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IX. PREPARATION OF LIQUID ORALS

PREPARATION OF LIQUID ORALS
(Including syrup, solution and suspension)

1 Product description

Medicines under syrup, solution and suspension form are used by children as well as by adults in heavy different illnesses. These are made from basic drugs and excipient such as sorbitol, glycerin, propylene glycol, sugar etc.,

2. Process description

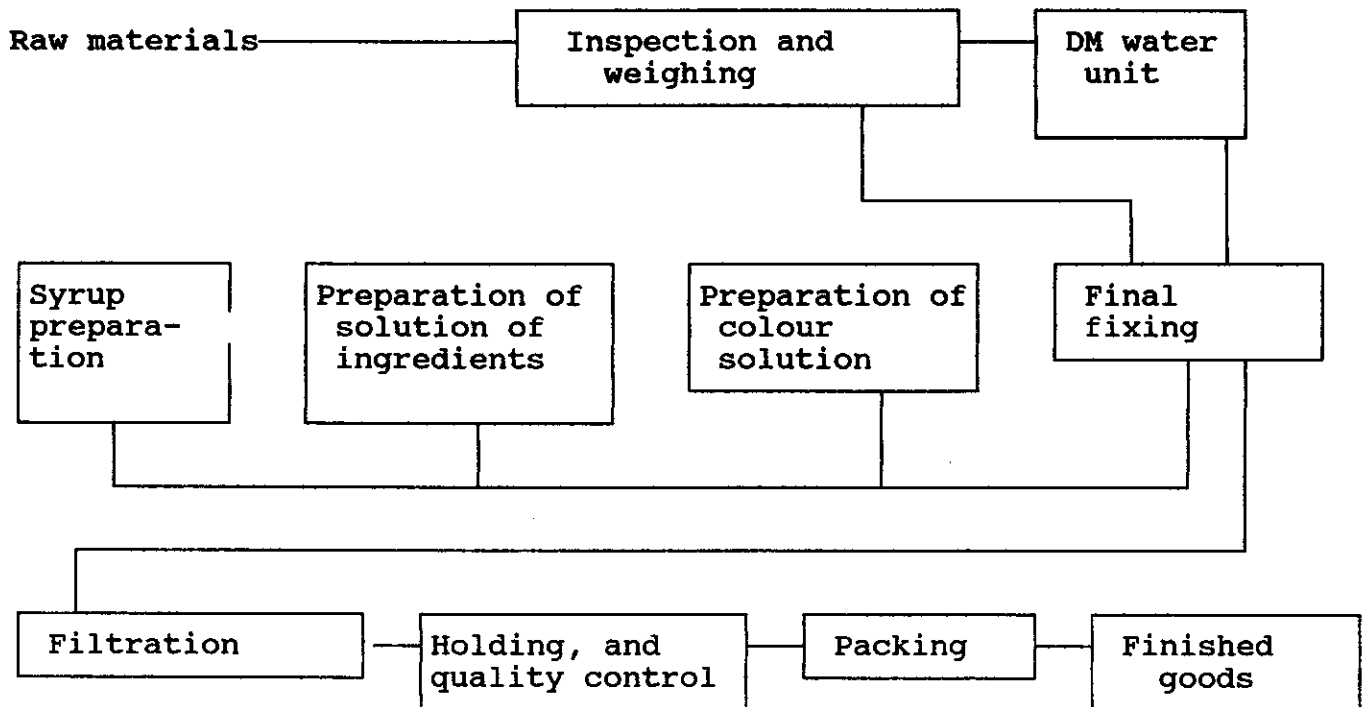
The materials including basic drugs and excipient are physically checked and weighed as per batch requirement. Then there are conditioned according to the kind of liquid orals: For syrup: the required quantity syrup is made by dissolving sugar in demineralised water in a syrup preparation tank. The syrup is then filtered through a filter press and transferred to the mixing tank; For solution: other ingredients are weighed as per batch requirement and dissolved in mineralised water in separate vessels and transferred to a mixing tank. For colour solution: the permitted colour is weighed and a solution of the colour is made with demineralised water in a colour preparation kettle. The solution is then transferred to a mixing tank.

Then, all the transferred items are mixed in the mixing tank with the help of an agitator until a clear solution is obtained. The flavour is then added to the solution. The final volume is made up with demineralised water. The final mix is then passed through a filter press and collected in a holding tank.

For suspension, after obtaining the final mix, the product is passed through a colloidal mill and homogenizer, then it is transferred to the holding tank via a filter press and stored. A sample of the filtered product is sent to quality control for complete analysis.

The laboratory tested product is then filled in prewashed bottles in desired volume, and the filled bottles are then sealed with pilfer proof caps and labelled ready for selling.

