DETERMINATION OF THE RATE OF WATER LOSS IN DEHYDRATION OF VEGETABLES

by

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INTRODUCTION

The modern method of dehydration involves subjecting food, with or without pretreatment, to the action of regulated currents of air in which the temperature and humidity are properly controlled. In this procedure, the food product loses water without deleterious changes in either color, flavor, or cellular structure. If properly dehydrated and properly stored, foods will not undergo spoilage as a result of microbic activity or chemical change. Such a product on absorbing water returns to near its normal size and appearance, and when cooked will have flavor, appearance, and texture comparable to the same product freshly cooked.

In view of these considerations it is easy to understand how strict the basic requirements for dehydrated products are. In order to meet these requirements extensive research has been carried on for some time. Past wars have greatly stimulated the improvement of methods of food preservations. Just as the Civil war stimulated the canning industry so the Boer war and to a greater extent the great European war stimulated the dehydrating industry.

Following an European tour, Cruess in 1939 (4) con-

cluded that dried products being exported from the U.S.A. are now of much higher quality than the European products.

At present most of the dried foods in China are sun-dried. The disadvantages of depending on the sun for drying instead of using modern dehydraters are easily recognized. The author of this thesis well realizes the importance of introducing the dehydrating industry into China.

A review of the literature disclosed that there was accurate information on the drying characteristics of prunes and apples but no information for other fruits or for vegetables. This study was undertaken to supply original data on drying characteristics of certain vegetables. Also the study was made to acquaint the author with modern dehydration and the application of modern technique.

PRINCIPLES OF DEHYDRATION

As explained in the foregoing statement, dehydration is the process of drying under controlled conditions of temperature, humidity and air circulation. The following is a discussion of these functions and their relations to one another.

Temperature. Evaporation of water means the change of water from a liquid to a gaseous state and its subsequent removal. To accomplish this change requires the expenditure of a definite amount of heat or energy. The temperature of the air used in dehydration not only greatly affects the time required for drying but also the quality of the finished product. In sun-drying heat derived from the sun is used to evaporate moisture from the product and convert it to a dry or partially dry form. Modern dehydration operates from the heat of combustion or from electrical energy.

The water removal process is somewhat complicated, but must be thoroughly understood in order to appreciate the factors controlling drying. There are two simultaneous processes which control removal of water from the product. They are evaporation from the surface and diffusion from the interior of the product to the surface. These processes continue until the drying operation is

suspended or the product has come to a state of equilibrium. In some cases, the controlling factor in drying is the rate of surface evaporation. In others, the rate of diffusion of the water from the interior of a product to its surface is a limiting factor. However, in any case, it is essential to keep in mind that the part played by each of these processes depends upon the temperature in the drying chamber. The higher the temperature the greater the increase in the rate of transfusion of moisture to the surface of the product and the more rapid the rate of dehydration.

According to Cruess (3) approximately 1000 British thermal heat units are required to change one pound of water to vapor in the drying of fruits and vegetables; this figure is known as the latent heat of vaporization of water. A British thermal unit is the amount of heat required to raise the temperature of one pound of water 1 degree Fahrenheit, conversely 1 B.t.u. of heat is liberated when the temperature of one pound of water is lowered one degree Fahrenheit.

Air expands upon heating, setting up convection currents which conduct heat. Due to convection currents, the warm air will rise in the dehydrator and the cold air will descend. Air occupies a greater volume at higher temperatures providing the pressure remains constant. When one cubic foot of air at 60 degrees Fahrenheit rises

one degree Fahrenheit 0.01807 B.t.u. of heat is absorbed. The converse of this is also true. (3) This figure is somewhat larger for changes at higher temperatures, but for general purposes of calculation the percent of error would be slight if this figure is used.

It is possible to dry vegetables or other materials with air at ordinary temperatures as is now done in sun-drying. In any case the air will drop in temperature as it passes over the drying material. If this fact and the weight of the air are taken into account, it will be found that the evaporating product has absorbed the normal number of heat units (B.t.u.) that the air under these conditions can give up.

Humidity. The dew point of air is the temperature to which air must be cooled before the amount of moisture present in it will reach the saturation point. If further cooling takes place and the temperature drops below the dew point condensation will take place and water will be formed. If this should happen in the dehydrater, it would be very objectionable because it would produce uneven relative humidity within the dehydrater. In extreme cases this condensate may collect on the product causing damage.

The absolute amount of water vapor that air can absorb (within certain temperature limits) approximately

doubles with each 27°F. rise in temperature. (2) In other words the lower the humidity, the greater the moisture absorbing power of air. It follows that the rate of moisture removal is more rapid at a low than at a high humidity.

The rate of evaporation from a free water surface in air at a given temperature varies inversely with relative humidity. The greater the relative humidity the less rapid the rate of evaporation. (2) The relative humidity of air may be defined as its percentage of saturation with moisture vapor at a given temperature and pressure. Air completely saturated with water vapor at a given temperature is at 100 percent relative humidity; air at the same temperature containing one half the amount of water vapor that it is capable of absorbing is at 50% relative humidity.

The relative humidity is measured by means of wet and dry bulb thermometers. The wet bulb is like the dry bulb but is covered with an absorbent cloth, the lower end of which is kept in a supply of water at dehydrater temperature. If any evaporation takes place, this bulb will be cooled, in proportion to the rate of evaporation, and the resultant temperature registered by the thermometer. This temperature will be less than that of the dry bulb and the difference is known as depression. If

the air is saturated with moisture there will be no difference in the readings of the two thermometers. From these readings the relative humidity may be determined from previously calculated tables.

The main purpose of humidity in the dehydrater is to regulate the rate of moisture removal. In some cases, moisture is taken from the surface of the product more quickly than it can be replaced from the interior cells. This results in "case hardening" which gives a dry outside layer to the product. When case hardening occurs it prevents transpiration of moisture to the surface from whence it can be removed. In this way the drying rate is greatly decreased with a resulting loss of efficiency. Case hardening can be prevented by increasing the humidity in the drying chamber. This is because at the higher humidity evaporation is slower and the transpiration capacity is not exceeded by the evaporation and sufficient moisture is brought to the surface to prevent case hardening.

Air Velocity. Air velocity is not a factor which, in itself removes moisture from the product in the dehydration process. Heat is responsible for hastening the removal of moisture from the product. Humidity controls the rapidity of water evaporation since the water vapor which is already present in the air controls the amount

which can be further absorbed by the air. Circulation in a dryer is the factor responsible for the even distribution of heat and humidity throughout the dryer. It serves two purposes in dehydration. (3) It conveys to the product that heat necessary to evaporate the moisture and it also carries away the water vapor after evaporation has taken place. Much more air is required in the former than the latter function. Not only must the dehydrater be furnished with a sufficient volume of air, but the air so furnished should be applied to the product to be dried in an evenly distributed manner. Improving the circulation increases the efficiency of the dryer.

Drying rate is governed by temperature and humidity but these factors cannot reach maximum efficiency without adequate circulation. Circulation must be adequate and may be increased extensively if the correct relative temperature and humidity are maintained. In fact the greater the circulation the faster the drying (within reasonable limits) due to the more uniform heat and humidity distribution within the dehydrater.

