

Rough Estimates for Spawn Lab

INPUT VALUES IN YELLOW BOXES

Target spawn production per day in one shift	300	kg
Number of lab operational days/annum	350	days
Days of incubation of spawn in incubation room	20	days
Rate (per kg) at which spawn is proposed to be sold	80	Rs
Master spawn for above	9	kg
Buffer for 5% contamination	15	kg
Total spawn to be produced per day	324	kg
Expected spawn output/annum	105	tons

INFRASTRUCTURE -AREA REQUIRED AND COST

Item	Area sq ft	Rate/sq ft	Cost (Rs)
Grain Storage space	324	600	194400
Store Room for miscellaneous items	140	500	70000
Worker Room	110	500	55000
Sale room	90	600	54000
Area for boiling, sieving, mixing and bag filling	650	600	390000
Boiler Room area	100	500	50000
Bag cooling area	130	600	77760
Bathing and change room area	120	600	72000
Inoculation Area	120	600	72000
Incubation Room(s) for 6.48 ton spawn -(width to be adjusted as per stands and width of paths)	518	1000	518400
Corridor space	110	600	66000
Cold room (including insulation) for 3.24 ton	162	1000	162000
Office space	140	600	84000
Sub total of lab area	2574		1865560
Boundary wall and flooring of open area (50% of above)	1290	100	129000
Total area and cost of Infrastructure(A)	3864		1994560

EQUIPMENT REQUIRED AND COST

Item	No./kg	Rate (Rs)	Cost (Rs)
Kettle (250 lts)	1	130000	130000
Boiler	1	400000	400000
Grain sieves	2	2500	5000
Grain mixer	1	50000	50000
Bag filling machine	1	80000	80000
Trolleys	2	10000	20000
Autoclaves horizontal	1	1000000	1000000
Autoclave vertical small for lab	1	30000	30000
Laminar flow	1	80000	80000
Stands for incubation rooms (sq mt area)	80	5000	400000
Stands for cooling room (sq mt area)	40	5000	200000
AC Unit for Incubation and cold room (TR)	5.32	40000	212800
AC system for cooling room	1	25000	25000
AHU for positive pressure and line (cubic meter)	330	500	165000
Incubator	1	60000	60000
Fridge	1	25000	25000
pH meter	1	20000	20000
Lab coats	21	400	8400
Gloves, caps, foot wears, masks, disposable coats, etc.	7	1000	7000
First aid box	1	1000	1000
Fire safety equipment	5	2500	12500
Gas/LPG cylinder, burner/spirit lamps, misc equip for filling (per ton spawn)	105	200	21000
Temperature and humidity meters	10	1000	10000
UV tubes	6	1000	6000
Ozone generator	1	50000	50000
Air curtains	3	8000	24000
Hot air Oven	1	15000	15000
Grain cleaning machine	1	40000	40000
Hot air blower	2	2000	4000
Weighing balance	1	5000	5000
Data Logger	1	20000	20000
Display boards	2	1000	2000
Packing and tagging facility	1	50000	50000
Microwave oven/induction cooktop	1	5000	5000
Wet vacuum cleaner	1	5000	5000
Air conditioned transport vehicle	1	300000	300000

Total (B)

3488700

CHEMICALS REQUIRED (per annum) AND COST

Calcium carbonate (kg)	2917	1	2917
Calcium sulphate (kg)	11667	3	35001
Spirit/sanitizer/alcohol (Bottle of half litre)	21	100	2100
Agar-agar (kg)	0.84	3000	2520
Glucose (kg)	0.63	500	315
Malt extract (kg)	0.84	3000	2520
Potato (kg)	8.4	20	168
Sodium hydroxide (500 g)	1	500	500
Hydrochloric acid (500 ml)	1	200	200
Floor cleaner (litre)	10.5	60	630
Yeast extract (kg)	0.5	1500	750
Misc	2.1	5000	10500
Total (C)			58121

OTHER INGREDIENTS REQUIRED (per annum)

Wheat/Sorghum/Bajra/ Paddy grains, etc. (quintals)	583	1800	1050000
Glass bottles	1050	2	2100
flasks	21	200	4200
Plastic petri plates (pre-sterilized)	1050	15	15750
Culture tubes	105	25	2625
Non absorbent cotton/Polyfill (Kg)	1312.5	300	393750
PP bags/Microbial filter bags (kg)	1050	200	210000
PP rings	105000	0.8	84000
Parafilm for Petriplates,	3	2500	7500
Paper bags, butter paper, tissue paper, rubber bands, etc	105000	1	105000
Data registers, standard labels for record & traceability	105000	0.3	31500
Forceps, inoculation needles, spatula, Bottle holders/ dispensers	4	500	2000
Misc items	10500	1	10500
Total (D)			1918925

LABOUR REQUIRED AND COST

Number of labour required per month	7		
Labour cost per annum (Rs)	84	6000	504000
Total (E)			504000

ELECTRICITY REQUIRED AND COST

Electricity units needed per annum (kw)	85200	6	511200
Total (F)			511200

COST ESTIMATES

Infrastructure (a)	1994560
Equipment (b)	3488700
Total (A+B)	5483260
Others	
Chemicals (C)	58121
Other ingredients (D)	1918925
Labour (E)	504000
Electricity charges (F)	511200
Misc expenses	105000
Total cost of ingredients per annum (c)	3097246

PROJECT COST

Interest +Depreciation on infrastructure	339075.2
Interest +Depreciation on equipment	767514
Ingredients	3097246
TOTAL COST PER ANNUM (Rs)	4203835

Revenue from sale of spawn (Rs) **8400000**

NET PROFIT (Rs) **4196165**

OTHER CALCULATIONS ON CAPACITIES

Wheat required/day	167	kg
Wheat put in each kettle	60	kg
Max. number of one kg bags from one kettle used thrice	324	
No of 250 l kettle required	1	
No of autoclaves needed	1	
Total volume of autoclave needed if square (litre)	1620	litre
Volume of each autoclave (litre)	1620	litre
Total volume of autoclave needed if round	2333	litre
Volume of each autoclave	2333	litre
No of 6' Laminar flow needed	1	
Boiler capacity for kettles/autoclaves (kg/h)	490	kg/h
AHU capacity for positive pressure of lab		
Approx TR for incubation rooms and cold room (TR)	9.7	ton

The estimates are for single shift. In case of more shifts, the capacity of incubation rooms will have to be increased and other facilities will remain same

The estimates provided here are only rough estimates and the actual infrastructure and other items may vary from place to place and sophistication required.

The estimates are suitable for 200 kg to 1000 kg per day spawn production. In case lower production is required, the minimum facilities will remain same and only incubation space can be decreased and cold room and various other infrastructure can be omitted.

In case of production of 50 kg or less, boiling kettle and boiler can be replaced with LPG or diesel/kerosene bhathi. At this scale many of the facilities like workers room, sale room, etc. can be omitted. Also some of the equipment like refer van, data logger, ozone generator, etc. can be omitted. *(in case any infrastructure or other item is not required, enter its cost as 0 (zero)).*

Normally the profits will start only if lab is operational for more than 150 days and targetted production capacity per day is 300 kg or more.