Flow chart



3. Description of raw materials

The major raw materials for the production of liquid orals are basic drugs extracted from medicinal plants. Besides these basic materials, different vehicles like sorbitol, glycerin, propylene glycol, sugar, bottles etc. are required.

4. Market study

Liquid orals are in demand in pharmaceuticals, hospitals and the like. Most of pharmaceutical products are imported. There is, therefore, a potential for the local as well as export market. But, an exact assessment of the market should be undertaken before a starting of a plant establishment.

5. Location requirement

Locating the plant near by big cities will be advantageous. In addition, there should be adequate supply of water, power and accessible roads. Since the plant will use a number of excipients, it is advised to take into consideration all necessary environmental aspects, when establishing the plant.

6. Technology

The technology consists of preparing the impediements and solution, filtration.

7 Machinery and equipment

	<u>Description</u>	<u>Qty</u>	<u>US \$</u>
1	Jacketed stainless steel tank with agitator, 250 and 300 litres	2	600
2.	Tank, stainless steel, 350 litres	2	300
3	Centrifugal pump, stainless steel cap. 1 M3/hr, head=20M	1	250
4	Horizontal plate type filter press stainless, steel	1	100
5	Bottle washing machine	1	500
6	Twin head vaccumetric fill machine	1	450
7	Semi-automatic roll seal sealing machine	1	300
8	Conveyor belt, 6 M length	1	200
9	Demineralised water unit, output 250 litres/hr	1	350
10	Automatic labelling machine	1	250
11	Overprinting machine	1	200
12	Percolator stainless steel, cap. 350 lts	1	300
13	Colloid mill	1	250
14	Quality control equipment	1 set	500
		Total	<u>4550</u>

7. Manpower requirement

The manpower required for this plant is given below.

	<u>Position</u>	<u>No.</u>	<u>Salary</u> <u>US \$</u>
1	Manager	1	120
2	Chemical engineer	1	80
3	Production pharmacists	2	100
4	Secretaries	2	50
5	Cleaner	1	15
6	Clerks	2	40
7	Skilled workers	6	180
8	Unskilled workers	5	100
9	Laboratory assistants	2	60
10	Guards	2	40
		Total	<u>785</u>

9.	<u>Raw material (per month)</u>		
	Basic drugs US\$ 120 per ton, 140 tons		<u>US\$ 16800</u>
10.	<u>Utilities (per month)</u>		
	Water and electricity charges		<u>US\$ 80</u>
11.	<u>Other expenses (per month)</u>		<u>US \$</u>
	1. Rent		150
	2. Consumable items		40
	3. Lubricants & other consumable tool		45
	4. maintenance		60
	5. Cottage & freight		30
	6. Sales expenses including travelling		50
	7. Stationery & postage		25
	8. Insurance legal charges, fees licenses		70
	9. Packing & publicity		<u>20</u>
		Total	<u>350</u>
12.	<u>Working capital (per month)</u>		<u>US \$</u>
	1. Raw material		16800
	2. Staff & labour		785
	3. Utilities		80
	4. Other expenses		<u>350</u>
		Total	<u>18015</u>
14.	<u>Capital investment</u>		<u>US \$</u>
	1. Machinery & equipment		4550
	2. Working capital for 3 months		<u>54045</u>
		Total	<u>59595</u>
15.	<u>Cost of production (per annum)</u>		<u>US \$</u>
	1. Raw material		201600
	2. Staff & labour		9420
	3. Other expenses		4200
	4. Interest on capital @ 15% p.a.		10809
	5. Depreciation on machineries & equipment @ 10%		<u>455</u>
			<u>226481</u>
15.	<u>Total sales (per annum)</u>		
	By sales of 1680 tons ducting @ US\$ 140 per ton liquid orals at an average price of		<u>US\$ 235200</u>

16. Profitability (per annum)

Profit = Total sales - production cost

profit ratio = $\frac{\text{Profit} \times 100}{\text{Total sales}}$ = 3.7%

Rate of return = $\frac{\text{Profit} \times 100}{\text{Total capital investment}}$ = 14.6%

17. Break even analysis

a) Fixed cost		US \$
1. Rent		150
2. Interest		10809
3. Depreciation		455
4. 40% of wages		3768
5. 40% of other cost		1680
		Total <u>16862</u>
b) B.E.P.	= $\frac{\text{F.C.} \times 100}{\text{F.C.} + \text{profit}}$	= 33.4%

Salaries, cost of machinery and equipment in no way represent the current value it is used only for computation purpose.

18. Possible suppliers

1. The National Small Industries Corp. Ltd.
Laghu Udyog Bhavan
Okhla Industrial Estate
New Delhi - 110020
Telex NSIC 31-62376
Fax 6837669
India
2. Dino Anlage Und Maschinenbau GmbH
Postfach 660267
D - 2800 Bremen 66
FRG
Telex 246943