Circulation beyond an optimum point results in increased power cost. Recirculation means the reuse of a portion or all of the warm air. To this is usually added sufficient fresh air to make the resulting mixture after reheating contain no more water vapor than it did before previously passing over the product.

The time required for dehydration of a certain product varies considerably depending on the nature of the product as well as on conditions within the dehydrater. The temperature, the humidity and the volume of air passing through the dehydrater definitely effect the rate at which moisture is evaporated.

DEHYDRATER

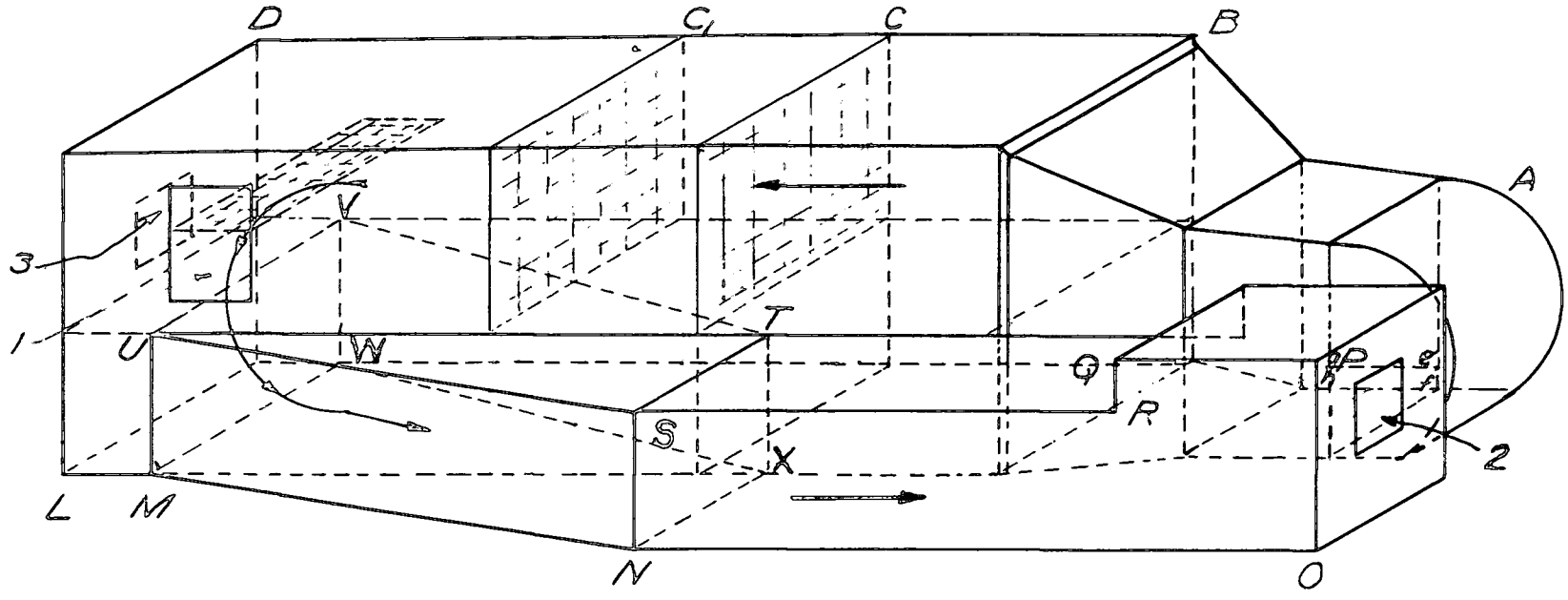

Plate 1

EXPERIMENTAL EQUIPMENT AND SUPPLIES

Description of the Dehydrater. The dehydrater used in this experiment was a small model which was built for experimental use. This was the first recirculation model built and it was so equipped that the various factors of temperature, humidity and rate of air flow could be controlled while making tests. From the research originally done in this dehydrater came the development of what is now universally known as the Oregon recirculated air dehydrater.

The dehydrater used in these experiments is shown in plate I. It is twenty feet long, three feet eight inches wide, and six feet ten inches high. There are four main parts: A-B includes the fan and the air duct to the steam coil, B-C includes the coil and the air duct to the wire screen, C-C_1 includes two wire screens, C_1-D is the evaporating chamber with slides arranged for six trays which are two and one half inches apart. L-M-N-O-P-Q-R-S-T-U-V-W-X is the air return duct.

In this experimental work small trays 14.5 by 30.5 inches were used. They were put in and removed at door 1, which is built into the side of the tunnel. The trays were placed in the second, fourth and sixth tray slides. This allowed for uniform air circulation.

The air is blown by the fan in the direction indi-

cated by the arrows and passed over the steam coils to the evaporating chamber. After passing over the product, to be dried, it is drawn back to the fan intake through the return duct. In order to eliminate the channeling of air after it passed from the steam coils it is forced through two thicknesses of window-screen 12 mesh per inch.

These screens provided resistence to the flow of air. Upon filtering through the screen the air is uniformly distributed in flow throughout the cross section of the evaporating chamber.

Measurement of air movement in lineal feet per minute was made with an anemometer. This instrument read accurately within velocity ranges of 25 to 1200 L. F. M.

Temperature was controlled automatically by air operated controls (C. J. Tagliablue Mfg. Co., N. Y.) connected by direct acting diaphragm valves in the steam supply. This control could be set for any desired temperature. When this temperature was reached in the evaporating chamber the control allowed compressed air to flow to the diaphragm which closed the valve. When the temperature was reduced the control allowed the escape of the air thus permitting the valve to open and again supply heat to the heating coils.

A recording thermometer (Tycos) was used for recording the exact temperature throughout the drying process.

A glass thermometer was used to read the temperature in the dehydrater during its operation. It was placed in the path of the entering air and hung at a position approximately one half way between the bottom and the top.

Humidity control was necessary in these experiments. When a commercial drier is in operation, the load of product being dried normally supplies much moisture to the air and thus the humidity is increased. This increase may continue until the air in the dehydrater will become so moist that the drying efficiency may be impaired. Fresh air supply for the dehydrater is normally needed only to reduce such highly humidified air. When such fresh air is needed an adjustable slide at door 2 permits it to be drawn in by the fan. By adjusting a similar slide in door 3 high humidity air is forced out of the dehydrater. This procedure will naturally reduce the humidity.

When the dehydrater is operated with a small load of produce as was done in these experiments it became necessary to supply humidity to the air because there was not sufficient moisture evaporated from the product to keep the humidity at the point predetermined for the experiment. This humidity was conveniently supplied by passing steam into the air in the dehydrater.

A control unit like the one used to control the flow of steam to the heating coils was used to control the ad-

dition of steam to the air in the dehydrater. The bulb of this control unit was kept wet by an absorbent stocking and thus it acted as a wet bulb thermometer. Air passing through this control acted on a reverse acting diaphragm valve which could supply steam to increase the humidity when needed. When the wet bulb registered lower than the wet bulb temperature corresponding to the humidity desired then the control allowed air to pass to the reverse acting diaphragm forcing it open and thus supplying the steam which increased the humidity to the desired point. When this point was reached the control automatically closed the steam valve and thus maintained a constant humidity.

