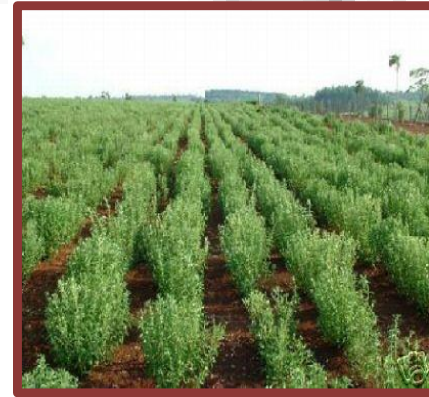
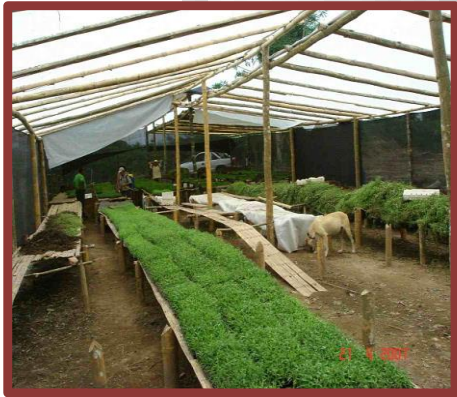


# Stevia Plantation in Ukraine



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10.01.2011



## Stevia Botanic : *Stevia rebaudiana* Bertoni

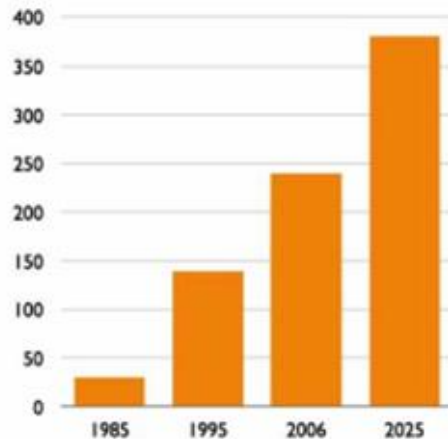
- ❖ Is a sweet herb - member of the daisy family
- ❖ The leaves are mid green and intensely sweet. The leaves contain '**stevioside**', a substance that is 300 times sweeter than sucrose. Other reports say that they contain '**estevin**' a substance that, is 150 times sweeter than sugar.
- ❖ The plant bears greenish cream flowers in autumn.
- ❖ Stevia leaves can be dried and stored. Stevia can be used in raw form.
- ❖ A short day plant, it only reaches a height of 45 cm in three months. The concentration of Stevioside in the leaves of Stevia increases when the plants are grown under long day condition.





# Stevia: Health – Diabetes mellitus

- Metabolic disorder characterized by high blood glucose in blood
- Due to deficiency in insulin production by pancreas. Normally, insulin lowers blood glucose level by carrying glucose into cells and liver for storage
- 2 types of diabetes:
  - Type 1: ~ 5% (autoimmune diseases damage cells in pancreas)
  - Type 2: ~ 95% (adult-onset diabetes. Due largely to obesity and physical inactivity)
- Increased risk of heart attacks, strokes, kidney failure, amputation of limbs



People with diabetes  
world wide (in millions)

Increasing trend of number of people afflicted with diabetes due to population growth, aging, urbanization, obesity and physical inactivity

Predicted number of people with diabetes worldwide by 2025: ~370 million  
Predicted world population in 2025: 8 billion

**4,6% of the world population will be affected by diabetes in 2025**

<http://www.deutsche-diabetikerhilfe.de>



# Stevia: Usage

**0% Calorie, 100% Sweet, 100% Nature**

Stevia rich in protein, calcium and phosphorus.

Leaves can be used raw or cooked. Many who hesitate to consume artificial food additives may prefer Stevia because it is all natural.

Its calorie free content does not impact in blood sugar levels as unlike sucrose (refined sugar) does.

The leaves are sometimes chewed by those wishing to reduce their sugar intake.

Stevia is versatile herb that can be safely used in herbal medicines (-tea), tonics for diabetic patients and also in the daily usage products.

