

CHELSEA CENTER FOR RECYCLING AND ECONOMIC DEVELOPMENT

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Compounding and Testing of Recovered Colored Polypropylene for the Preserve[®] Toothbrush

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The Chelsea Center for Recycling and Economic Development, a part of the University of Massachusetts' Center for Environmentally Appropriate Materials, was created by the Commonwealth of Massachusetts in 1995 to create jobs, support recycling efforts, and help the economy and the environment by increasing the use of recyclables by manufacturers. The mission of the Chelsea Center is to develop an infrastructure for a sustainable materials economy in Massachusetts, where businesses will thrive that rely on locally discarded goods as their feedstock and that minimize pressure on the environment by reducing waste, pollution, dependence on virgin materials, and dependence on disposal facilities. Further information can be obtained by writing the Chelsea Center for Recycling and Economic Development, 180 Second Street, Chelsea, MA 02150.

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1. ABSTRACT

From its client base of approximately 1,300 retailers and their customers, Recycline (Recycline or the Company) has learned that a variety of colors for the handle of the *Preserve*[®] toothbrush increases the attractiveness of the product, as color is one of the top buying criteria for consumers. The recycled polypropylene that Recycline sources for its *Preserve* toothbrush has until this point been a natural color (an uncolored state). Recycline has used color additives during the compounding process or in the production process to produce the *Preserve's* color.

With funding from a grant from the Chelsea Center for Recycling and Economic Development, Recycline has tested the use of pre-colored recycled polypropylene. The Company identified several suppliers of pre-colored recycled polypropylene. After purchasing 5,400 lbs. of material, the Company compounded and tested this material with New Frontier Plastic Company in Springfield, Massachusetts, and is now in the process of producing six separate colored handles from this material.

2. BACKGROUND

Each year discarded toothbrushes account for an estimated 50 million pounds of plastic waste in the United States. With dentists continuing to recommend more frequent replacement, this number will likely increase. By manufacturing the *Preserve* from recycled polypropylene and providing a postage-paid recycling mailer, Recycline seeks to provide consumers with ways to replace their toothbrushes frequently without depleting the resources used to manufacture virgin plastics and without contributing to landfill waste.

Since its launch in April 1997, the *Preserve's* unique combination of environmental and functional advantages has enabled it to make sizeable market share gains. In the natural food channel, Recycline has established the *Preserve* as the 3rd best-selling brand. Recycline is continually striving to develop unique marketing ideas that will add to consumers' attraction to the *Preserve*.

One marketing idea that Recycline hopes will establish an advantage for the *Preserve* lies in delivering a variety of changing handle colors. Recycline believes that these changing colors may add character and highlight the *Preserve's* use of recycled materials. In addition, the concept appeals to consumers' desire for a variety of colors, noted as one of the top buying criteria in toothbrushes. Sourcing pre-colored recycled materials will help Recycline seize this opportunity and will augment Recycline's existing sources of natural, uncolored recycled polypropylene, providing several new sourcing opportunities for the *Preserve*.

3. SCOPE OF WORK

Grant funding from the Chelsea Center for Recycling and Economic Development has enabled Recycline to research the potential of approximately 15 prospective suppliers of recycled polypropylene, work closely with a nearby compounder, and produce six new colors for the *Preserve* toothbrush's handle. The grant has funded the purchase, compounding, and analysis of 5,400 lbs. of recovered, recycled polypropylene. With the compounded plastic, Recycline has produced three new colors, black, white, and blue-green, that will define a new color category for the *Preserve*. The Company has also produced varieties of its existing colors, dark blue, periwinkle blue and purple.

4. DESCRIPTION OF APPROACH

As a first step, Recycline identified the compounder New Frontier to perform the compounding of the recovered material into usable pellets for the production of the *Preserve* handles. Recycline then contacted approximately 15 potential suppliers and indicated the Company's desire to purchase colored recycled material.

Upon the identification of three possible sources, Recycline's president visited New Frontier compounding facility in West Springfield, MA. The meeting was instrumental in that it improved Recycline's understanding of the compounder's needs and the issues involved in compounding pre-colored material, such as sorting and separating. It also identified the potential to combine like-colored materials thus increasing the amount of recovered plastics available to the Company. The meeting also was helpful to New Frontier as they developed an understanding of Recycline's needs to produce new and unique colors, and a general understanding of the types of colors that are appropriate for the *Preserve*.

As Recycline found promising sources, the Company hired the services of David Ryan, a consulting chemist, to perform foreign elements testing on samples to ascertain that the materials were within Recycline's foreign element levels, those acceptable by the EPA for drinking water. Afterwards, Recycline purchased 5,400 lbs. of recycled polypropylene. The New Frontier facility then analyzed and compounded the material. After the compounding was complete, Recycline worked with its production partner to identify the appropriate color concentrate to add to the pre-colored material in order to produce six unique colors for the *Preserve*.

5. ACTIONS TAKEN TO IMPROVE PROCESS

In support of this project, the visit by Recycline's president to New Frontier was a key step in improving the compounding process at Recycline. Though not a novel concept, this face-to-face visit helped Recycline to understand the constraints and potential of the compounder's production capabilities. In addition, the compounder was able to work with Recycline to help the Company best understand the colors that will be produced when compounding a variety of pre-colored materials.

6. TRANSFERABILITY OF LESSONS/RESEARCH

The primary lesson learned by Recycline in this project is that supplies of pre-colored recycled material provide a very promising alternative to natural recycled material when the final product may be delivered to market in a color similar to the color of the pre-colored recycled. In addition, the Company gained additional knowledge about the potential to change the melt flow of a material by combining it with a material with a different melt flow. As a result, Recycline is now sourcing a material that it previously thought as unusable due to its high melt flow.

7. RECOMMENDATIONS FOR FUTURE WORK

Through the meeting with New Frontier, Recycline now sees potential for sourcing specific recovered, post-consumer materials from the packaging or products of other manufacturers. The Company is hopeful that this process may eventually lead to the recycling and usage of a waste stream, yogurt cups, that most communities are not presently recycling. Once Recycline has effectively turned this waste stream into a useable material in this controlled collection process, or manufacturer to manufacturer, the goal will be to work with reprocessors who will be willing

to separate this stream on an ongoing basis. Recycline will both put this recycled stream to use in its products and will seek to offer it to other manufacturers through its new service, *sourcerecycled.com*.

As a first step, the Company is now working with Stonyfield Farm, makers of Stonyfield Farm yogurt, to reprocess their used and recycled yogurt containers into the handle of the *Preserve*. This will involve a compounding process with an additional material to reduce the melt flow of the final material and may allow for some very interesting marketing opportunities with Stonyfield.

8. CONCLUSIONS

This project has given Recycline the experience to confidently source pre-colored recycled material for the production of the handle of the *Preserve* toothbrush. Recycline has also gained insight into the practice of combining materials in the compounding process to produce a compounded pellet with the desirable specifications (e.g., melt flow rate) for Recycline's manufacturing process. In addition, while these new colored handles are not yet at market, Recycline hopes it may conclude that the *Preserve's* ever-changing colors will establish another distinguishing characteristic for the *Preserve* in the marketplace.