# Development of Dow-based Solutions focused on material reduction for Breathable Backsheet films

**Master thesis presented by Eduard de las Heras García**

To obtain the Master Degree in Chemical Engineering from the Universitat Rovira I Virgili


Company Supervisor: Albert Carbonell (acarbonell@dow.com)

URV Tutor: Antoni Cabello Rimbau

*Tarragona, January 2024*

# ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to the various individuals and teams whose selfless support and collaboration were instrumental in the successful completion of this research project.

I would like to extend my sincere gratitude to Albert Carbonell and Natacha Bitinis for their invaluable contributions in broadening my perspective and facilitating my introduction to the Healthcare and Hygiene Department. Their wealth of knowledge and expertise have been instrumental in providing me with a comprehensive understanding of the department's principles and intricacies. Albert's and Natacha's dedication to sharing their expertise has not only enriched me professionally and personally but has also played a pivotal role in seamlessly integrating me into the workings of the department. Their mentorship has been a cornerstone in navigating the complexities of healthcare and hygiene previous findings and technical concepts.

Also, the cooperation and easy communication with the other departments' engineering teams whose innovative contributions and problem-solving skills greatly enhanced the project's overall quality. Their collaborative spirit and willingness to tackle challenges head-on were crucial in overcoming technical hurdles and ensuring the project's success.

Moreover, I extend my deepest appreciation to the dedicated members of the physical testing lab, analytical lab, and manufacturing teams. Their expertise, commitment, and tireless efforts significantly contributed to the experimental aspects of this study. The synergy between the research endeavors and their technical prowess played a pivotal role in achieving meaningful results and overcoming the challenges. From that, I wanted to give a special highlight to Elisenda Sugranyes, my lab coach, whose unwavering support, guidance, and expertise were integral to overcoming the challenges encountered throughout the project complexities.

I am also indebted to Salma El Marrasse, the leader of the I2C program. It was under her guidance and mentorship that I had the privilege to join the TS&D Department thanks to the Work Experience Award, where Dow, together with the university allows the most promising students to work on such relevant projects and introduce them to their professional careers. With that, I discovered a direct-customer-oriented path that I was unaware of as a chemical engineer. I am immensely grateful for the opportunity she provided me to explore and learn from the diverse perspectives within the department.

Moreover, I would like to extend a heartfelt acknowledgment to the I2C students who I met during this journey. The moments of collaborative learning and shared experiences were invaluable, and their positive impact on both the project and my personal growth is immeasurable. The support from my I2C students' coworkers added a unique dimension to this research endeavor, creating a vibrant, multicultural and dynamic environment that greatly enriched the overall experience.

# ABSTRACT

Backsheet films are frequently employed in the hygiene sector to act as a protective layer against liquids in products like baby diapers, feminine hygiene items, and adult incontinence products, for certain applications these films can require to obtain certain levels of breathability to ensure skin health.

This breathable structure is commonly made by the stretching of films with a high content of inorganic filler ($CaCO_3$) and polyethylene resins, where Dow's contribution comes from.

Breathable backsheet films represent a significant share within EMEA Healthcare and Hygiene market.

Due to the forecast of population growth expected for the next 30 years, there is a need to work on an innovation pipeline by the incorporation of new resin solutions/configurations that can further differentiate through innovation.

**This study is focused on improving the mechanical properties for breathable backsheet films at lower thicknesses, where certain levels of breathability must be ensured within the structure.**

In this work, it will be evaluated the use of new structures and resins to improve the mechanical properties of highly porous and stretched-type films while maintaining breathability.

The success of the project will allow Dow to promote new solutions to the market while advancing on the sustainability targets of customers, as high-performance films can lead to potential downgauging of customer's films.

*In the interest of ongoing activities associated with the findings derived from this research, the detailed approach employed in this project, the market trend analysis, previous work research, approach definition, design of experiments, results discussion and conclusions has been deliberately omitted from the public version of the master thesis. This measure is taken to safeguard intellectual property and proprietary methods integral to the research outcomes. For further details regarding the project approach, results discussion and conclusions, interested parties may contact the company tutor under non-disclosure agreements.*

*Albert Carbonell Blanch (ACarbonell@dow.com)*

*Natacha Bitinis (nbitinis@dow.com)*