**In bakery, confectionery and beverage sector** 50 g of Stevia leaf powder can replace 1 Kg. of cane sugar.

A wet Stevia leaf bag provides a cooling effect on eyes (similar to using cucumber). The leaves effectively tighten the skin and are good for wrinkles.

It also has a healing effect on blemishes, wounds, cuts and scratches.

Stevia is helpful in weight and blood pressure management. It has also been reported that stevia lowers incident of colds and flu.





# Stevia Harvesting



Stevia is short duration crop. It is harvested 3-4 times a year.

It can be grown in well-drained red soil and sandy loam soil. (The soil pH in a range of 6.5-7.5).

The best planting material for Stevia is by stem cuttings.

Stevia requires large amount of water all year around. As the plant cannot tolerate drought, frequent irrigation with micro sprinklers are the best method of irrigation.



For the application of fertilizers the recommended dose is 110:45:45 NPK/ac per Ha. This requires 4½ bags of urea, 2 bags of DAP and 2 bags of Potash.

Removal of weeds can be done manually as inter-cultural operations are easier by manual labour.

The first harvesting can be done four to five months after planting. Subsequent harvesting can be done every three months, for three consecutive years.

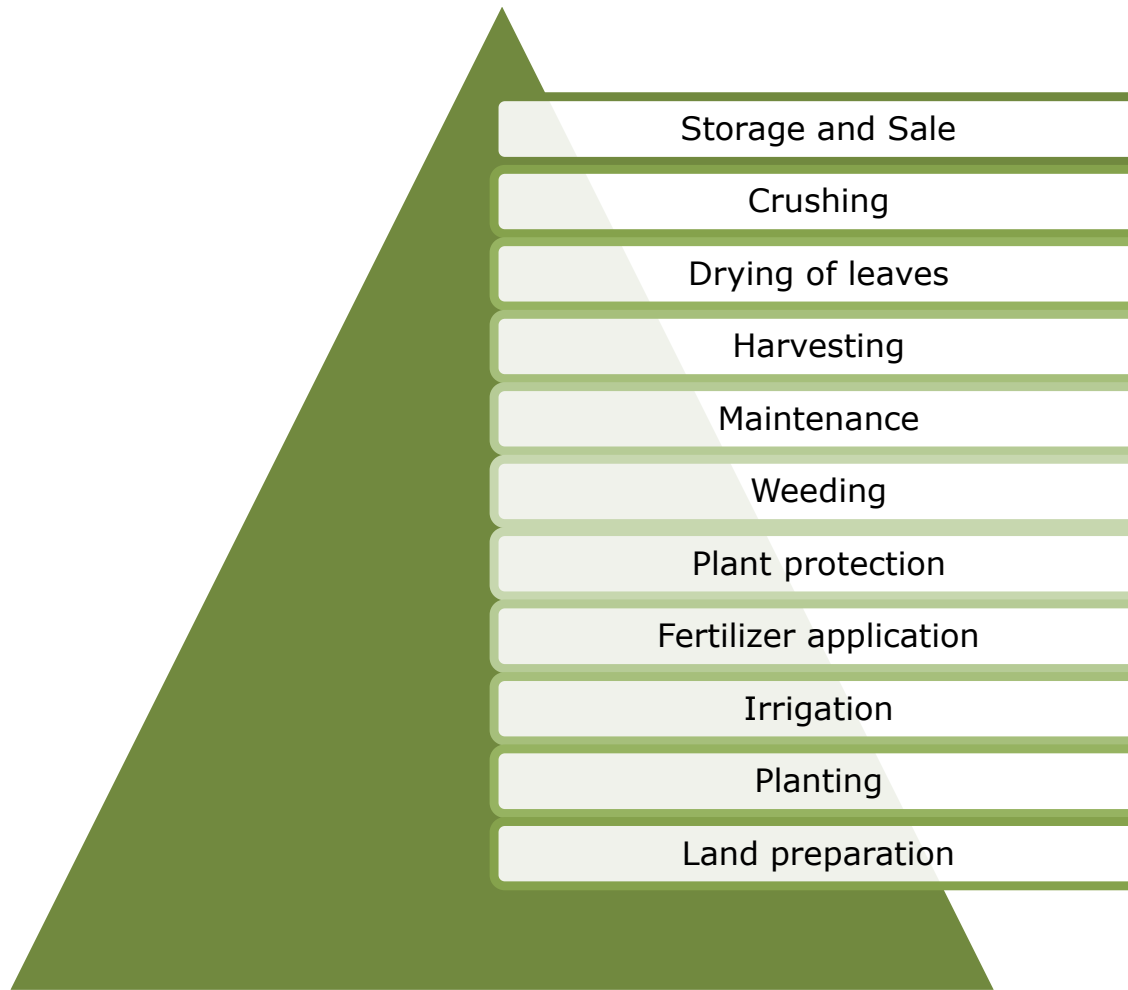


The plant is ready to be cut just after the flowering. The plant should be cut completely leaving 10 cm from the ground.

Today Stevia rebaudiana extract accounts for 40% of the sweetener market in countries such as Japan, Korea and Malaysia.



