Lot volumen (Plants to be obtained)	100.000
Cacao Floral buttons required	838

Item	Total value	Value per plant	Weight per item	Weight per item
Direct labor	34.000,11	0,34	47,25%	53%
Indirect labor	3.851,61	0,04	5,35%	
Culture medium (CM)	8.866,26	0,09	12,32%	12%
Transportation (IMC)	542,86	0,01	0,75%	5%
IMC others	3.112,58	0,03	4,33%	
Operating expenses	7.196,20	0,07	10,00%	30%
	14.392,40	0,14	20,00%	

Total Cost / Plant	**0,72**

Plants to be obtained	100.000

Process or variable	Initiation		Multiplication			Maturation	Germination		Acclimation
	Introduction	Induction	Expression I	Expression II	Expression III	Maturation	Conversion	Seedling development	Substrate Sand: Soil
Explants that enter in each stage	4.190	1.885	8.776	4.300	14.751	101.189	694.155	340.136	166.667
% contamination / necrosis	10%	2%	2%	2%	2%	2%	2%	2%	0%
Loss of explants due to contamination / necrosis	419	38	176	86	295	2.024	13.883	6.803	-
Explants to be processed before response	3.771	1.848	8.601	4.214	14.456	99.165	680.272	333.333	166.667
% explant response	50%	95%	10%	70%	70%	70%	50%	50%	60%
Loss of explants due to absence of response	1.885	92	7.741	1.264	4.337	29.750	340.136	166.667	66.667
Total explants with response	1.885	1.755	860	2.950	10.119	69.416	340.136	166.667	100.000
Coefficient of multiplication	1	1	5	5	10	10	1	1	1
Explants to process for the next stage	1.885	1.755	4.300	14.751	101.189	694.155	340.136	166.667	100.000
Productive phase duration (Days)	15	30	30	20	20	20	20	60	120
Accumulated time in each productive phase (Days)	15	45	75	95	115	135	155	215	335

Calculation of containers									
Type of container	Conical tube	Petri boxes	Petri boxes	Petri boxes	Petri boxes	Petri boxes	Petri boxes	500ml vessels	Tray
No of explants per vessel	350	25	25	49	49	49	49	20	50
Total containers processed by stage	12	75	351	88	301	2.065	14.166	17.007	3.333

Calculation of culture media									
Liters (L) of culture media per container	0,04	0,03	0,03	0,03	0,03	0,03	0,15	0,15	
Total liters	0,5	2,3	10,5	2,6	9,0	62,0	2.125	2.551	

Labor calculation									
Work standard (container / day / worker)	2	20	240	48	48	30	147	360	120
Working days	6	4	1	2	6	69	96	47	28

Colombian Salary Calculation Year 2020

Concept	Percentage		
Minimum Wage (Articles 145 to 148 of The CST)			251
Transportation Aid (Law 1 of 1963)			29
Health security (Article 204 of Law 100 of 1993)	8,50%		21
Life Pension (Book I of Law 100 of 1993)	12,00%		30
Occupational hazards (Decree 1295 of 1994)	0,52%		1
Severance payments (Decree 923 of 2017)	9,00%		23
Premium (Articles 306-308 of The CST)	8,33%		23
Losses (Articles 249 To 258 of The CST)	8,33%		23
Interests (Law 52 of 1975)	12,00%		3
Holidays (Articles 186 To 192 of The CST)	4,17%		10
Endowment (Article 230 of The CST)	5%		13
		Total	**428**

Potentially working time	
Days of the year	365
Sunday days	52
Holidays	18
Vacation days	15
Average disability	3
Working days year	277
Working days month	23
Working hours in the year	2216
Working hours in the month	184,67
Normal idle hours (10%)	18,46
Potentially effective hours	166,21

Direct labor

	Countryside	Initiation		Multiplication			Maturation	Germination		Acclimation	Total productive batch
	Field collection	Introduction	Induction	Expression I	Expression II	Expression III	Maturation	Conversion	Seedling development	Substrate Sand: Soil	
Staff days in the field	28										27,93
Days of staff in flow chamber		6	4	1	2	6	69	96	47	28	259,58
Days of support process staff		23	24	27	17	21	53	555	612	216	1.546,40
											1.833,91

Total working days	1.834
Duration of the production process in days	335
Staff required in biofactory	7
Months of staff required	79
Labor value	34.000
	35.948

Indirect labor

			Total monthly value	Duration of the process in months	% time destination	Total cost
Supervisor			1.284	12	25%	3.852

