The JETS Challenge

Provided by Dave Meredith, Associate Professor,
Penn State University-Fayette

Challenge 99— The Big Mac Challenge

Problem:

In 1967, the Big Mac was created by Jim Deligatti at his McDonald's restaurant in Uniontown, PA. Today McDonalds is the largest buyer of beef in the United States, exceeding 292 million kilograms in 1996. Assume 28 percent of the beef purchased by McDonalds is used to build Big Macs and that the two beef patties in the Big Mac contain a total of 96 grams of beef. Their famous commercial jingle in 1975 was "Two all beef patties, special sauce, lettuce, cheese, pickles, onions on a sesame bun." The top of each Big Mac bun contains 178 sesame seeds. Each sesame seed approximates a spheroid (shaped like an egg with diameters of 3.18 x 1.27 mm). An average 1,000 seeds weighs 3.72 grams.

Find the total mass (kg) of sesame seeds used annually to build Big Macs.

Solution:

1000 seeds weight 3.72 g
= .00372 kg

Each bun has 178 seeds

$$\frac{178}{1000} = \frac{x}{.00372}$$

x = .00066216 kg seeds per bun

So how many per year?

Beef

292,000,000 kg beef for McDonalds
28% for Big Mac
=81,760,000 kg for Big Macs
each Big Mac has 96 grams = .096 kg

$$\frac{81,760,000\ kg}{.096\ kg\ /\ BigMac} = 851,666,666.7$$

So seeds for Big Macs = (.00066216 kg seeds per bun) × (851,666,666.7)

= 563,940 kg