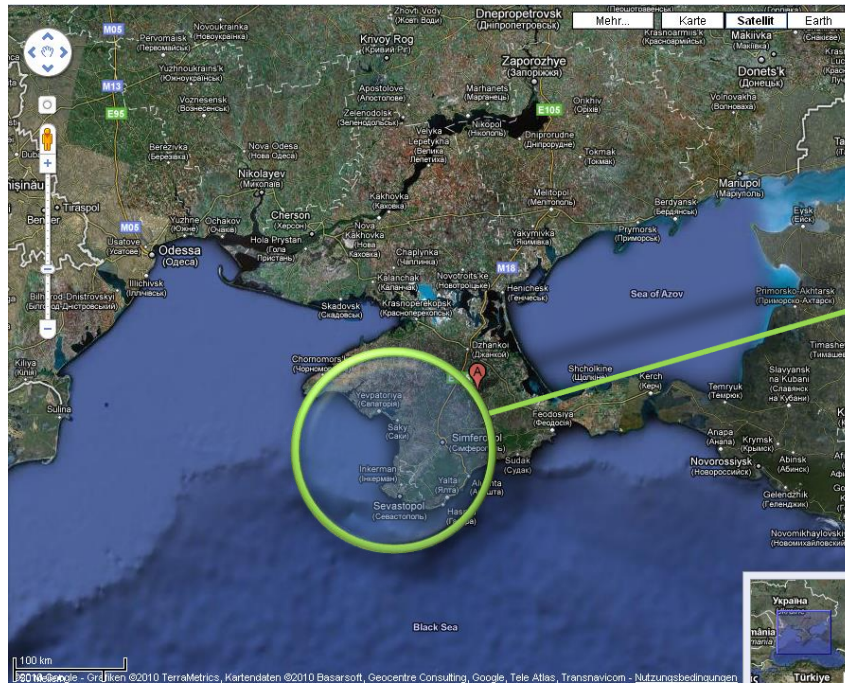
# Phase of Plantation







# Location

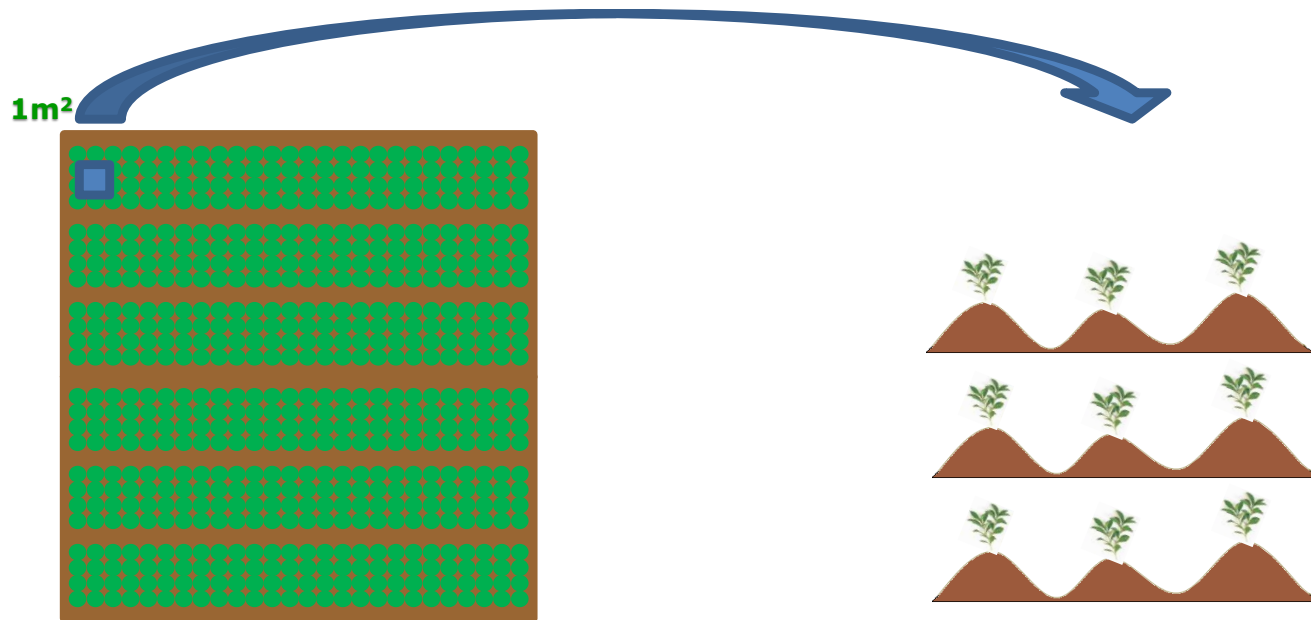


**Crimea Peninsula:** located in south Ukraine at the Black Sea.  
Moderate weather. Nearest city: Sevastopol. Coordinates  
[44°36'0"N 33°31'48"E](#)



# Density

Ideal planting density of 70.000 plants per hectare with spacing of 23x60 cm in between.



Number of rows is 24 and there are 2920 plants per row.





## Initial Statements

Parameter	Specific Assumptions
Area	1 ha
Haverst time per year	3 (every three months) March-April-May June-July-August September-October-November
Production of Stevia	7,2 Tons per year
Production of Dryied Stevia	3,8 Tons per year
Work time	5 days/week, one shift of 8 hours for permanent employees. 10 days/season, three shifts of 8 hours each shift, for temporary employees.
Selling Price	45 EUR per kg of well dryied Stevia
Place of Plantation	Ukraine, Crymea.



# Characterization

<b>Capital intensive</b>	<b>Labour intensive</b>
Crop cultivation ( 9 months/yr = 270 days)	Harvesting, Collecting, Packaging (10 days every 3 months = 30 days)
Production 8h/day	Production 24h/day
