S1 File: Co-production constraints calculations

Dairy products and bovine meat

Producing milk necessarily coproduces meat: a veal’s birth is needed to initiate a lactation, and dairy cows are culled at the end of their productive life. It is possible to estimate the mean quantity of meat co-produced per kg of milk produced. We considered 4 lactations for the productive life of a cow (1) producing 6990 kg of milk per lactation (2). Two male and two female as offspring were considered, leading to 1.8 veal calves, i.e. 0.6 steers, 1.5 cows for herd renewal and 0.1 heifers (3). Using estimates of carcass weights (1,3,4), offspring plus culled cow over a productive year represent 823 kg carcass-equivalent, or 20 kg of marketable meat for 1000 L of milk. We considered a 30% weight loss during meat cooking (5), leading to a constraint expressed as bovine dairy protein (g) ≤ 0.43*bovine meat (g).

Blood sausage and pork meat

Blood sausage is a deli meat specialty prepared with pork blood. Its high content in heme iron (the readily absorbed form of iron) makes it a potentially valuable food choice to fulfill iron requirements when iron bioavailability is taken into account. As blood being a co-product of pork meat, we constrained blood sausage quantity. We estimated that a hog provides 47.6 kg of cooked meat and 3 liters of blood (6). As it takes 4600 g of blood to produce 9600 g of blood sausage, the constraint was set as blood sausage (g) ≤ 0.13*pork meat (g).
References


