

Chapter 1

Introduction



1.1 Background of the research

Canned Liquid Coffee products have been introduced to Thailand market since 1995. Because of the changing of customers behavior trend to be drinking a lot of coffee by easy way of preparation, therefore, they don't have enough time to do. By the up turn of economic situation of Thailand, young generation people do a lot of work per day and they want something to refresh while they are working. Canned Liquid Coffee was born with its image of refreshing beverage by this situation and introduced to target group, young generation people.

The market is continuing growth until 1999, many players jump to the market. It becomes high competition situation with this market, new products have been launched from many brand, competitive promotion, for example. By this reason, every player has to capture at the right target group with a cool taste and lower cost. In Thailand market has two type of liquid coffee in can, one is black coffee, and the other one is coffee with milk. Generally, milk in liquid coffee product is milk powder, which was imported from European country. Because of European country is the biggest source of milk, and the quality of milk is good in consistency. For coffee, Thailand has a big source of coffee bean, Robusta type, in the southern part area.

The cost of product is directly from the cost of raw material. The main raw materials, which were used, are coffee powder, milk powder and sugar. In fact, mostly raw material can supply by domestic supplier, except, milk powder, which have to import from outside the country. If the cost of raw material is raised up, it wills consequence to shift up cost of product. Last two years ago, the currency exchange rate was fluctuated from the economic down turn situation. It makes a huge impact to the costs of raw material, which was imported from oversea. Therefore, it becomes to higher cost of product. Substitution of raw material is one solution, which can help the company fix the cost of finished product. Fresh milk, which is local supply, can be substituted whole milk powder and lower risk of fluctuation of currency exchange rate.

1.2 Company background

A case study company is a factory we will call company A, which produces canned liquid coffee, with a maximum capacity 60,000 ton per year. The market of the company's product is both local and export to Indochina region.

1.3 Production process

The detail of existing production process to manufacture canned liquid coffee product by using whole milk powder is as follow.

1. Dissolving: make all ingredient into liquid form with reverse osmosis water
2. Mixing: blend all component until homogenous
3. Inspection: inspect the color of liquid, solid content and taste
4. Pasteurization: reduce number of microorganism by heat treatment
5. Homogenization: reduce fat molecule size and reduce fat separation from milk
6. Filling and seaming: fill liquid coffee into the can and close
7. Sterilization: Destroy all microorganism by heat treatment
8. Packing: packed cans with paper tray and shrink-wrap

