Anti-Cavity Toothpaste Project Executive Summary

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The goal of this project is to discover an agent that will prevent the occurrence of cavities and to determine its profitability. A variety of substances were discovered based upon peer-review research that either kill or inhibit the virulence factors of *Streptococcus mutans*, the bacteria that causes cavities. After our analysis, Pinot Noir grape pomace phenolyic extracts were determined to be the cheapest and most effective option for our active ingredient. The phenolyic extract was determined to inhibit the virulence factors of *S. mutans* by inhibiting its plaque production and its tolerance in acidic conditions.

Consumer surveys were distributed to people in order to gauge preferences for eight different qualities of toothpaste. The results of the survey were used to determine the optimal toothpaste product for our consumers. This satisfaction rating was used to rank our toothpaste along with competitor anti-cavity toothpastes. The function, price, and properties of each individual toothpaste ingredient were researched. These findings were used to learn how the properties of the individual components particular qualities of the toothpaste. Based upon the satisfaction ratings and the study of the raw materials, our optimal product was determined.

It was decided to locate at an existing toothpaste manufacturing facility in northern California (close to the supply of the grape pomace) and to utilize an existing process line. This decision eliminated the majority of the investment costs for this process and also significantly decreased transportation costs associated with our active ingredient. A study of the population in the South/Southwest region of the United States was performed and correlated to the sales of multi-benefit toothpaste generated from market research. The price of the raw materials needed to produce the optimal product were used to determine the total annual product cost and the price of the phenolic extraction process was used to determine the total capital investment. The production rate was determined by the demand that resulted from the Consumer Maximization Utility equation at a product price of $8.00/ tube. These economic calculations were used to determine the return on investment, net present worth (on a yearly basis), and the cash flow for the project over a ten year period.

Our product was determined to have a satisfaction rating of 98% and a raw material cost of $2.32 for each tube. It was determined that 7.45 million people comprised the target market that would buy toothpaste 6 times per year. The production rate was set at 33 million tubes/year based upon the projected demand. This resulted in a production cost of $4.34 for each tube on an annual basis. The total capital investment for this process is $10 million and the net worth after one year of production is $80 million. The return on investment was determined to be 800% and the pay out time occurred within the first year of production. Additional profit scenarios were performed which varied the production and demand of the product based upon market share. These scenarios yielded varying return on investments, net present worth, net profit, and pay out times but the end results identified a profitable process.

Our phenolic extract has a proven effectiveness of 98% against the virulence factors of *S. mutans* and will be suitable as an active ingredient. This was determined to be a profitable venture because of the low investment cost in comparison to the high net profit that would result in a 800% return in the first year.