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EMULSIFICATION OF LIQUID MONKEY FOOD[1]

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Herndon, Greenburg, VanLoon, Kelleher, Cook, and Davidson (1958) have described a high protein monkey diet for use both in animal maintenance and as a reinforcer. A modification of this diet (Ellison and Riddle, 1961) is commercially available (monkey diet SK&F; Nutritional Biochemicals Corp., 21010 Miles Ave., Cleveland 28, Ohio). The use of this food for both maintenance and reinforcement of squirrel monkeys has been described by Kelleher, Gill, Riddle, and Cook (1963).

For use as a liquid reinforcement delivered by a dipper feeder, the diet is prepared by mixing with water and cottonseed oil and stirring thoroughly in a Waring blender. Hand-stirred mixtures separate in a short time, forming three layers. Even when the liquid is thoroughly stirred with an electric mixer, separation takes place within 2 to 4 hr. As the mixture separates the dipper fails to enter the solid layer at the bottom of the dish and delivers mostly oil and water to the subjects.

While the behavior of some squirrel monkeys appears unaffected by this gradual change in the properties of the reinforcer, other subjects display changes similar to extinction. Thus, separation of the liquid reinforcement precludes the use of long experimental sessions or of laboratory routines involving a single daily servicing of all feeders.

A solution to this problem has been found through the use of sodium carboxymethylcellulose (CMC) as an emulsifying agent in preparing the liquid diet. The liquid is prepared as follows:

(1) The CMC is added slowly to water while stirring in an electric mixer; the solution is stirred for 30 min.

(2) Powdered monkey diet is slowly added, stirring being continued for 15 min.

(3) Cottonseed oil is added and the mixture is stirred for another 15 min.

An 800 g batch of liquid diet, sufficient to load four Gerbrands dipper feeders each holding about 180 ml can be prepared using 400 g monkey diet, 340 ml water, 60 ml cottonseed oil, and 1200 mg CMC (Hercules Powder Co., Wilmington, Del., type 7HP). Smaller or larger batches can be prepared using the same weight ratios of ingredients.

It is essential to dissolve completely the CMC in water before adding the other ingredients. This mixture will not separate for several days, so that spoilage becomes the only problem in handling the diet. The mixture given above is somewhat thicker than that obtained by using the same weight ratios of ingredients without the emulsifier. This mixture will not clog feeders, however, and is readily accepted by the subjects. The food can be prepared once daily and all feeders can be loaded without regard to animals' running times. Because of possible spoilage, the food should not be used more than 24 hr after preparation. In more than six months experience with this diet, no difficulties have been encountered.

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