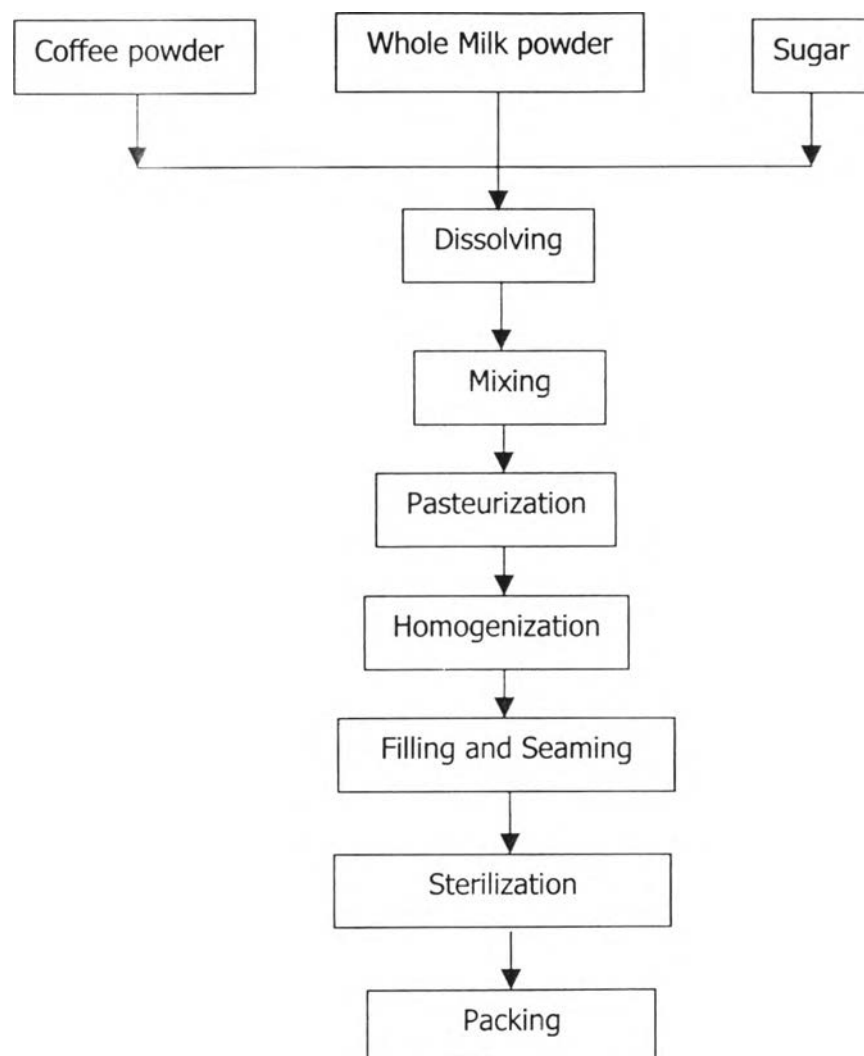
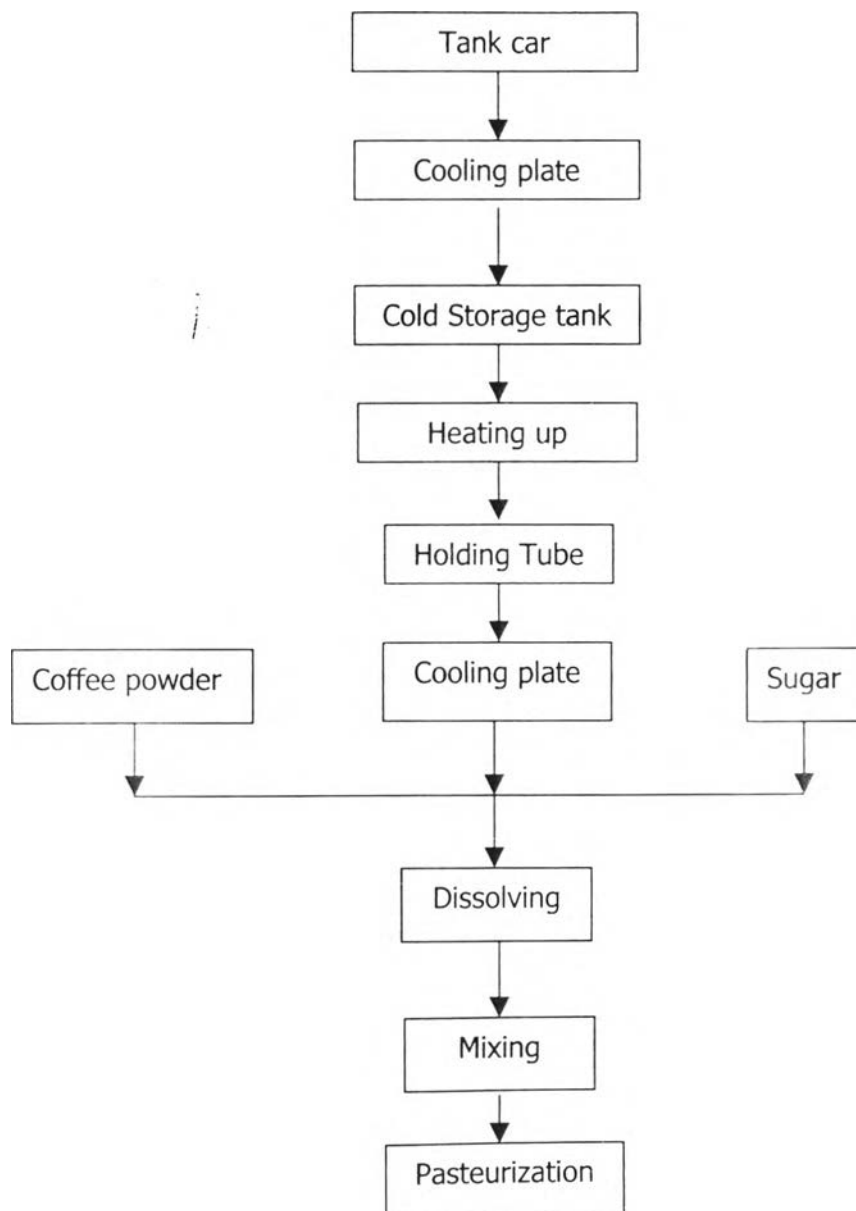


