Answer on Question #60352 – Math – Statistics and Probability

Question

A biologist is studying the levels of arsenic that are naturally produced in some ground water sources. A mean level of 8.0 parts per billion (ppb) and less is considered safe for agricultural use. A random sample of 60 tests of the ground water at different locations in the town of Howick yields a sample mean of 8.46 ppb with a standard deviation of 1.3 ppb.

Is there enough evidence to conclude that the arsenic levels are too dangerous to use for agricultural purposes at the 98% confidence level? Conduct a complete hypothesis test.

Solution

Consider one sample, right-tailed t-test.

The null hypothesis $H_0: \mu \leq 8.0,$ the alternative hypothesis $H_A: \mu > 8.0.$

Test score: $t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{8.46 - 8.0}{1.3/\sqrt{60}} = 2.74$

For $t = 2.74, df = 60 - 1 = 59,$ rigth $-$ tailed test: $p = 0.041.$

P value is $p = 0.041 > \alpha = 0.02.$

Therefore, we fail to reject the null hypothesis and we should conclude that there is no sufficient evidence that the arsenic levels are too dangerous to use for agricultural purposes.