270 days	10 days
1 shift	3 shifts
Production turning 270 days/a (excluding winter months)	
Capacity of machinery to be installed : 3.8 tonnes / 270 days = <b>1.41x10<sup>2</sup> tonnes/day</b>	



# Investments and Depreciation Costs

Description	Amount of investment, €	Depreciation rate in year	Depreciation Cost
Property	5.000	0	0
Additional expenses	5.000	0	
<b>Sum Purchase of land</b>	<b>10.000</b>		<b>0</b>
<b>Exterior installations:</b>			
Roads, footpath	50.000	20	2.500
Outside illumination	5.000	20	250
Fence	3.000	20	150
Drain	1.000	20	50
Storage tank (Rain water collection)	800	20	40
Power installation (including lines)	10.000	20	500
Climatization of Greenhouse	20.000	20	1.000
<b>Sum of Exterior Installations</b>	<b>89.800</b>		<b>4.490</b>



# Investments Calculation: BUILDING

Description plant	Investment sum, €	Depreciation rate in year	Depreciation Cost
Greenhouse	113000,00	20	5650,00
Administration Office	5500,00	20	275,00
Workshop	9000,00	20	450,00
Social area for staff	4500,00	20	225,00
Storage	3800,00	20	190,00
Guardhouse	1500,00	20	75,00
<b>Sum of Buildings</b>	<b>137.300,00</b>		<b>6.865,00</b>