Figure 1. Process flow of canned liquid coffee production process by using Whole milk powder.

The detail of new production process, which proposed to manufacture canned liquid coffee product by using fresh milk, is as follow.

1. Fresh milk receiving: Transfer fresh milk from tank car in to storage tank and cool down by cooling plat exchanger.
2. Cold storage tank: Keep fresh milk in tank with low temperature, below 10 °C
3. Heat up: transfer fresh milk from storage tank to plate heat exchanger to heat up fresh milk.
4. Holding tube: pass to holding tube with high temperature
5. Cooling: cool down fresh milk
6. Mixing: blend all component until homogenous
7. Inspection: inspect the color of liquid, solid content and taste
8. Pasteurization: reduce number of microorganism by heat treatment
9. Homogenization: reduce fat molecule size and reduce fat separation from milk
10. Filling and seaming: fill liquid coffee into the can and close
11. Sterilization: Destroy all microorganism by heat treatment
12. Packing: packed cans with paper tray and shrink-wrap



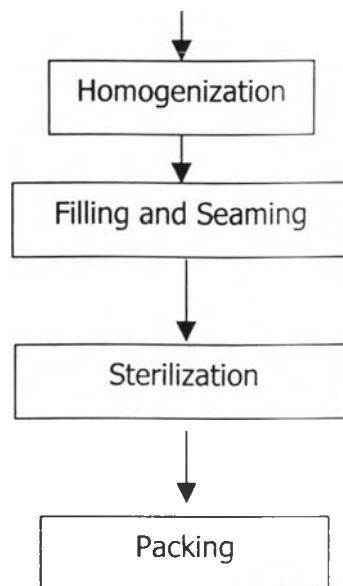


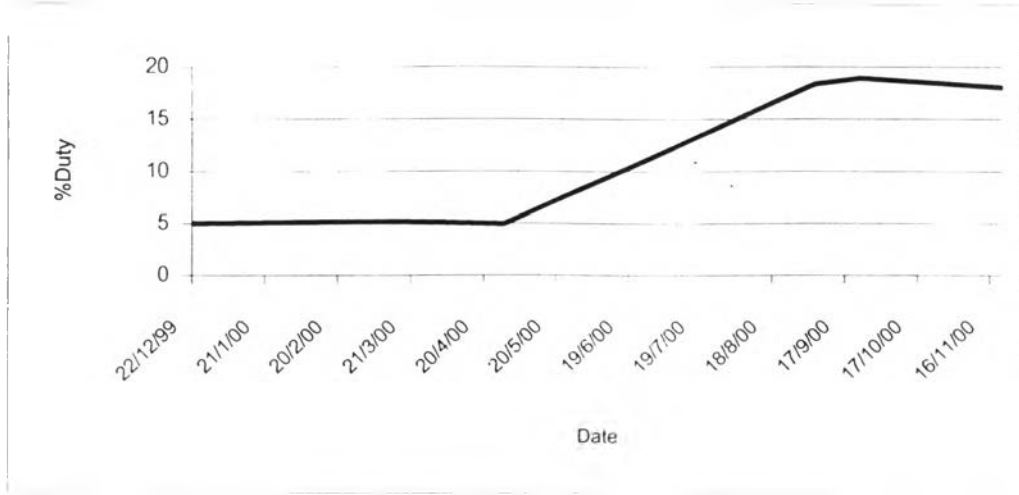
Figure 2. Process flow of canned liquid coffee production process by using fresh milk.

