Decision Sciences

Exercise Linear Programming - Blending problem

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Problem description

A company receives four raw grains from which it blends its dry pet food. The pet food advertises that each can of 1/2 kg meets the minimum daily requirements for vitamin C, protein and iron.

The cost of each raw grain as well as the vitamin C, protein, and iron units per kilogram of each grain are given in the following table:

Table: Input data for blending dry pet food (per kg)

Grain	Vitamins C (units/kg)	Protein (units/kg)	Iron (units/kg)	Cost/kg
1	9	12	0	0.75
2	16	10	14	0.9
3	8	10	15	0.8
4	10	8	7	0.7
Minimal requirement	6	5	5	

The company is interested in producing the 1/2 kg mixture at minimum cost while meeting the minimum daily requirements of 6 units of vitamin C, 5 units of protein, and 5 units of iron.

Table: Minimum requirements

	Vitamins C (units/kg)	Protein (units/kg)	Iron (units/kg)
Minimum requirement	6	5	5

a) Formulate a model in Excel. Discuss the variables and the constraints. Solve your model and discuss the results.
b) Analyze the sensitivity report.