Various rates of air flow as required for some of the experiments were obtained by a procedure of blocking of part of the air flow to the fan. This was found to be a more adjustable method than trying to change the fan speeds. Pieces of board were adjusted over the opening to the fan at e, f, g, h, as shown in plate I. Close adjustment was possible.

Trays used for drying product. Three trays for produce were used in each of these experiments. Each had its weight marked on the end. The trays were placed one above the other with two and one half inches between them which allowed ample air passage. Trays were of 12 mesh

wire screen with wooden frame of outer dimensions 14.5 inches by 30.5 inches and 11 3/4 inches by 29 1/2 inches inside dimensions.

Scale for Weighing. A scale graduated to hundreths of pounds was located on a table which stood beside the door of the dehydrater. The trays were weighed on this scale and readings were determined to hundreths of a pound. Each reading did not, under any condition, take more than one minute, usually they were made within 10 seconds.

Vegetables used for Dehydration. Three kinds of vegetables, spinach, peas and carrots, were used in these experiments. Different vegetables have different drying characteristics, due to the fact that the cellular structure and chemical nature of tissues differ. The vegetables used in these experiments each represent a quite different kind of crop. For example, spinach is a leafy crop, peas are seed crop and carrots are a root crop.

The spinach and carrots in this experiment were purchased in a good fresh condition from the city market. Peas used were a supply which had been frozen in small packages.

The pretreatment given the vegetables was that recommended in U.S.D.A. Department Bulletin 1335; Commercial Dehydration of Fruits and Vegetables by Nichols, F. F. and

Powers, Ray and Cross, C. R., September, 1925.

Spinach. Spinach was trimmed with knives so that the roots and coarse stems were cut from the leaves. The inferior leaves were discarded. The spinach thus prepared was washed thoroughly to free it from dirt. It was blanched by placing the basket with spinach for three minutes, in rapidly boiling water in a steam kettle. In some cases a little more time was given for blanching coarse and thick leaf varieties.

Peas. As previously stated, frozen peas were used. The peas were frozen almost one year before these tests were made. These peas had been given the same pretreatment before freezing as peas prepared for dehydration. They were washed, graded, blanched, and cooled after being shelled. These peas were thawed with warm water before they were placed on trays in the dehydrater.

Carrots. . Carrots were washed before blanching. Irregular shaped or abnormally large carrots were discarded due to their uneven maturity which would cause a variation in the moisture content of the product. Due to the scarcity of carrots in the market, some poor quality ones had to be used. They were blanched in the same manner that the spinach was blanched. The time of blanching was six to eight minutes according to the size of car-

rots. After hand trimming and washing with cold water they are diced with a small hand machine which cut the carrots into small and uniform 1/2 inch cubes.

DRYING SCHEDULE

The proper relation of temperature, humidity, circulation and volume of air in the evaporating of vegetables is a simple statement of a rather involved problem. The first obvious step taken was to make runs of vegetables with different combinations of factors. It was plain, at the start of the experiments that there would not be sufficient time to make tests on each vegetable under all combinations of factors. Therefore, it was necessary to simplify the experiment. From the results obtained there is every reason to believe that the short cut was justified. Reference may be made to Table 1.

These were the tests contemplated at the beginning of the experiments, but due to lack of time, material and unforeseen difficulties, four items were omitted.

Although this work was not done on as large a scale as would make it complete and comprehensive, yet data has been acquired which may be of value to commercial dehydration.

Table I. Tabulation of Test Factors

Temperature	Humidity	Air Velocity	Temperature	Humidity	Air Velocity
180°F.	10%	700 L.F.M.	180°F.	10%	430 L.F.M.
150°F.	10%	700 L.F.M.	150°F.	10%	430 L.F.M.
120°F.	10%	700 L.F.M.	120°F.	10%	430 L.F.M.
180°F.	25%	700 L.F.M.	180°F.	25%	430 L.F.M.
150°F.	25%	700 L.F.M.	150°F.	25%	430 L.F.M.
120°F.	25%	700 L.F.M.	120°F.	25%	430 L.F.M.
180°F.	40%	700 L.F.M.	180°F.	40%	430 L.F.M.
150°F.	40%	700 L.F.M.	150°F.	40%	430 L.F.M.
120°F.	40%	700 L.F.M.	120°F.	40%	430 L.F.M.
180°F.	10%	180 L.F.M.	180°F.	25%	180 L.F.M.
150°F.	10%	180 L.F.M.	150°F.	25%	180 L.F.M.
120°F.	10%	180 L.F.M.	120°F.	25%	180 L.F.M.
180°F.	40%	180 L.F.M.			
150°F.	40%	180 L.F.M.			
120°F.	40%	180 L.F.M.			

EXPERIMENTAL PROCEDURE

Operation of the dehydrater during the work on this problem was carried on in much the same manner as that for an ordinary commercial operation. However, more care and attention were given to the work and to the machinery than would be the case in most commercial dehydration procedures. Before turning the steam into the heating coils of the dehydrater a detailed inspection was made of all instruments and equipment.

For each experiment, a certain temperature, per cent humidity and rate of air flow (circulation) was desired. Steam was admitted to the coil and the fan started an hour before the product was put in. This action gave plenty of time to warm the drier and adjust it properly.

Since the humidity was related to wet bulb temperature, a relative humidity table was consulted to obtain the wet bulb temperature necessary to maintain the desired humidity. A Tycos recording temperature control graphically recorded the wet and dry bulb temperatures throughout the run, and a new chart was provided for each run.

The air velocity was measured by an anemometer. Anemometer readings showed slight variations in rate of air flow at different points in the cross sections of the evaporating chamber where the small trays were located.

The trays were rotated in positions after each weighing to assure uniform treatment to all samples. The product on the tray was turned or stirred occasionally so as not to remain in one position throughout the entire test.

After the vegetables were pretreated in the desired manner, they were placed on trays. The trays and vegetables were weighed and the weights recorded to the nearest hundredth of a pound. They were then immediately placed in the drying chamber. The doors were shut and the processing started.

A complete record of the rate of moisture loss from the vegetables was obtained by removing the trays and recording their weights every 15 minutes during the experimental run.

Vegetables were not dried for a definite period of time but rather until they reached a near constant weight or moisture content. Because unavoidably vegetables of various maturity were used, the moisture content of various batches of the dried product was not equal in all cases.

The data made during these experimental runs was tabulated and is presented in tables 2 to 24 inclusive. Graphs showing the rate of moisture loss for each product are included in figures 1 to 23 inclusive.