With the new production process, which uses fresh milk, has to invest some equipment to receive and handling fresh milk. Because the existing production process, which uses whole milk powder, had been designed for using only milk in powder form. The equipment, which have to invest, as follow,

- Storage tank which has insulation
- Cooling plate exchanger
- Holding tube
- Heating plate exchanger

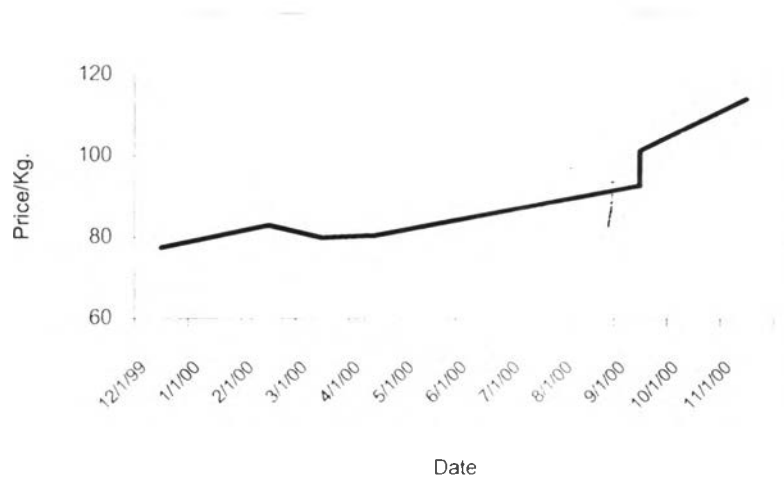
1.4 Statement of problems

Last two years ago, Thailand has been faced with economic crisis; the exchange rate was fluctuated. It becomes constrain to the company which mostly import milk powder from the European countries, the cost is higher than the previous year from changing currency exchange rate. Moreover, duty rate also rose up from 5 percents to 18 percent within 1 year and trends to be more than 20 percents as show graph 1.



Graph 1. : Percent (%) Duty charge of Whole Milk Powder

So, it impacts to the cost of whole milk powder, it increase from 80 Baht to 100 Baht per kilogram as graph 2.



Graph 2. : Price per Kilogram Of Whole milk powder

It is directly impacted to the cost of product because the company used it a lot per year. Meanwhile, the company doesn't want to raise the cost of product, which comes from high competitive market reason. So, the company has to find something, which can be substituted milk powder with equal cost and has low risk of changing currency exchange rate. Fresh milk is one solution that we can think about it. In fact, Thailand has a lot of cow farms around the center part area, such as Ratchaburi province, Lopburi province, and Saraburi province. Therefore, the company did not use fresh milk because of

- ◆ It is higher cost if compare to the cost of imported milk powder, Whole Milk Powder.

- ◆ Milk powder is easier to handling because it is in dry form with seal plastic bag, while fresh milk has a constrain in term of microorganism growth from improper handling

However, the interesting points of use fresh milk instead of milk powder are

- ◆ It is a local available, company don't have the problem with currency exchange rate
- ◆ Lower cost of transportation because of short distance to transport
- ◆ Lower risk from improper transportation from oversea and shorter distance
- ◆ Easy to control and order
- ◆ The image of product will be better because of use fresh raw material
- ◆ Make good image and ownership with Thailand people

This project is a study of substitution whole milk powder with fresh milk on both technical and economic aspects. However, existing production process can't apply with fresh milk reception. If this project is possible to use fresh milk instead of whole milk powder, it has to have some extra budget to invest.

1.5 Objectives of the research

To study the possibility of substitution of whole milk powder with fresh Milk in canned liquid coffee product.

1.6 Scope of the research

The scope of this study focusing on canned liquid coffee product based on "Tubular Heat Exchanger" process for the technical study.