# Investments Calculation: EQUIPMENTS AND MACHINERY

<b>Equipments and Machinery</b>	<b>Prices, €</b>	<b>Depreciation rate in year</b>	<b>Depreciation Cost</b>
Plowed Soil Machine (preparation of soil)	7000,00	10	700,00
Water Sprinkles (Irrigation System)	25000,00	10	2500,00
3 Trollies	360,00	10	36,00
Pump (Rain Water)	500,00	10	50,00
<b>Sum of Equipments and Machinery</b>	<b>32.860,00</b>		<b>3.286,00</b>



# Investments Calculation: PROCESSING AND PRODUCTION

<b>Stevia Processing and Production</b>	<b>Prices, €</b>	<b>Depreciation rate in year</b>	<b>Depreciation Cost</b>
Kiln	30000,00	10	3000,00
Threshing machine	38000,00	10	3800,00
Packing machine	6000,00	10	600,00
<b>Sum of Processing and Production</b>	<b>74.000,00</b>		<b>7.400,00</b>

(\*) The processing of Stevia include the separation of the leaves from the stem and the drying of the leaves.



# Investments Calculation: OFF-SITES

Offsites/Extra Investment	Investment, €	Depreciation rate in year	Depreciation Cost
<b>Offsites</b>			
Tools (for cropping, maintenance of Greenhouse, etc)	10.000	10	1.000
Spare parts	20.000	10	2.000
Water supply lines	9.000	10	900
Rollers (transportation of packages)	1.500	10	150
<b>Sum of Offsites</b>	<b>40.500</b>		<b>4.050</b>
<b>Vehicles</b>			
2 Bicycles	400	5	80
1 Truck	20.000	5	4.000
<b>Sum of Vehicles</b>	<b>20.400</b>		<b>4.080</b>
<b>Engineering</b>			
Designing	5.000	10	500
Licenses	2.000	10	200
<b>Sum of Engineering</b>	<b>47.800</b>		<b>8.860</b>



# Total Investment

Investment Goods	Investment Expenditures, €	Depreciation, %	Depreciation Cost, €
Property	10.000	0	0
Exterior Installations	89.800	5	4.490
Buildings	137.300	5	6.865
Equipments and Machinery	32.860	10	3.286
Processing and Production	74.000	10	7.400
Offsites	40.500	5	2.025
Engineering	47.800	10	4.780
Vehicles	20.400	20	4.080
Transport costs of the Greenhouse	0		
Assembly on Greenhouse	0		
Unexpected	50.000	0	0
Circulating capital	25.000	0	0
<b>Total Investment</b>	<b>527.660</b>		<b>32.926</b>





# Calculation of Consumption Costs

Expendable Material *	Specific Consumption per m <sup>2</sup> of cropped soil obtaining 0.380 kg of dryied Stevia	Specific Price per unit quantity, €	Cost of producing 0.38 kg of dried stevia / m <sup>2</sup>	Cost of producing 1 kg of dried stevia
<b>Raw material</b>				
Soil (Kg)	0,00	0,00000	0,00000	0,00000
Fertilizant - NPK (kg)	0,10	0,04000	0,00400	0,01053
Organic Pesticides (L)	0,05	0,31000	0,01550	0,04079
Water (m <sup>3</sup> )	0,13	0,40000	0,05067	0,13333
Soil Neutralizer	0,10	0,00100	0,00010	0,00026
Seeds (number of seeds)	48,00	0,04000	1,92000	5,05263
<b>Packing</b>				
Plastic bags [EUR/PACK]	0,01	0,04100	0,00041	0,00108
Containers [EUR/PACK]	0,23	0,12000	0,02760	0,07263
Labels [EUR/PACK]	0,01	0,00500	0,00005	0,00013
Nailon (Sealing bags) (EUR/PACK)	0,01	0,00100	0,00001	0,00001
<b>Utilities</b>				
Electric Energy (EUR/m <sup>2</sup> )			0,06000	0,15789
Maintenance Cost (EUR/m <sup>2</sup> )			0,20000	0,52632
Administrative (EUR/m <sup>2</sup> )			0,01200	0,03158
Selling (EUR/m <sup>2</sup> )			0,05000	0,13158
<b>Sum of Raw Material cost per 0.380 Kg of dryied Stevia leaves</b>			<b>2,34033</b>	
<b>Sum of Raw Material cost per 1 Kg of dried Stevia leaves</b>				<b>6,15877</b>