TABLE 2 EXPERIMENT 1

Date March 14, 1939 Temperature 180°F. Humidity 10% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4
SPINACH														
Wt. of veg. in lbs.	1.12	.75	.44	.28	.18	.15	.12	.10	.08	.07	.06	.05		
Wt. of veg. in %	100	67.0	39.3	25.0	16.1	13.4	10.7	8.9	7.1	6.2	5.3	4.4		
Total loss in %	0	33.0	60.7	75.0	83.9	86.6	89.3	91.1	92.9	93.8	94.7	95.6		
Loss per period in %	0	33.0	30.7	14.3	8.9	2.7	2.7	1.8	1.8	0.9	0.9	0.9		
PEAS														
Wt. of veg. in lbs.	21.0	1.36	.91	.72	.57	.50	.46	.43	.41	.38	.36	.35		
Wt. of veg. in %	100	64.6	43.4	34.2	27.2	23.8	21.9	20.4	19.5	18.1	17.1	16.7		
Total loss in %	0	35.4	56.6	65.8	72.8	76.2	78.1	79.6	80.5	81.9	82.9	83.3		
Loss per period in %	0	35.4	21.2	9.2	7.0	3.4	1.9	1.5	0.9	1.4	1.0	0.4		
CARROTS														
Wt. of veg. in lbs.	3.19	2.52	1.84	1.46	1.14	.89	.77	.70	.64	.58	.53	.48	.44	.40
Wt. of veg. in %	100	79.0	57.7	45.8	35.8	27.9	24.2	22.0	20.0	18.2	16.6	15.0	13.7	12.5
Total loss in %	0	21.0	42.3	54.2	64.2	70.1	75.8	78.0	80.0	81.8	83.4	85.0	86.3	87.5
Loss per period in %	0	21.0	21.3	1.19	10.0	5.9	5.7	2.2	2.0	1.8	1.6	1.6	1.3	0.8

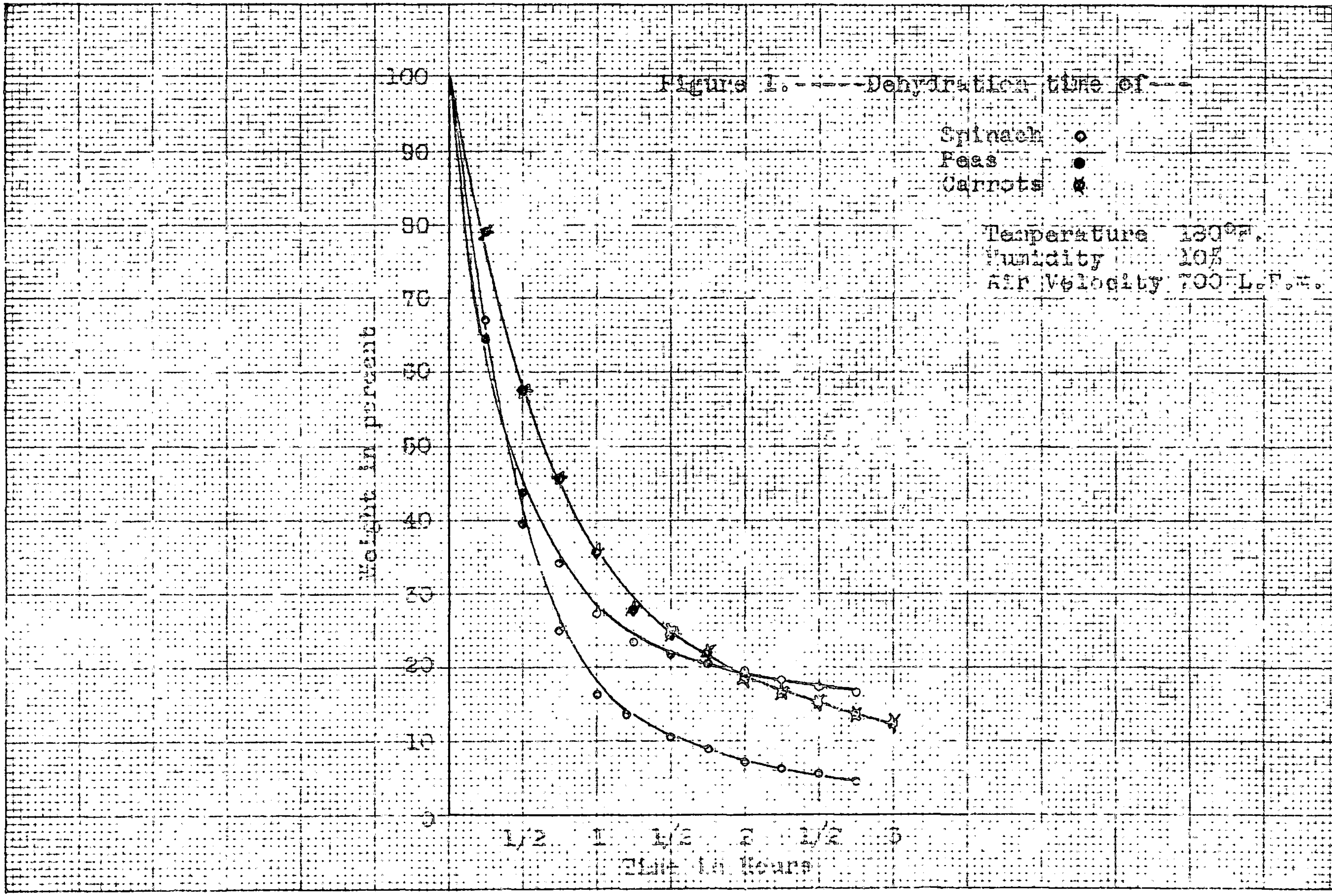

Figure 1.----Dehydration time of---

TABLE 3 EXPERIMENT 2

Date March 15, 1939 Temperature 180°F. Humidity 25% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4
SPINACH											
Wt. of veg. in lbs.	1.15	.88	.67	.47	.32	.22	.15	.11	.09	.07	.06
Wt. of veg. in %	100	76.5	58.2	40.8	27.8	19.1	13.0	9.5	7.8	6.0	5.2
Total loss in %	0	23.5	41.8	59.1	72.2	80.9	87.0	90.5	92.2	94.0	94.8
Loss per period in %	0	23.5	18.3	17.3	13.1	8.7	6.1	3.5	1.7	1.8	0.8
PEAS											
Wt. of veg. in lbs.	2.15	1.76	1.27	.92	.74	.64	.51	.45	.43	.41	.40
Wt. of veg. in %	100	81.8	59.1	42.8	34.4	29.8	23.7	20.9	20.0	19.1	18.6
Total loss in %	0	18.2	40.9	57.2	65.6	70.2	76.3	79.1	80.0	80.9	81.4
Loss per period in %	0	18.1	23.7	16.2	8.3	4.6	6.1	2.8	0.9	0.9	0.5
CARROTS											
Wt. of veg. in lbs.	3.20	2.78	2.31	1.76	1.43	1.04	.80	.60	.43	.41	.40
Wt. of veg. in %	100	86.9	72.2	5.55	44.7	32.5	25.0	18.7	13.4	12.7	12.3
Total loss in %	0	13.1	27.9	45.0	45.4	67.5	75.0	81.3	86.6	87.3	87.7
Loss per period in %	0	13.1	14.8	17.1	10.4	12.1	7.5	6.3	5.3	0.7	0.4

