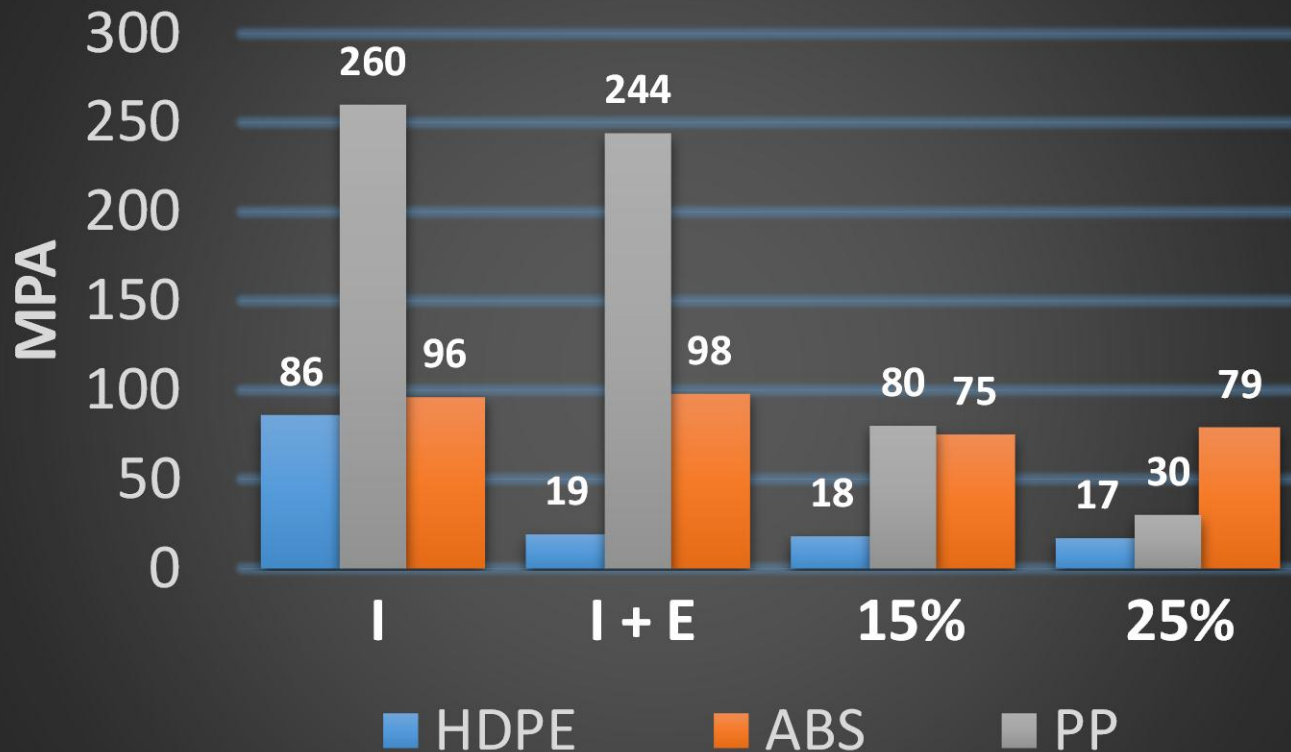
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### IMPACT STRENGTH



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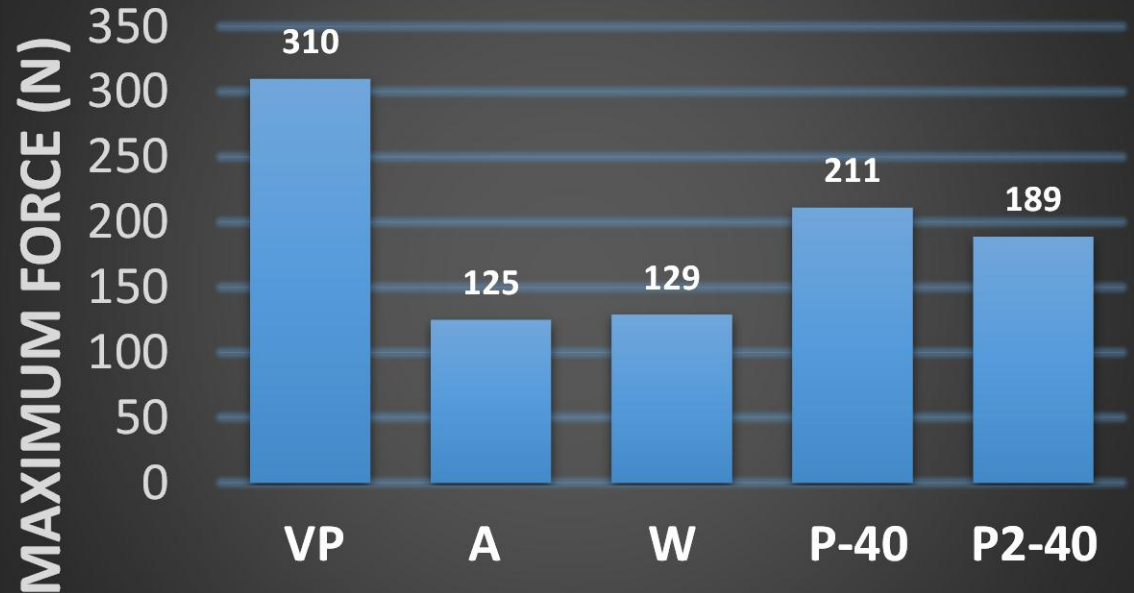
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## T COMPRESSION (MOLDED)

### PMMA AND OTHERS



NOMENCLATURE	DEFLEXION (mm)
VP: HIGH QUALITY CERAMIC FLOOR	2.25
A: BATHROOM FLOOR	2.12
PINE WOOD	7.71





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## CURRENT APPLICATION

## SHOE HEEL AND PLATFORMS (ABS)



- Shoe heels and platforms
- Colorful alternatives
- Same raw material as typical heels



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## CONCLUSIONS

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## ADVANTAGES

- The **inclusion** of **chrome leather waste** residue to the virgin **plastic** generates a **composite material** whose **cost is reduced** compared to that of the virgin plastic being used.
- **It** also **maintains** most of the **mechanical properties**.
- ***The technology:***
  - **valorizes** a leather residue
  - provides **alternatives** of use
  - contributes to **reduce** the use of non-renewable resources such as **plastics**
  - **Avoids** the **confinement** of a **contaminant**





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## FORECAST SELLING

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## NAPPA PLASTICS : manufacture and mkt



➤ Tiles

➤ Profiles

➤ Bathroom

➤ Pallets

➤ Fake stone walls

➤ Containers





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