# Labour Costs

Personnel in cost center	Number	Personnel Direct Annual Costs, €
<b>Permanent Contract</b>		
Maintainence	2	4.940,00
Gardener	2	4.940,00
Technician	2	4.940,00
Administration incl. Director General	3	7.410,00
Security Guard	3	7.410,00
General Service	1	2.470,00
Driver	1	2.470,00
<b>Total ( 1 shift)</b>		<b>34.580,00</b>

Personnel in cost center	Number	Personnel Direct Annual Costs, €
<b>Temporary Contract</b>		
Collectors of Leaves	30	855,00
Packing machines	3	85,50
Plastic packing	2	57,00
Loading and Unloading Personnel	2	57,00
<b>Total ( 3 shift)</b>		<b>1.054,50</b>
<b>Total ( 1 shift)</b>		<b>351,00</b>

<b>Total (1 shift)</b>		<b>34.931,00</b>
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<b>Gardener's Wage</b>	
<b>Salary Brut per month (EUR)</b>	<b>670</b>
<b>Deductions</b>	
Retirement payment (35,26%)	234,5
Unemployment ensurance (1,6%)	10,72
temporal dissability ensurance (1,4%)	9,38
occupational risk and disease (0,56%)	3,752
Total Deductions	258,352
<b>Salary net per month</b>	<b>411,648</b>
<b>Personnel direct cost</b>	<b>4939,776</b>



# Investment and Financing

<b>Total Investment, €</b>	<b>527.660,00</b>
40% Own capital funds (shareholders equity), €	211.064,00
60% Outside financing (Bank Loan), €	316.596,00

<b>Year</b>	<b>Balance of Debt, €</b>	<b>Interest Rate (%)</b>	<b>Interest costs paid per year, €</b>	<b>Repayment / Paying back loan per year, €</b>
1	316.596,00	7	22.161,72	31.659,60
2	284.936,40	7	19.945,55	31.659,60
3	253.276,80	7	17.729,38	31.659,60
4	221.617,20	7	15.513,20	31.659,60
5	189.957,60	7	13.297,03	31.659,60
6	158.298,00	7	11.080,86	31.659,60
7	126.638,40	7	8.864,69	31.659,60
8	94.978,80	7	6.648,52	31.659,60
9	63.319,20	7	4.432,34	31.659,60
10	31.659,60	7	2.216,17	31.659,60
<b>Total Interest Paid</b>			<b>121.889,46</b>	
	<b>Total Repayment</b>			<b>316.596,00</b>



# Self Costs in 10 years

	1. Year / kg	1. Year	2. Year	3. Year	4. Year	5. Year	6. Year	7. Year	8. Year	9. Year	10. Year
Utilization of capacity (%)	60	60	80	100	100	100	100	100	100	100	100
Quantity produced , kg	2280	2280	3040	3800	3800	3800	3800	3800	3800	3800	3800

Cost	Costs per kg of dried stevia	Costs per year	Costs per year	Costs per year	Costs per year	Costs per year	Costs per year	Costs per year	Costs per year	Costs per year	Costs per year
Depreciation Costs	14,441	32.926,000	32.926,000	32.926,000	32.926,000	32.926,000	32.926,000	32.926,000	32.926,000	32.926,000	32.926,000
Financing Costs	9,720	22.161,720	19.945,548	17.729,376	15.513,204	13.297,032	11.080,860	8.864,688	6.648,516	4.432,344	2.216,172
Labour Costs	15,321	34.931,000	34.931,000	34.931,000	34.931,000	34.931,000	34.931,000	34.931,000	34.931,000	34.931,000	34.931,000
Raw material & Utilities cost	6,160	14.044,800	18.726,400	23.408,000	23.408,000	23.408,000	23.408,000	23.408,000	23.408,000	23.408,000	23.408,000
<b>Total of Costs</b>		104.063,520	106.528,948	108.994,376	106.778,204	104.562,032	102.345,860	100.129,688	97.913,516	95.697,344	93.481,172
Self Costs per kg of dried stevia	45,642	45,642	35,042	28,683	28,100	27,516	26,933	26,350	25,767	25,184	24,600

The production during the first year correspond to 60%, for the second and third year correspond to 80% and 100% respectively.

