c) producing a baseline performance value comprising milk production efficiency using the value of the primary parameter and one or more of the values of the secondary parameters using a computing device;

d) producing a carbon footprint for the milk, producing animal using the baseline performance using a computing device; and

e) adjusting a component of the first feed sample to change either the baseline performance, the carbon foot print or both.

56. The method of claim 54 or claim 55, wherein the steps are repeated until a feed composition is identified that maintains or increases milk production efficiency and decreases carbon footprint as compared to the first feed sample.

57. The method of claim 54, wherein the in vitro digestion system comprises digesting the feed sample with one or more digestive enzymes in the presence of a microbial population.

58. The method of claim 55, wherein the characteristic of the feed sample is selected from the group consisting of a measure of protein, a measure of carbohydrate, a measure of fat, a measure of dry matter, and a measure of gross energy.

59. The method of claim 55, wherein the step of determining the characteristic of the feed sample comprises measuring a characteristic of the feed sample.

60. The method of claim 55, wherein the step of determining the characteristic of the feed sample comprises calculating a characteristic of the feed sample.

61. The method of claim 59, wherein the characteristic of the feed sample is determined by a chemical method or by near infrared spectroscopy.

~~62. The method of any one of claims 54-61, wherein adjusting a component of the feed sample comprises adding a feed supplement to the feed sample.~~

~~63. The method of claim 62, wherein adjusting a component of the feed sample comprises altering the form of protein or amount of protein in the sample.~~

~~64. The method of claim 62 or claim 63, wherein adjusting a component of the feed sample comprises altering the digestibility of the feed sample.~~

~~65.~~62. The method of claim 54 or claim 55, wherein the step of producing a baseline performance comprises calculating a baseline performance.

~~66.~~63. The method of claim 54 or claim 55, wherein the step of producing a carbon footprint comprises calculating a carbon footprint.

~~67.~~64. The method of claim 54 or claim 55, wherein the step of producing a baseline performance comprises measuring a baseline performance.