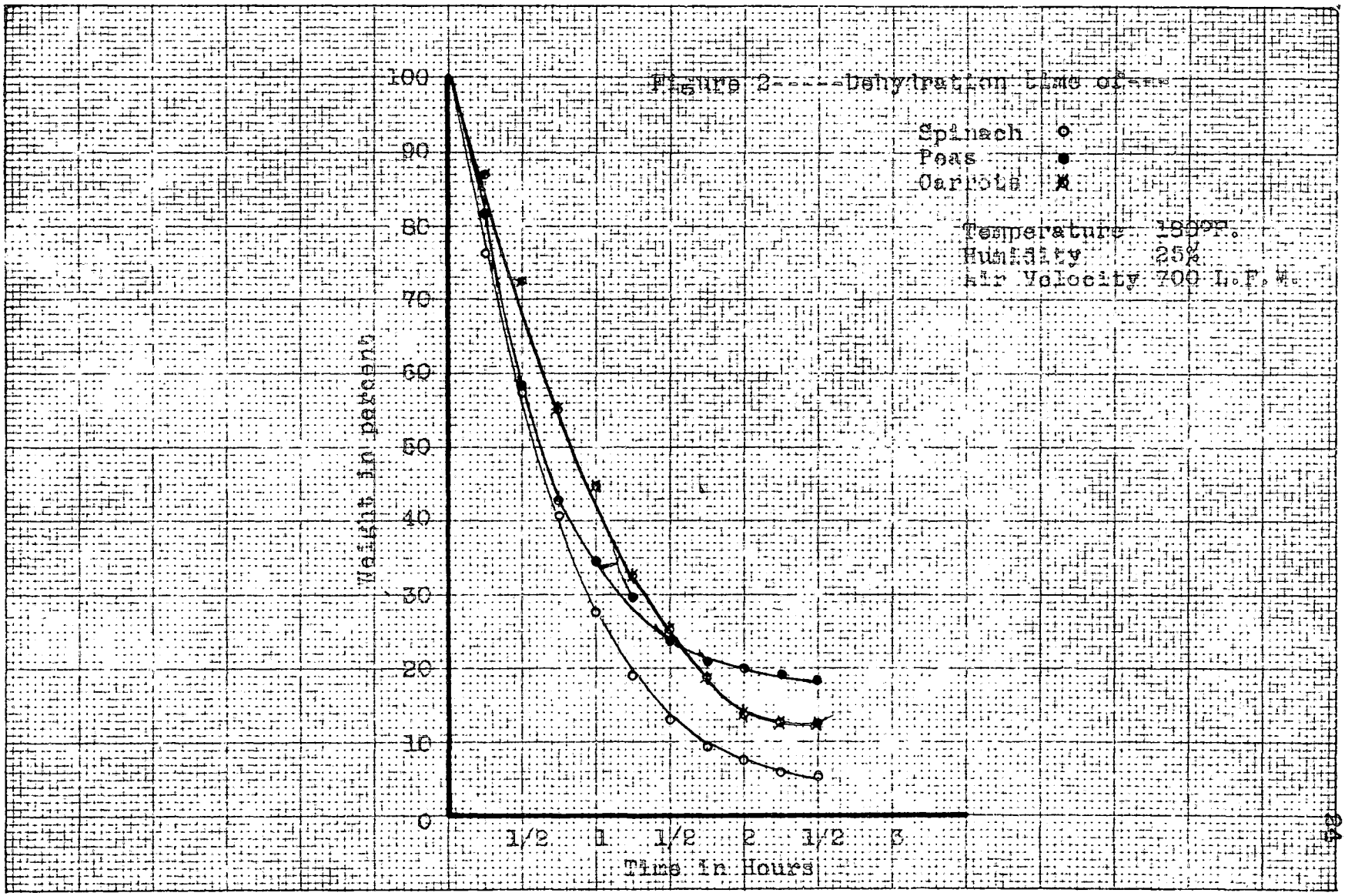
Figure 2-----Dehydration time of---
Spinach
Peas
Carrots
Temperature 180°F.
Humidity 25%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
Time in Hours

TABLE 4 EXPERIMENT 3

Date March 21, 1939 Temperature 180°F. Humidity 40% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4
SPINACH															
Wt. of veg. in lbs.	1.07	.88	.62	.43	.27	.16	.12	.09	.08	.07	.06				
Wt. of veg. in %	100	82.2	57.9	40.2	25.2	14.9	11.2	8.4	7.5	6.6	5.7				
Total loss in %	0	17.8	42.1	59.8	74.8	85.1	88.8	91.6	92.5	93.4	94.3				
Loss per period in %	0	17.8	24.2	17.7	15.0	10.3	3.7	2.8	.90	.90	.90				
PEAS															
Wt. of veg. in lbs.	2.12	1.92	1.62	1.36	1.17	.97	.86	.79	.72	.68	.63	.61	.58	.57	.56
Wt. of veg. in %	100	90.6	76.4	64.2	55.2	45.7	40.6	37.3	34.0	32.1	29.7	28.8	27.4	26.9	26.4
Total loss in %	0	9.4	23.4	35.8	44.8	54.3	59.4	62.7	66.0	67.9	70.3	72.0	72.6	73.1	73.6
Loss per period in %	0	9.4	14.0	12.4	9.0	.95	.51	.33	.33	.19	.24	.17	0.6	0.5	0.5
CARROTS															
Wt. of veg. in lbs.	3.16	2.87	2.49	2.04	1.70	1.35	1.10	.84	.67	.49	.44	.37	.34	.33	
Wt. of veg. in %	100	90.8	78.8	64.5	53.8	42.7	34.8	26.6	21.2	15.5	13.9	11.7	10.8	10.4	
Total loss in %	0	9.2	21.2	35.5	4.62	57.3	65.2	73.4	78.8	84.5	86.1	88.3	89.2	89.6	
Loss per period in %	0	9.2	12.0	14.3	10.7	11.1	.79	.82	.54	.57	.16	.22	0.9	0.4	

