

ing Digitalin solution (1 in 1,000) through the jugular vein at the rate of 0.5 c.c./min. till the cardiac pulsations were imperceptible. For each sample, at least six guinea-pigs were tried and the figures in the table represent the mean average m.l.d. figures. The standard deviation of these figures were determined by the usual formula and was found not to exceed 10 per cent. on either side.

It will be seen from the table that commercial preparations of Digitalin, even when stored in powder form in tropical climates, undergoes deterioration. While some figures indicate slightly higher potency than what is demanded by Digitalin, B.P.C. (i.e., 80 units per gramme of powder), there are quite a number which are definitely below this level. This is undoubtedly, at least in part, due to hydrolysis of the glycosides, as it is well established that the aglycons are much less potent than the glycosides from which they are derived. This hydrolysis may be brought about by enzymes, which might remain in the Digitalin samples unless and until they are properly purified, a fact which is seldom achieved in most commercial samples of this category. From the point of view of medical practice, however, it may be a dangerous procedure to use under-strength Digitalin, which is used largely as an emergency measure in cardiac failure. It is, therefore, very desirable that all 'Digitalin preparations' must be biologically tested before they are permitted to be employed in the manufacture of injectable 'Digitalins' and similar preparations.

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1. Nativelle, Quoted by *U. S. Dispensatory*, 23rd. Edition, 1943, p. 369. 2. Bose and Mukerji, *I. J. M. R.*, 1942, 30, 611.

### CHARACTERISTICS OF INDIAN ANIMAL FATS

IVANOW<sup>1</sup> has shown that plants thriving in both hot and cold climates yield, when raised in the tropics, seed-fats that are relatively more saturated, since a certain effective degree of fluidity of the fat must be maintained relative to the environment. Animal fats—milk and depot—from tropical countries also appear to exhibit similar features of saturation. An analysis of 160 cow and buffalo milk fats by Achaya *et al.*<sup>2</sup> revealed that the unsaturation varied from iodine value 24 to 40. The comparatively high saturation characterising these fats when compared to those of European origin, which give I.V. exceeding 40, is evident. Also, the I.V. of the cow ghees was about 3 units higher than buffalo ghees of the same R.M. value, there being an inverse relation between the two values in both species.<sup>2</sup>

Since the neutral triglyceride component of blood is held to be the precursor of both milk and depot fats, the depot fats may in consequence be expected to reveal analogous differences in saturation. Four samples of Indian

cow depot fats examined by Hilditch and Murti<sup>3</sup> showed extremely low I.V. (25.8 to 31.1) compared to Western beef tallows (I.V. about 40); while an analysis of four Indian buffalo depot fats by the authors showed I.V. between 23 and 27 which though too small in number in either case for an unqualified opinion, appear to be of the order of 3 units less as in the milk fats. The extreme saturation of these depot fats has been already noticed by Hilditch and Murti.<sup>3</sup>

In addition to these regional and species characteristics, there are striking peculiarities in the specific glyceride structures of Indian animal fats. Hilditch and co-workers<sup>4</sup> have shown that, if the fully-saturated glyceride percentage of animal fats be plotted against the percentage of total saturated acids of the fats, the points lie on a smooth curve which cuts the saturated acid axis at a point corresponding to about 30 per cent.—which is invariably the proportion of palmitic acid found in these fats, the percentages being about  $23 \pm 3$  in the milk fats and  $27 \pm 3$  in the depot fats. Corresponding points plotted for the fats from Indian animals lie rather on a fairly well-defined line about 4 unit mols. below the former. This new graph cuts the saturated acid axis at a point corresponding to about 35 mols. per cent., in striking agreement with the palmitic acid content of these fats; to make a further particularization, the percentages are about  $27 \pm 3$  for the milk fats and  $31 \pm 3$  for the depot. These relationships are shown below in tabular and graphical form:—

Observer	Total saturated acids (% m.l.)	Fully-saturated glycerides (% mol.)	Palmitic acid content (% mol.)
<i>Milk fats</i>			
1. Buffalo Achaya and Banerjee <sup>5</sup>	74.9	41.7	31.9
2. " Achaya and Bauerjee <sup>5</sup>	62.9	24.3	25.1
3. " Bhattadharya and Hilditch <sup>6</sup>	70.1	34.3	28.7
4. Cow Bhattacharya and Hilditch <sup>6</sup>	67.9	33.7	26.8
5. Sheep Dhingra <sup>7</sup>	74.6	36.8	20.4
6. Goat Dhingra <sup>7</sup>	74.6	39.3	21.5
7. Camel Dhingra <sup>7</sup>	62.6	25.6	28.3
<i>Depot fats</i>			
a. Cow Hilditch and Murti <sup>3</sup>	72.9	35.9	40.8
b. " Hilditch and Murti <sup>3</sup>	67.5	28.3	33.4
c. Goat Dhingra and Sharma <sup>8</sup>	63.1	29.2	27.0
d. Buffalo Achaya and Banerjee <sup>9</sup>	69.5	32.5	33.4

In addition to the above eleven cases worked out in full, data are available on the palmitic acid contents of three more buffalo milk fats,<sup>5,6,10</sup> and one more cow milk fat<sup>6</sup>; and of two cow depot fats,<sup>3</sup> one buffalo depot fat<sup>9</sup> and seven wild animal depot fats of Eastern animals.<sup>11</sup> These figures indeed strikingly confirm the new glyceride relationship postulated above which certainly appears more than coincidental.

Of the five apparent exceptions, the goat and sheep milk fats of Dhingra<sup>7</sup> were from animals on a winter diet in the Punjab and may indeed be said to support the contention that it is in a tropical climate that the above relationship