	Countryside	Initiation		Multiplication			Maturation	Germination		Acclimation
	Field collection	Introduction	Induction	Expression I	Expression II	Expression III	Maturation	Conversion	Seedling development	Substrate Sand: Substrate
Working in flow chamber (W)										
Working standard (vessel / day / worker)		1	14	240	58,8	36	58,8	360	360	100
Total recipients required in the production process		12	75	351	88	301	2.065	14.166	17.007	3.333
Working days		**6**	**4**	**1**	**2**	**6**	**69**	**96**	**47**	**28**
W support processes										
Explants to process according to production calculation		**4.190**	**1.885**	**8.776**	**4.300**	**14.751**	**101.189**	**694.155**	**340.136**	**166.667**
Liters (L) of cultivation medium		**0,5**	**2**	**11**	**3**	**9**	**62**	**2.125**	**2.551**	-
W in culture medium preparation										
Liters of culture medium needed to prepare		1,0	3,0	11,0	3,0	10,0	62,0	2125,0	2552,0	
Time required for the preparation of a liter in hours		1	1	1	1	1	1	1	1	
Hours required for CM preparation		**1**	**3**	**11**	**3**	**10**	**62**	**2125**	**2552**	
W in culture medium dispensing										
Liters of culture medium required to dispose		1,0	3,0	11,0	3,0	10,0	62,0	2125,0	2552,0	
Liters that can be dispensed in one hour		3	3	3	3	3	3	3	3	
Hours required to dispose CM		**0**	**1**	**4**	**1**	**3**	**21**	**708**	**851**	
W in subculture from explants										
Explants per container			25	25	49	49	49	20	20	
Containers per hour			40	40	20	20	20	40	40	
Explants per container / hour			1000	1000	980	980	980	800	800	
Hours required for subculture			**2**	**9**	**5**	**16**	**104**	**868**	**426**	
W in preparation of materials										
Days of introduction in vitro		15								
Medium preparation hours / in vitro introduction / day		6								
Hours required for preparation of materials induction		**90**								
Direct hand hours		6,0	3,8	1,5	1,8	6,3	68,8	96,4	47,2	
8 hours of a work/day, 4 hours of material preparation		50%	50%	50%	50%	50%	50%	50%	50%	
Hours of material preparation		**3**	**2**	**1**	**1**	**3**	**34**	**48**	**24**	
W in discard materials										
Number of containers to check		12,0	75,4	351,1	87,8	301,0	2065,1	14166,4	17006,8	
Number of containers to be processed per hour		100	100	100	100	100	100	100	100	
Hours required to discard material		**0**	**1**	**4**	**1**	**3**	**21**	**142**	**170**	
W in wash activities										
Number of containers to wash		12,0	75,4	351,1	87,8	301,0	2065,1	14166,4	17006,8	
Number of containers washed per hour		100	100	100	100	100	100	100	100	
Hours required to wash material		**0**	**1**	**4**	**1**	**3**	**21**	**142**	**170**	
W in monitoring and selection										
Number of containers for monitoring and selection		12,0	75,4	351,1	87,8	301,0	2065,1	14166,4	17006,8	
Number of monitored containers per hour		50	50	50	50	50	50	50	50	
Hours required to monitor material		**0**	**2**	**7**	**2**	**6**	**41**	**283**	**340**	
W of supervisor										
Total hours that operators are working full time		**90,0**	**180,0**	**180,0**	**120,0**	**120,0**	**120,0**	**120,0**	**360,0**	
W in acclimation										
Number of plants										166666,7
Preparation of materials per hour										100,0
Hours for preparation of ex vitro materials										**1666,7**
W in monitoring garderie plantlets										
No of days acclimation phase										120,0
Hours required for acclimatization per day										2,0
W in monitoring plantlets										**60,0**
Total in hours		**185**	**191**	**218**	**133**	**165**	**424**	**4436**	**4893**	**1727**
Total in days (8 hours / working day)		**23**	**24**	**27**	**17**	**21**	**53**	**555**	**612**	**216**

		Commercial formulation	Units	Liters required	Total cost medium
Initiation	Introduction	$ 1,74	COST/LITRE	**0,48**	0,84
	Induction	$ 1,74	COST/LITRE	2,26	3,95
Multiplication	Expression I	$ 1,83	COST/LITRE	10,53	19,22
	Expression II	$ 1,73	COST/LITRE	2,63	4,55
	Expression III	$ 1,61	COST/LITRE	9,03	14,52
Maturation	Maturation	$ 1,61	COST/LITRE	61,95	99,59
Germination	Conversion	$ 2,05	COST/LITRE	2.124,96	4.361,81
	Seedling development	$ 2,05	COST/LITRE	2.124,96	4.361,79
				Total procces	**8.866,26**

		Price	Und	Requirement	Total
Acclimation	**Substrate Sand: Substrate**	$ 0,01143	COST/KILO	11.667	133,33
					133,33