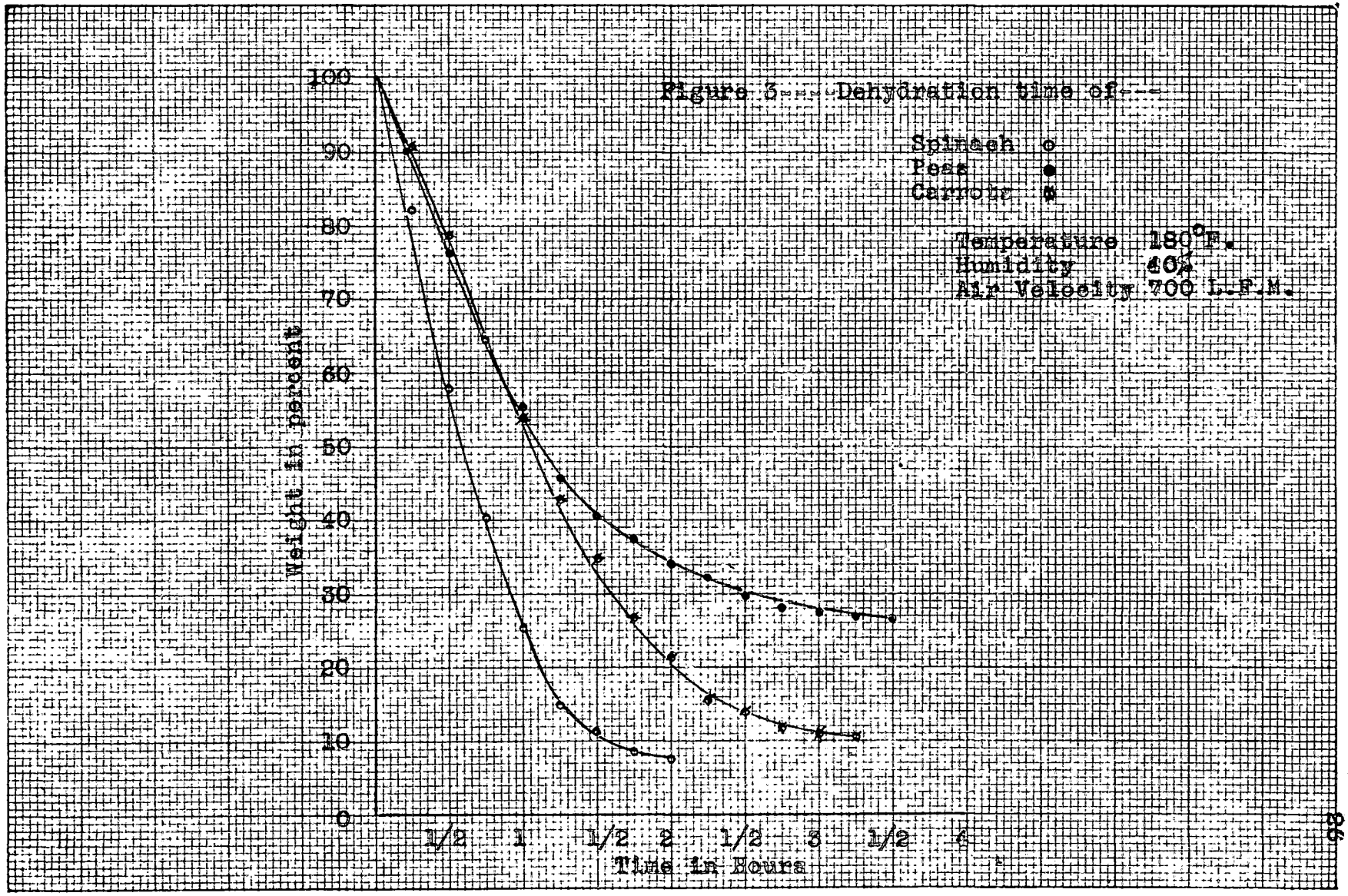
Figure 3.--Dehydration time of---
Spinach ○
Peas ●
Carrots ✱
Temperature 180°F.
Humidity 40%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
Time in Hours

TABLE 5 EXPERIMENT 4

Date March 21, 1939 Temperature 150°F. Humidity 40% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4	1/4	2/4
SPINACH																			
Wt. of veg. in lbs.	1.07	.39	.75	.62	.52	.42	.35	.30	.26	.21	.17	.15	.13	.11	.10				
Wt. of veg. in %	100	83.2	70.1	58.0	48.6	38.2	32.7	28.0	24.3	19.6	15.9	14.0	12.1	10.3	9.3				
Total loss in %	0	16.8	29.9	42.0	51.4	60.8	67.3	72.0	75.7	80.4	84.1	86.0	87.9	89.7	90.6				
Loss per period in %	0	16.8	13.1	12.1	9.4	9.4	5.5	4.7	3.7	4.7	3.7	1.9	1.9	1.8	0.9				
PEAS																			
Wt. of veg. in lbs.	2.12	1.83	1.63	1.45	1.23	1.08	.96	.89	.81	.77	.72	.68	.66	.63	.61	.59	.57	.55	.53
Wt. of veg. in %	100	86.3	76.8	68.4	58.0	50.9	45.3	41.9	38.2	36.3	33.9	32.1	31.1	29.7	28.8	27.8	26.9	25.9	25.0
Total loss in %	0	13.7	23.2	31.6	42.0	49.1	54.7	58.1	61.8	63.7	66.1	67.8	68.9	70.3	71.2	72.2	73.1	74.1	75.0
Loss per period in %	0	13.7	9.5	8.4	10.4	7.1	5.5	3.4	3.7	1.9	2.4	1.7	1.1	1.4	0.9	1.0	.09	1.0	0.9
CARROTS																			
Wt. of veg. in lbs.	3.16	2.90	2.58	2.28	2.00	1.70	1.45	1.22	.98	.88	.75	.62	.49	.47	.44	.41	.40	.39	.38
Wt. of veg. in %	100	91.3	81.6	72.3	63.3	53.8	45.9	38.6	31.0	27.8	23.7	19.6	15.5	14.9	13.9	13.0	12.7	12.3	12.0
Total loss in %	0	9.2	18.4	27.7	36.7	46.2	54.1	61.4	69.0	72.2	76.3	80.4	84.5	85.1	86.1	87.0	87.3	87.7	88.0
Loss per period in %	0	9.2	9.2	9.3	9.0	9.5	7.9	7.3	7.6	3.2	4.1	4.1	4.1	0.6	1.0	0.9	0.3	0.4	0.3

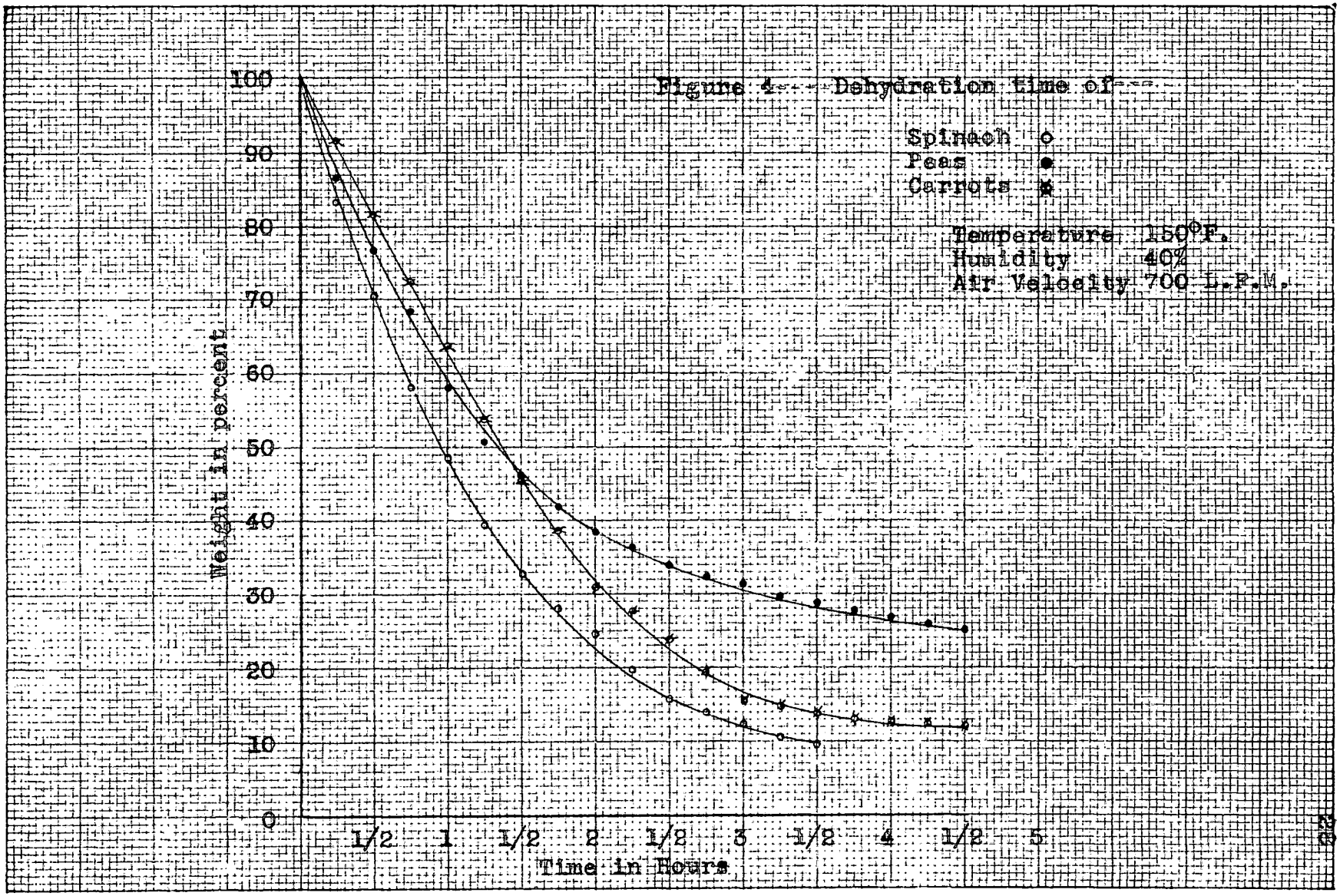
Figure 4--- Dehydration time of---
Spinach ○
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 40%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
6
Time in Hours

