

Bioplastic Degradation Model

Experimental Decomposition data:

```
In[6]:= data = {{0, 0.1001}, {24, 0.0904}, {48, 0.0847}, {72, 0.0768}, {96, 0.0725}}
```

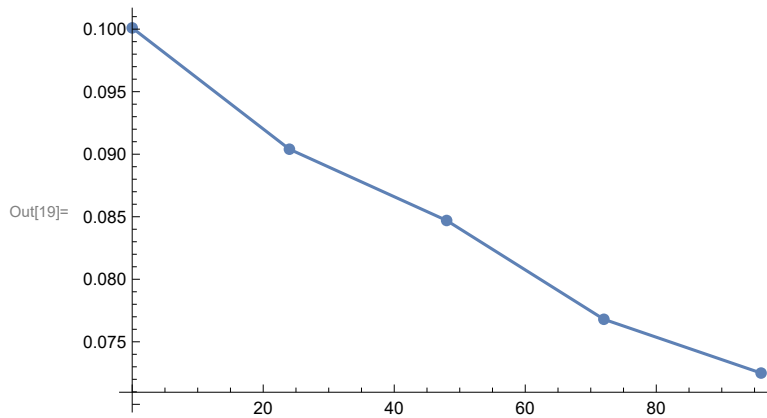
```
Out[6]= {{0, 0.1001}, {24, 0.0904}, {48, 0.0847}, {72, 0.0768}, {96, 0.0725}}
```

```
In[7]:= TableForm[data]
```

```
Out[7]/TableForm=
```

0	0.1001
24	0.0904
48	0.0847
72	0.0768
96	0.0725

```
In[19]:= expt = ListPlot[data, PlotMarkers → Automatic, Joined → True]
```



Finding the best exponential fit for the above data:

```
In[10]:= f[x_] = a E-k x
```

```
Out[10]= a e-k x
```

```
In[13]:= fit = FindFit[data, f[x], {a, k}, x]
```

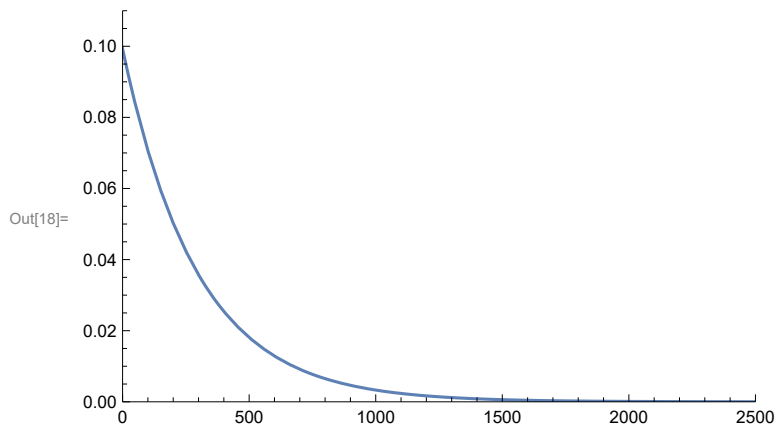
```
Out[13]= {a → 0.0993071, k → 0.00340519}
```

```
In[14]:= g[x_] = f[x] /. fit
```

```
Out[14]= 0.0993071 e-0.00340519 x
```

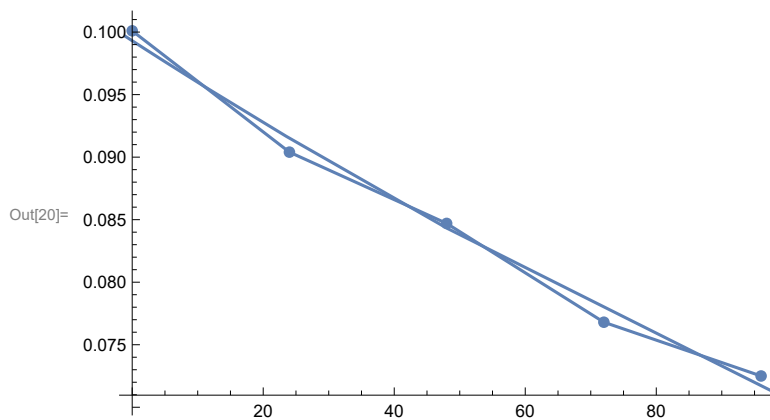
Plotting the Theoretical Model:

```
In[18]:= theoretical = Plot[0.0993071 e-0.00340519 x, {x, -1, 2500}, PlotRange -> {{0, 2500}, {0, 0.11}}]
```



Error Plot

```
In[20]:= Show[expt, theoretical]
```



Estimating the Decomposition time:

```
In[25]:= 
$$\frac{0.1001 - g[2500]}{0.1001} * 100$$

```

Out[25]= 99.9801

Hence, in 2500 Hours (or 105 days), the Bioplastic will be 99.9801% degraded.