

Bacterial Dosimeter Cost Analysis

The purpose of this report is to emphasize the monetary cost per device that it would cost to produce such a device for sale and compare against major competitors already in the market of selling dosimeters.

When buying our bacterial dosimeter, there are two kinds of cost associated with the device: fixed cost and variable costs. The fixed cost occurs when buying the tray because the tray can be used over and over again with a new tray put in after every use. The variable costs are the cost associated with buying the individual trays per use. Additionally, the cost of catechol must be factored into the equation because it is required to show the results of the dosimeter.

Equation 1: Cost on User for Using our Bacterial Dosimeter to Detect Radiation

$$C_{\text{dosimeter}} = C_{\text{case}} + (N * C_{\text{tray}}) + C_{\text{catechol}}$$

$C_{\text{dosimeter}}$ = Cost per Bacterial Dosimeter

C_{tray} = Cost per Tray

C_{case} = Cost per Case

N = Number of Trays

C_{catechol} = cost of catechol per use

Equation 2: Cost of building each individual Case in the Dosimeter

$$C_{\text{case}} = V * C_{\text{plastic}}$$

C_{plastic} = Cost per cubic meter of plastic

V = Volume of Plastic

Equation 3: Cost of building each individual tray in the dosimeter.

$$C_{\text{tray}} = C_{\text{ecoli}} + C_{\text{gellan}} + C_{\text{plastic}}$$

C_{ecoli} = Cost of Growing the Bacteria

C_{gellan} = Cost of Phytagel™

Taking the price of the gellan gum (PHYTAGEL™) in bulk, the average cost would be that of \$1,003.20 USD for 5kg of powder. At this price, it would cost approximately Considering that the dimensions for one sheet of gellan gum in our model has the dimensions of 0.035m x 0.02 m x 0.00075 m it has a volume of $5.25e-7 \text{ m}^3$. At this volume it would cost approximately \$0.20 to produce the gellan gum per dosimeter.

Equation 4: Final Cost Analysis of Building a Bacterial Dosimeter

$$C_{\text{dosimeter}} = (V * C_{\text{plastic}}) + [n * (C_{\text{ecoli}} + C_{\text{gellan}} + C_{\text{plastic}})] + C_{\text{catechol}}$$

Sources:

http://www.sigmaaldrich.com/catalog/ProductDetail.do?D7=0&N5=SEARCH_CONCAT_PNO|BRAND_KEY&N4=P8169|SIGMA&N25=0&QS=ON&F=SPEC