ENGINEERING ROACH KILLERS

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EXECUTIVE SUMMARY

The enclosed report addresses the possibility of integrating a synthetic roach sex pheromone into an existing trapping mechanism to produce a superior roach control product. This new product would be an off the shelf brand designed for private homeowners, and should be competitive with the current market leader, Maxforce.

It was decided to market this product in a gel form that combines blattellaquinone and maltose as the attractants, fipronil as the active insecticide, and carrageenan as the gel matrix. The southwestern United States (TX, OK, KS, NV, AZ, NM, CA, UT, CO) is the target distribution area.

Utility functions were created to assess the necessary characteristics of the new product from a consumer standpoint. Four characteristics of the new product were rated by ten consumers through the distribution of surveys. The four characteristics were: durability, speed, odor, and toxicity. Each of these characteristics were then linked to an adjustable component of the new product such that shifting the composition of the product altered consumer satisfaction ratings accordingly.

The resulting utility functions were then used in combination with an economics based pricing model correlation to analyze how product composition affects supply and demand.

Maximizing the utility functions under reasonable constraints led to a product composition of 10mg/tube of fipronil, 0.02mg/tube of blattellaquinone, and 15000mg/tube maltose. These compositions correspond to a selling price for the new product of 6$/unit along with an expected demand of 2,500,000 units. At this selling price and demand the estimated NPV after 10 years was calculated to be $90,000,000. The FCI and TCI are $1,800,000 and $2,200,000 respectively.

A more optimal solution was pursued with the utilization of risk and uncertainty, but this attempt proved unsuccessful. In the future, this avenue will be pursued thoroughly in an attempt to more confidently select a product composition. The unsuccessful attempts at incorporating risk are included in the report appendices.

Future work centers heavily on pursuing a more optimal solution using risk and uncertainty. In addition, the results of the utility functions depend heavily on the population model. To this end it would be advisable to make the model as accurate as possible for future calculations. Also, more accurate estimates are needed for the total revenue available in this narrow market because the estimated profit per year for this new product seems uncharacteristically large.