You own a company which makes a line of nutritionally complete, weight-reduction beverages. One of your products is a strawberry shake which is designed to be a complete meal. The strawberry shake consists of several ingredients. Some information about each of these ingredients is given below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Ingredients | | | | |
|  | Strawberry flavoring | Cream | Vitamin supplement | Artificial sweetener | Thickening agent |
|
|  |  |  |  |  |  |
| Calories from fat (per tbsp) | 1 | 75 | 0 | 0 | 30 |
| Total calories (per tbsp) | 50 | 100 | 0 | 120 | 80 |
| Vitamin content (mg/ tbsp) | 20 | 0 | 50 | 0 | 2 |
| Thickeners (mg/ tbsp) | 3 | 8 | 1 | 2 | 25 |
| Cost ($ / tbsp) | 10 | 8 | 25 | 15 | 6 |

The nutritional requirements are as follows.

* The beverage must total between 380 and 420 calories (inclusive).
* No more than 20% of the total calories should come from fat.
* There must be at least 50 milligrams (mg) of vitamin content.
* For taste reasons, there must be at least two tablespoons (tbsp) of strawberry flavoring for each tbsp of artificial sweetener.
* Finally, to maintain proper thickness, there must be exactly 15 mg of thickeners in the beverage.

Your management department would like to select the quantity of each ingredient for the beverage which would minimize cost while meeting the above requirements. ***Formulate a linear programming model for this problem.***