CORRESPONDENCE

This department is provided for the publication of informal communications which are of interest, whether because they are informative or are suggestive and stimulating, and to serve as an open forum for discussions of matters brought up by readers.

MANUFACTURE OF ETHYL ESTERS

To the EDITOR:

I have noticed that in various places leprosy drugs are being bought at high prices instead of being made locally, and that small appropriations for treatment purposes restrict the use of these drugs. As examples I might name several countries, from the Far East to the New World, in all of which there are laboratory facilities available that could be utilized for the manufacture of drugs. When officials are questioned as to why this is not done, the answer usually given is that they have no adequate directions for the work. It has seemed to me that an article containing not only directions for the preparation of the drugs but also details of the apparatus required and methods of chemical control would be of value.[1]

It is also frequently noted that leprologists do not realize how cheaply these drugs can be made. I have recently analyzed the cost of production on the basis of a plant which we have recently installed here at the Instituto Oswaldo Cruz, and the data may be of interest to readers of THE JOURNAL. In the first seven months of operation we prepared 406 liters of drugs, and in the next year we should make five to ten times as much. Heretofore comparatively few lepers in Brazil outside of the State of São Paulo were receiving treatment, mainly because of the high cost of drugs, but we now expect to supply all of the States at reasonable cost.

The figures in the following tabulation do not include a salary charge for a supervising chemist, for it is assumed that the work would be done where such personnel is already available, but they do include the salary of a junior chemist to carry on the actual work. I have put down four "laborers," but we are actually using only

[1] See Cole, H. I. and Cardoso, H., Purification and esterification of chaulmoogra oils, in this issue of THE JOURNAL, page 455.—EDITOR.

two, at a considerably lower wage rate than that shown in the estimate. The list of equipment does not include articles such as oven, sterilizer, etc., that are generally available in any laboratory, but to include them would not increase the total cost very greatly. The price for *H. wightiana* oil is that which we have recently paid, but we understand that because of competition among producers in India the price is going down. The main figure for the cost per liter of the finished ethyl esters provides for packaging in ampules, because we distribute our products in that way exclusively. Bottles are not popular here, and ampules are safer and more convenient; but the final cost would be about 20 per cent less if 100 cc. bottles were used, as at Culion.

COST DATA, MANUFACTURE OF LEPROSY DRUGS

I. EQUIPMENT AND PERSONNEL

(Plant capacity 2,000 liters annually)

Equipment (special)	*Cost*
1 Stainless steel steam kettle, 200 liters capacity	$ 180.00
3 Stainless steel sauce pans (30, 10 and 6 liters, respectively, for iodizing esters)	35.00
4 Stoneware jars (26 liters), with steam tubs, reflux condensers and piping for steam and water	50.00
1 Still and condenser, iron	20.00
1 Vacuum pump and motor, heavy duty	190.00
1 Steam boiler, 1 h.p.	100.00
1 Refractometer, Abbe	210.00
1 Polarimeter	125.00
1 Balance, heavy duty	20.00
1 Balance, chemical	150.00
Miscellaneous (glassware, etc., and chemicals for the control of products)	200.00
Cost of installation	220.00
Total cost of special equipment	$ 1,500.00
Salaries and wages	
1 Junior chemist, per annum	$ 1,200.00
4 Laborers, at $600 per annum	2,400.00
Total, salaries and wages	$ 3,600.00

II. Estimated Cost, Chaulmoogra Ethyl Esters
(Per liter, based on 2,000 liters production per annum.)

Raw materials		*Cost*
Chaulmoogra oil, first quality (*H. wightiana* oil, cold pressed, as delivered in Rio de Janeiro in tons lots in steel drums, $400 a ton)	$ 0.40	
Alcohol, 95% ethyl, at $0.10 per liter	.12	
Lye, sulphuric acid, etc.	.10	
Miscellaneous supplies	.06	
Plus 20%, for losses	.14	
Total, materials, per liter		$ 0.82
Salaries, depreciation, etc.		
Salaries and wages	$ 3,600.00	
Depreciation of equipment, 10%	150.00	
Interest on investment, 6%	90.00	
Total	$ 3,840.00	
Per liter		1.90
Power, heat and water		
Average, per liter produced		.18
Packaging		
In 5 cc. ampules packed in two 100-ampule boxes (if packed in 100 cc. bottles, capped and labelled, $0.20 per liter)		1.00
Total cost per liter, in 5 cc. ampules (in 100 cc. bottles $3.20)		$ 4.00

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