

# Technical and Economic Forecasts Regarding Technological Flux for Obtaining Linseed Oil Cold Pressed

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## Abstract

The paper presents technical and economic forecasts on the technological linseed oil obtained by cold pressing, and in this specific economic indicators were calculated. The values obtained were as follows: total costs (692 950 €/year), total incomes (1 050 800 €/year), profit (357 850 €/year), profit rate (51.64%), costs per product (7235 949.47 €) and costs for production (3.031 €/liter). The results of technical-economic forecasts estimated have positive values, suggesting that processing technology is profitable, the costs being lower than incomes, and therefore can be recommended a potential technology for producing an edible cooking oil, healthy and rich in nutrients.

**Keywords:** linseed oil, forecast, profit, economic indicators

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## 1. Introduction

Flaxseed is abundant in many nutrients, such as polyunsaturated fatty acid, protein, and lignans [1]. Consumption of flax (*Linum usitatissimum L.*) seeds is beneficial for human health. Flax seeds, containing about 36-40 % oil are the richest (among crop plants) source of polyunsaturated fatty acids (PUFA) essential in the human diet [2]. PUFA are highly oil and 22% of oil in seed coating and is found in about 4% is in its embryo. Linseed oil contains mainly triacylglycerols and about approximately 70% of all the linseed oil produced worldwide is destined for technical applications and 30% is for food production [3]. Technology of linseed oil by cold pressing method is characterized by simplicity, relatively low production costs and low electric energy consumption.

Linseed oil obtained by cold pressing is a 100% natural product that has the ability to fully preserve all the nutrients of raw flax seed, which

is an important factor in food and a balanced diet composition.

## 2. Materials and methods

Economic and methodological resources were received from operators of food processing.

In technical economic forecasting is an important instrument of analysis is the economic indicators used to measure and analyze economic efficiency in the evaluation of investment projects, representing quantitative characteristics, sizes and values with which you express the level of economic efficiency [4-6].

Indicative technical and economic assessments were conducted for 240 working days/year.

### a. Calculation of total costs ( $C_t$ )

$$C_t = MP + MA + U + AU + AC + S_d + S_i + C_v + D + A_c$$

$C_t$  = total costs, MP = raw material costs, MA = auxiliary materials costs, U = utilities costs, AU = costs with amortization of machinery, AC = costs with amortization of buildings,  $S_d$  = costs of

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labour power,  $S_i$  = indirect costs of the salary,  $C_v$  = supported costs from income,  $D$  = costs of interest rate,  $A_c$  = other costs

**Table 1.** Raw material costs (MP)

Raw material	Quantity [kg/day]	Price [€/kg]	Total [€/day]
linseed	1 000	2	2 000

MP = raw material costs

€ = euro

$MP_{\text{linseed}} = 2\,000$  Euro/day

$2\,000$  €/day x 240 working days = 480 000 €/year

$MP_{\text{linseed}} = 480\,000$  €/year

Costs of auxiliary materials (MA) = 20 000 €/year

Utilities costs (U) = 12 000 €/year

Costs with amortization of machinery (AU) = 3 000 €/year

Costs with amortization of buildings (AC) = 5 000 €/year

Costs of labour power ( $S_d$ ) = 45 000 €/year

Indirect costs of the salary ( $S_i$ )

The indirect costs of the salary ( $S_i$ ) represented 30% from the costs of labour power

$$S_i = \frac{30}{100} \cdot 45\,000 = 0.30 \cdot 45\,000$$

$S_i = 13\,500$  €/year

Supported costs from income ( $C_v$ )

The supported costs from income ( $C_v$ ) represented 10% from the costs sum with the raw material (MP), the auxiliary materials (MA) and the direct salary ( $S_d$ ):

$$C_v = \frac{10}{100} \cdot (MP + MA + S_d) = 0.10 \cdot (480\,000 + 20\,000 + 45\,000)$$

$C_v = 0.10 \cdot 545\,000$   $C_v = 54\,500$  €/year

Costs of interest rate (D)

The interest rate is 5% from costs of raw material (MP), from the auxiliary materials sums (MA) and the direct salary sums ( $S_d$ ):

$$D = \frac{5}{100} \cdot (MP + MA + S_d)$$

$D = 0.05 \cdot 545\,000$   $D = 27\,250$  €/year

Other costs ( $A_c$ )

