

Autoclaving Laboratory Diets

LabDiet® offers a multitude of Autoclavable laboratory animal diets. Steam autoclaving of laboratory diets has been performed for laboratory animals for many years. The purpose is to lower the microbiological load on the food. Autoclaved food is a means to feed animals kept behind bio-secure barriers that cannot be exposed to the natural microbiological load found on most natural-ingredient diets.

It is critical when autoclaving diets that care has been taken to compensate for heat-sensitive nutrients that may be degraded during the heating process. If one autoclaves a diet that was not formulated specifically for heat-treatment, there is a strong possibility that deficiencies can occur. In addition, it is very important to note that you should NOT feed a diet that is formulated for autoclaving in an un-autoclaved manner.

Different techniques can be used in preparing the diet for autoclaving. The diet can be placed in trays, re-packaged into 3-4 pound (1.4-1.8 kg) paper bags, or the original bag of food can be perforated to allow improved steam penetration. Bags should be arranged in the autoclave so all sides are free to allow steam penetration.

Adjust steam jacket pressure to normal. Place the desired volume of diet in autoclave, and pull a vacuum of 26-28 inches (660-711 mm) of mercury, or until completely void of air. Begin metering in the steam slowly while pulling vacuum. The temperature should reach 190°F (88°C) in 10-15 minutes. Take caution the diet does not become too wet with condensate or trapped water. Turn off the vacuum and allow entry of full steam volume.

The length of time and temperature will determine the degree of sterilization. Pasteurization will occur in 12-15 minutes at 250°F (121°C); sterilization in 20-25 minutes at 250°F (121°C) after pressure has reached 15 PSI.

Close steam and slowly open chamber exhaust. Vent to 2-5 PSI. Turn on vacuum and pull 20-25 inches (508-635 mm) of mercury. Drying time depends on quantity of diet and chamber volume, usually about 30 minutes.

In order to ascertain the microbiological status of the food, a microbiological culture will be required. This will give information regarding bacterial, viral and mold contaminants that might remain intact. Indicator strips are available to determine degree of sanitization that have been done on the food.

Samples of diet should be taken pre- and post-autoclave in order to assay the sentinel vitamins, A and thiamine. They are among the more heat-labile vitamins and analysis will give an indication if under- or over-heating has occurred.

The table below is an example of the effects different temperatures and exposure times has on autoclavable diets.

EFFECT OF VARYING TIME AND TEMPERATURE ON STERILIZATION OF PURINA AUTOCLAVABLE LABORATORY DIET

TEMP DEG (F)	TIME MIN	THIAMIN PPM	PERCENT RETAINED	VIT. A IU/G	PERCENT RETAINED	BACTERIA RETAINED
--	0	73.8	--	30.3	--	
250	5	67.1	90.9	28.1	92.7	GRAM (+) BACILLUS GRAM (-) RODS MICROCOCCUS
250	10	60.3	81.7	24.3	80.2	GRAM (+) BACILLUS
250	15	60.8	82.4	23.1	76.2	GRAM (+) BACILLUS
250	20	36.4	49.3	19.2	63.4	STERILE
250	25	31.2	42.3	14.7	48.5	STERILE
250	30	23.4	31.7	12.8	42.2	STERILE
270	5	55.6	75.4	28.1	92.7	GRAM (+) BACILLUS
270	10	16.2	22.0	10.3	34.0	STERILE
270	15	21.3	28.9	11.4	37.6	STERILE
270	20	16.1	21.8	12.4	40.9	STERILE

Tests in duplicate. Purina Autoclavable Laboratory Diet is fortified to be autoclaved using the following procedure:

Place 1-2 lb. of product in small bag or layer in trays 1-2 inches deep.

Pull a vacuum, 26-28 inches of mercury, for 5 minutes.

Sterilize at 250 deg F at 15 lb. pressure.

Maintain temperature for 20 minutes.