IMC transportation

Exercise	Vr/total	TRAYECTO	DESCRIPCION
Collection of material in field Track 1	11,43	Farm - transport terminal	Conical tube with flowers
Collection of material in field Track 2	17,14	Transport terminal - biofactory	Conical tube with flowers
Transportation Nursery - field	514,29	Biofactory - Farm	100.000 Plantlets
Total	**542,86**		

Containers						
	Quantity	**Units**	**Vr/Unitary**	**Units**	**Vr/total**	**# uses**
Petri boxes	14.166	Und	0,71	Und	10.086,50	6
500ml vessels	17.007	Und	0,29	Und	4.975,70	6
Tray	3.333	Und	0,29	Und	952,38	6
Conical tubes	12	Und	0,15	Und	1,85	6

Laboratory Tools					
	Quantity	**Units**	**Vr/Unitary**	**Units**	**Vr/total**
Scalpel	64	Und	3,86	Und	246,86
Tweezers	64	Und	7,74	Und	495,23
Markers	24	Und	0,86	Und	20,57
					-

Plant staff (additional to that required by law)				Working days	1.834
	Quantity	**Units**	**Vr/Unitary**	**Units**	**Vr/total**
Gloves	1.834	Und	0,13	Und	235,79
Blades	1.834	Und	0,02	Und	41,92
Stretch Film/Wrap		Und	5,71	Und	-
Covers	7	Und	0,05	Und	0,33

Nursery phase					
	Quantity	**Units**	**Vr/Unitary**	**Units**	**Vr/total**
Shovel	2	und	4,29	und	8,57
Gloves	2	und	2,66	und	5,31
Cart	2	und	107,14	und	214,29

Item	**Value**	**Cicles**	**Total**
Indirect cost of containers	16.016,43	6	2.669
Laboratory tool	762,66	6	127
Plant staff (additional to that required by law)	278,04	1	278
Nursery phase	228,17	6	38
		TOTAL IMF	**3.113**

Macroeconomic assumptions

FECHA	12/04/2022
TRM	3500,00
IVA	19,00%
	30,00%

	LESS PRICE	PROBABLE PRICE	HIGHER PRICE
TRM	3500,00	3500,00	4200,00

Ranges of variables

	Initiation		Multiplication			Maturation	Germination		Acclimation
	Introduction	**Induction**	**Expression I**	**Expression II**	**Expression III**	**Maturation**	**Conversion**	**Seedling development**	**Substrate Sand: Soil**
% permissible losses contanimation / necrosis	10,00%	2,00%	2,00%	2,00%	2,00%	2,00%	2,00%	2,00%	0,00%
% explants with response	50,00%	95,00%	10,00%	70,00%	70,00%	70,00%	50,00%	50,00%	60,00%
Coefficient of multiplication	100,00%	100,00%	500,00%	500,00%	1000,00%	1000,00%	100,00%	100,00%	100,00%
No of explants per container	350	25	25	49	49	49	49	20	50
Liters (l) of culture media per container	0,04	0,03	0,03	0,03	0,03	0,03	0,03	0,15	
Work standard (container / day / worker)	2	20	240	24	24	24	147	360	120

	Initiation		Multiplication			Maturation	Germination		Acclimation
	Introduction	**Induction**	**Expression I**	**Expression II**	**Expression III**	**Maturation**	**Conversion**	**Seedling development**	**Substrate Sand: Soil**
% of allowable losses contamination / necrosis									
Less value	9,50%	1,90%	1,90%	1,90%	1,90%	1,90%	1,90%	1,90%	0,00%
Probable value	10,00%	2,00%	2,00%	2,00%	2,00%	2,00%	2,00%	2,00%	0,00%
Higher value	10,50%	2,10%	2,10%	2,10%	2,10%	2,10%	2,10%	2,10%	0,00%
% explants with biological response									
Less value	47,50%	90,25%	9,50%	66,50%	66,50%	66,50%	47,50%	47,50%	57,00%
Probable value	50,00%	95,00%	10,00%	70,00%	70,00%	70,00%	50,00%	50,00%	60,00%
Higher value	52,50%	99,75%	10,50%	73,50%	73,50%	73,50%	52,50%	52,50%	63,00%
Multiplication coefficient									
Less value	95,00%	95,00%	475,00%	475,00%	950,00%	950,00%	95,00%	95,00%	95,00%
Probable value	100,00%	100,00%	500,00%	500,00%	1000,00%	1000,00%	100,00%	100,00%	100,00%
Higher value	105,00%	105,00%	525,00%	525,00%	1050,00%	1050,00%	105,00%	105,00%	105,00%