Represented 6% from costs of raw material (MP), from the auxiliary materials sums (MU) and the direct salary sums ( $S_d$ ):

$$A_c = \frac{6}{100} \cdot (MP + MA + S_d)$$

$A_c = 0.06 \cdot 545\,000$   $A_c = 32\,700$  €/year

$$C_t = MP + MA + U + AU + AC + S_d + S_i + C_v + D + A_c$$

$$C_t = 480\,000 + 20\,000 + 12\,000 + 3\,000 + 5\,000 + 45\,000 + 13\,500 + 54\,500 + 27\,250 + 32\,700$$

$$C_t = 692\,950 \text{ €/year}$$

### b. Calculation of total incomes ( $V_t$ )

The incomes resulted from the oil product sale of linseed, followed by cold pressing.

Of 1000 kg linseed/day and extracted with extraction efficiency of 30% were obtained 300 kg linseed oil.

1 000 kg linseed/day ---- > 300 kg linseed oil/day

The incomes were realized through the sale in the amount of linseed oil produced.

$$V_t = \text{quantity kg} \cdot 240 \text{ working days} \cdot \text{price}$$

$$V_t = 300 \cdot 240 = 72\,000 \text{ kg linseed oil} = 77\,837 \text{ l linseed oil/year (density is 0.925)}$$

Price for 1 liter linseed oil = 13.50 €/liter

$$V_t = 77\,837 \cdot 13.50$$

$$V_t = 1\,050\,800 \text{ €/year}$$

### c. Calculation of calculation of main economic indicators

The main economic indicators calculated in this study were: profit, the profit rate, the incomes per product, costs per product, costs for production and profit per product unit.

#### The profit (P)

The profit represented difference between total incomes and total costs:  $P = V_t - C_t$

$$P = 1\,050\,800 - 692\,950$$

$$P = 357\,850 \text{ €/year}$$

#### The profit rate ( $R_p$ )

The profit rate is the proportion between the profit value and total costs:

$$R_p = P/C_t \cdot 100$$

$$R_p = 51.64\%$$

#### The incomes per product ( $V_p$ )

The incomes per product represented proportion between profit value and total incomes:

$$V_p = P/V_t \cdot 100$$

$$V_p = 34.05\%$$

#### The costs per product ( $C_p$ )

Represented percentage ( $V_p$ ) by the total costs:

$$C_p = V_p \cdot C_t$$

$$C_p = 235\,949.47 \text{ €}$$

**The costs for production ( $C_{prod}$ )**

Represented proportion between the cost per product and the product annual quantity:

$$C_{prod} = C_p \text{ (cost per product)}/M \text{ (product annual quantity)}$$

$$C_{prod} = 235\,949.47 / 77\,837$$

$$C_{prod} = 3.031 \text{ €/liter}$$

**The profit per product unit ( $P_p$ )**

The profit per product unit ( $P_p$ ) represented proportion between profit value and product annual quantity:

$$P_p = P/M \quad P_p = 357\,850 / 77\,837$$

$$P_p = 4.59 \text{ €/liter}$$

**3. Results and discussion**

Of evaluation technical - economic and analysis key economic indicators is remarkable high incomes linseed oil processing (1 050 800 €/year) compared with total annual costs (692 950 €/year), and this has resulted in achieving a high profit (Table 2).

Technical and economic calculation results estimates were positive values, suggesting that processing technology is very profitable, costs are considerably much lower than incomes, and therefore, flaxseed can be recommended as a potential source of raw material for technology for obtaining linseed oil by cold pressing method.

**Table 2.** The main economic indicators in processing linseed oil

Specification	Total amount
Total costs ( $C_t$ )	692 950 €/year
Total incomes ( $V_t$ )	1 050 800 €/year
Profit (P)	357 850 €/year
The profit rate ( $R_p$ )	51.64%
The costs for production ( $C_{prod}$ )	3.031 €/liter
Selling price	13.50 € liter
The profit per product unit	4.59 €/liter

**4. Conclusions**

Although from a technical standpoint, flax seed oil has a relatively low yield of production, due to the method of extraction by cold pressing (about 30%), however, this technology is highly profitable and efficient ( $P = 51.64\%$ ).

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