The cost of the product during the first year is 45,64 EUR. At the end of the 10-year-period will decrease up to 24,60 EUR, representing a 54% of the initial cost.





# Calculation of Turnover/Revenue

Year	Output	Price per m2 (0.38kg)	Turnover/Revenue
1	2280	45	102.600,000
2	3040	45	136.800,000
3	3800	45	171.000,000
4	3800	45	171.000,000
5	3800	45	171.000,000
6	3800	45	171.000,000
7	3800	45	171.000,000
8	3800	45	171.000,000
9	3800	45	171.000,000
10	3800	45	171.000,000

The price per kg of dried  
Stevia is **45EUR**



# Cash flow Calculation for 10 years

	1. Year	2. Year	3. Year	4. Year	5. Year	6. Year	7. Year	8. Year	9. Year	10. Year
<b>Turnover / Revenue</b>	102.600,00	136.800,00	171.000,00	171.000,00	171.000,00	171.000,00	171.000,00	171.000,00	171.000,00	171.000,00
Depreciation Costs	32.926	32.926	32.926	32.926	32.926	32.926	32.926	32.926	32.926	32.926
Labour Costs	34.931	34.931	34.931	34.931	34.931	34.931	34.931	34.931	34.931	34.931
Raw material and Utilities Costs	14.045	18.726	23.408	23.408	23.408	23.408	23.408	23.408	23.408	23.408
Financing Costs	22.162	19.946	17.729	15.513	13.297	11.081	8.865	6.649	4.432	2.216
Loss carried forward		-1.464								
<b>Profit before tax</b>	-1.464	31.735	62.006	64.222	66.438	68.654	70.870	73.086	75.303	77.519
Taxes (25%)	0	7.934	15.501	16.055	16.609	17.164	17.718	18.272	18.826	19.380
<b>Profit after taxes</b>	-1.464	23.801	46.504	48.166	49.828	51.491	53.153	54.815	56.477	58.139
Cash-flow (net profit + depreciation costs)	31.462	56.727	79.430	81.092	82.754	84.417	86.079	87.741	89.403	91.065
Repayment Credit	31.660	31.660	31.660	31.660	31.660	31.660	31.660	31.660	31.660	31.660
Divident	-197	25.067	47.771	49.433	51.095	52.757	54.419	56.081	57.743	59.406

Total accumulated dividend over 10 Year is 453.575 EUR



# Equity Profitability

Equity	Profit after tax	Dividend	Interest made on Equity, %	
211.064	-1.464	-197	-1	1. Year
211.064	23.801	25.067	11	2. Year
211.064	46.504	47.771	22	3. Year
211.064	48.166	49.433	23	4. Year
211.064	49.828	51.095	24	5. Year
211.064	51.491	52.757	24	6. Year
211.064	53.153	54.419	25	7. Year
211.064	54.815	56.081	26	8. Year
211.064	56.477	57.743	27	9. Year
211.064	58.139	59.406	28	10. Year

The interest made on equity for the 10th year is 28 %. The production of Stevia has a low profit compared with others projects.

## CONCLUSIONS

During the market study we conclude that the price of our product is not competitive, even though the production of Stevia is profitable during the 10 year-project. We could lower the price from 140 to 120, until 45 EUR taking measures like reduction of labour costs and property cost.

We found out in Paraguay the same product costs about 5€, 9 times cheaper than ours.

To make our product more competitive we should reduce to avoid the construction of infrastructure (greenhouse, buildings, etc), low engineering support cost, labour cost and machinery.

Thus, the way to reduce the cost would invest in another regions like in South and Central America where weather conditions and local facilities are available.

The increasing number of diabetic patients and health conscious individuals would push forward the need for alternatives to sugar, therefore the demand for high potency sweeteners is expected to increase Worldwide.

As Stevia results to be a potential alternative source for replacing artificial sweeteners like saccharin, aspartame, asulfam, etc, there is the possibility to adapt the current calculations done during this study and invest in the production of Stevia in another regions.



**Thanks for your  
attention!**