1.7 Research procedure

- ◆ Study details of fresh milk in term of chemical components compare to chemical components of whole milk powder.
- ◆ Study supply of fresh milk to factory.
- ◆ Marketing analysis
- ◆ Study and analyze in technical term, investment cost, and cost of product in order to calculate Break Even Point of this project.
- ◆ Study the possibility of this project by using the Incremental cost Analysis.
- ◆ Study the sensitivity of this project for find out the factors, which will impact to this project study.
- ◆ Summarize the result of research
- ◆ Review and write up study report (Thesis)
- ◆ Prepare report and presentation

1.8 Expect results

The result of this project would provide an information and suggestion for decision- making whether the project should be invested or not.

1.9 Literature Survey

Chantana Chantaro and Sirichan Thongprasert (1989) explained about project feasibility study for business and industry project. It is concerning marketing, financial management, economic and business environment.

Sureporn Surat (1995), studied about benefit cost analysis for investment decision in the export food industry. The criteria for decision are Net Present Value, Internal Rate of return and Benefit Cost Ratio.

Thunyarat Attaprecha (1999), studied about pre-feasibility study of Northern refined products pipeline product. The criteria for decision are Net Present Value, Internal Rate of Return and benefit Cost ratio.

Chitarpar Rattanavaraha (1994), this thesis is about project management for setting up an automobile brake factory. At first, the feasibility study was applied study marketing, engineering, management and investment. After that, the project is shown that, it is very interested for investment.

Virapon Suwannut (1981), studied about project feasibility by analysis in each item of plan and project, benefit-expenditure and cost effectiveness

Kriangsak Rukachantarakul (1998), this thesis is studied about project feasibility of investing bunker oil equipment for oil company customers. This book shows the factors that effect the investment of oil company, calculation of cost structure NPV and IRR.

Tawachai Harncharnchai (1992), this thesis is studied about engineering economic analysis for setting up a new plant in small tyre Industry. This book shows engineering economic studied, demand forecast and replacement analysis method.

Nattaphol Janvitesook (1993), this thesis is studied about cost - benefit analysis and break even point of automatic payroll service : a case study of Siam Commercial Bank co, Ltd.

Prasit Tongyingsiri (1995), this book shows about project analysis and appraisal of economics and finance. Economic analysis emphasizes on net profit for social from project. Finance analysis emphasises on benefit of money.

Sonia battistutta/ Silvana Duncan (1998), **Incremental cost** are the additional costs incurred in choosing a particular alternative. As these additional costs may increase or decrease as a result of the decision made, they are considered relevant to the decision-making process.

Incremental benefit, is the additional revenue made when choosing a particular alternative. As this additional revenue may increase or decrease due to the decision made, it is considered relevant to the decision-making process. **Break-even analysis**, is a technique used in cost-volume-profit analysis. The break-even point is point where sales equal total costs and no profit are made. Any sales made above the break-even point will result in profit, providing that total costs stay the same. Fixed and variable costs are important terms in break-even analysis. Variable costs are cost that change as the level of activity changes. The contribution margin is another important term.

The calculation of break-even point can be done in terms of unit and money

$$\text{Break-even point (BEP) in unit:} = \frac{\text{Fixed costs}}{\text{Contribution margin per unit}}$$

Where Contribution margin per unit = selling price per unit- variable cost per unit

$$\text{Break-even point (BEP) in money:} = \frac{\text{Fixed cost}}{\text{Contribution margin ratio}}$$

$$\text{Where Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{Selling price}}$$

James L. Pappas/Mark Hirschey (1990), **Incremental cost** is cost that varies among the alternatives in a decision and is therefore relevant to that decision. **Sunk cost** is costs that are not affected by a specific decision and are therefore irrelevant to that decision.

Gosta Bylund (1995), a **holding cell** usually consists of a pipe arranged in a spiral or zig-zag pattern and often covered by a metal shroud to prevent people from being burned if they touch the holding cell. The length of the pipe and flow rate are calculated so that the time in holding cell is equal to the required holding time. **Tubular heat exchanger** unlike plate heat exchangers, has no contact points in the product channel and can thus handle products with particles up to a certain size. The maximum particle size depends on the diameter of the tube.