TABLE 6 EXPERIMENT 5

Date March 23, 1939 Temperature 150°F. Humidity 25% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4
SPINACH															
Wt. of veg. in lbs.	1.07	.84	.67	.56	.41	.32	.24	.18	.13	.11	.08	.07	.05		
Wt. of veg. in %	100	78.4	62.6	52.3	38.3	29.9	22.4	16.8	12.1	10.3	7.5	6.5	4.7		
Total loss in %	0	21.6	37.4	47.7	61.7	70.1	77.6	83.2	87.9	89.7	92.5	93.5	95.3		
Loss Per period in %	0	21.6	15.8	10.3	14.0	8.4	5.5	5.6	4.7	1.8	2.8	1.0	1.8		
PEAS															
Wt. of veg. in lbs.	2.13	1.58	1.30	1.12	.96	.86	.79	.73	.69	.65	.63	.60	.57	.56	.55
Wt. of veg. in %	100	74.2	61.0	52.6	45.1	40.3	37.1	34.3	32.4	30.5	29.6	28.2	26.8	26.3	25.8
Total loss in %	0	25.8	39.0	47.4	54.9	59.7	62.9	65.7	67.6	69.5	70.4	71.8	73.2	73.7	74.2
Loss per period in %	0	25.8	13.2	8.4	7.5	4.8	3.2	2.8	1.9	1.9	.9	1.4	1.4	.5	.5
CARROTS															
Wt. of veg. in lbs.	3.17	2.58	1.94	1.58	1.17	.91	.71	.57	.48	.42	.38	.34	.32	.31	.30
Wt. of veg. in %	100	81.4	61.2	49.8	36.9	28.7	22.4	18.0	15.1	13.3	12.0	10.7	10.1	9.8	9.5
Total loss in %	0	18.6	38.8	50.2	63.1	71.3	77.6	82.0	84.9	86.7	88.0	89.3	89.9	90.2	90.5
Loss per period in %	0	18.6	20.2	11.4	12.9	8.2	6.3	4.4	2.9	1.8	1.3	1.3	0.6	0.3	0.3

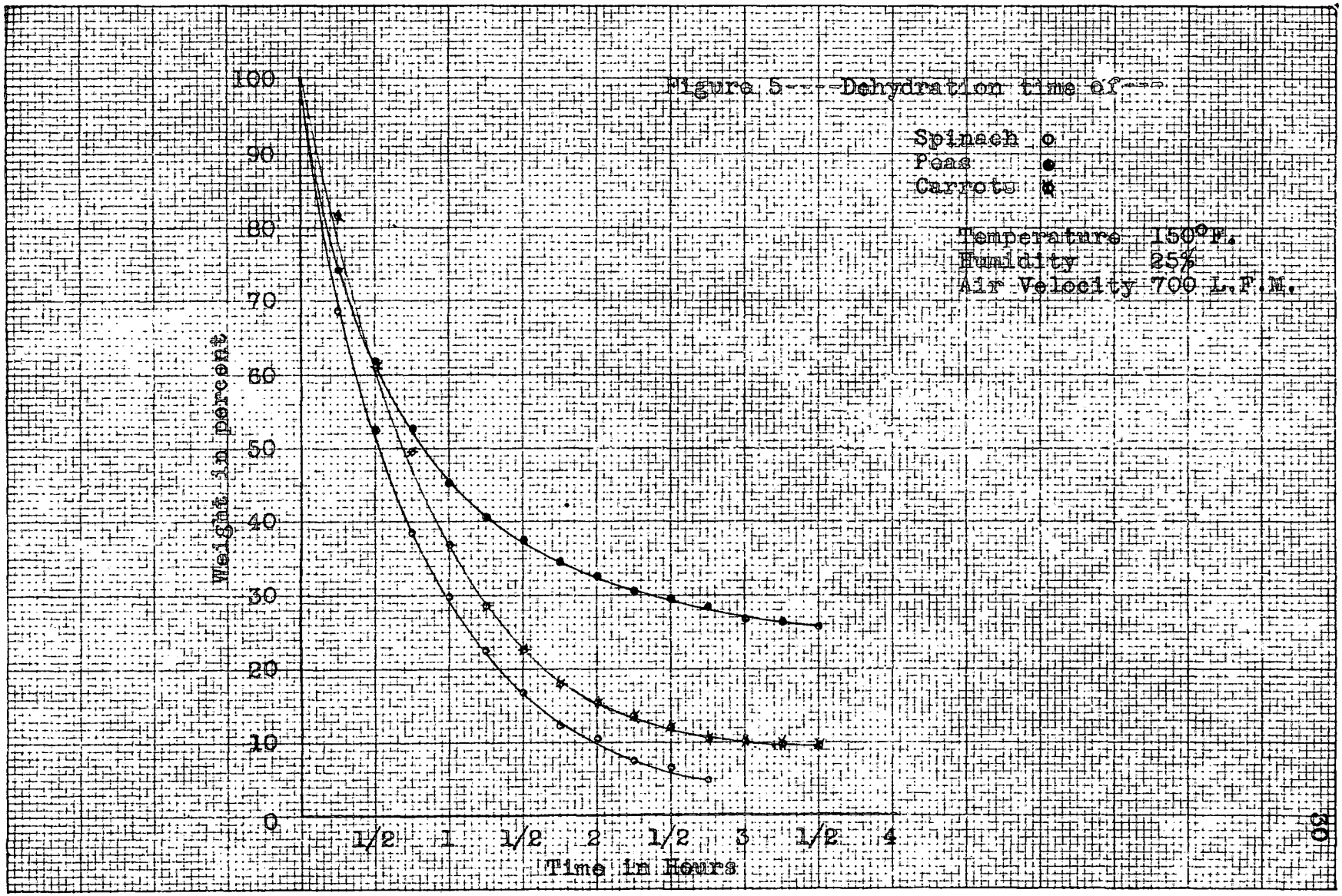
Figure 5----Dehydration time of----
Spinach o
Peas •
Carrots x
Temperature 150°F.
Humidity 25%
Air Velocity 700 L.F.M.
Weight in Percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
Time in Hours

TABLE 7 EXPERIMENT 6

Date March 22, 1939 Temperature 150°F. Humidity 10% Air Velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	2	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.12	.83	.69	.59	.49	.39	.31	.25	.21	.16	.13	.12	.11	.10	.09		
Wt. of veg. in %	100	74.1	61.6	52.7	43.8	34.8	27.7	22.3	18.8	14.3	11.6	10.7	9.8	8.9	8.0		
Total loss in %	0	25.9	38.4	47.3	56.2	65.2	72.3	77.7	81.2	85.7	88.4	89.3	90.2	91.1	92.0		
Loss per period in %	0	25.9	12.5	8.9	8.9	9.0	7.1	5.4	3.5	4.5	2.7	0.9	0.9	0.9	0.9		
PEAS																	
Wt. of veg. in lbs.	2.11	1.56	1.25	1.06	.91	.80	.72	.66	.61	.58	.56	.55	.53	.51	.50		
Wt. of veg. in %	100	70.6	56.6	48.0	41.2	36.2	32.6	29.8	27.6	26.2	25.3	24.9	24.0	23.1	22.6		
Total loss in %	0	29.4	43.4	52.0	58.8	63.8	67.4	70.2	72.4	73.8	74.7	75.1	76.0	76.9	77.4		
Loss per period in %	0	29.4	14.0	8.6	6.8	5.0	3.6	2.8	2.2	1.4	0.9	0.4	0.9	0.9	0.5		
CARROTS																	
Wt. of veg. in lbs.	3.21	2.52	2.08	1.61	1.23	.93	.75	.61	.50	.44	.40	.37	.35	.34	.33	.32	.31
Wt. of veg. in %	100	78.5	64.8	50.2	38.3	29.0	23.4	19.0	15.6	13.7	12.5	11.5	10.9	10.6	10.2	10.0	9.7
Total loss in %	0	21.5	35.2	49.8	61.7	71.0	76.6	81.0	84.4	86.3	87.5	88.5	89.1	89.4	89.8	90.0	90.3
Loss per period in %	0	21.5	13.7	14.6	11.9	9.3	5.6	4.4	3.4	1.9	1.2	1.0	0.6	0.3	0.4	0.2	0.3

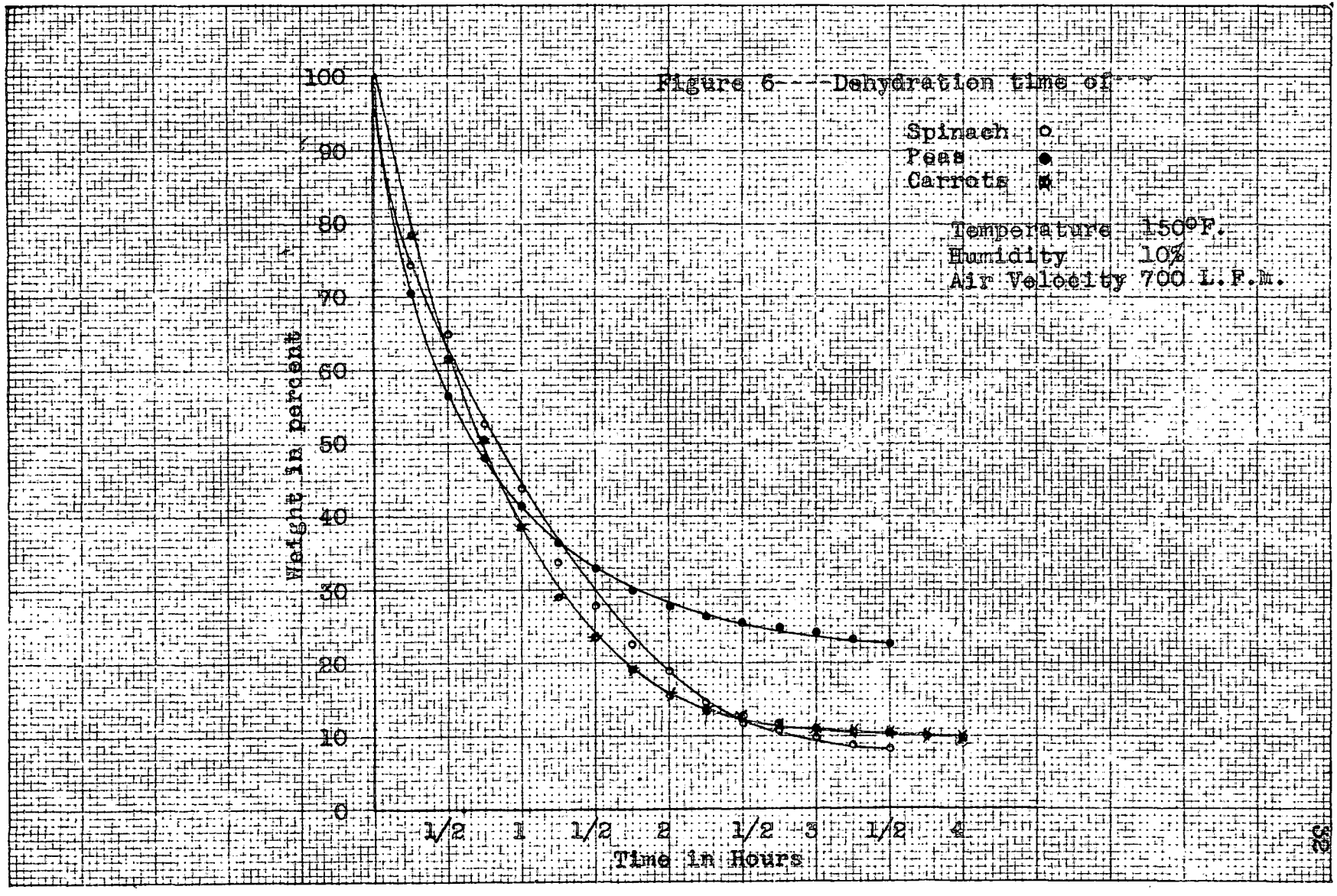
Figure 6---Dehydration time of
Spinach o
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 10%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
Time in Hours

TABLE 8 EXPERIMENT 7

Date March 24, 1939 Temperature 120°F. Humidity 10% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4	1/4	2/4	3/4
SPINACH																				
Wt. of veg. in lbs.	1.14	.93	.82	.73	.64	.55	.49	.44	.39	.34	.31	.28	.25	.23	.21	.19	.18	.16	.15	.14
Wt. of veg. in %	100	81.5	71.8	64.0	56.1	48.2	42.9	38.6	34.2	29.8	27.2	24.6	21.9	20.2	18.4	16.7	15.7	14.0	13.2	12.3
Total loss in %	0	18.5	28.2	36.0	43.9	51.8	57.1	61.4	65.8	70.2	72.8	75.4	78.1	79.8	71.6	83.3	84.3	86.0	86.8	87.7
Loss per period in %	0	18.5	9.7	7.8	7.9	7.9	5.3	4.3	4.4	4.4	2.6	2.6	2.7	1.7	1.8	1.7	1.0	1.7	0.8	0.9
PEAS																				
Wt. of veg. in lbs.	2.19	1.88	1.55	1.26	1.11	.97	.88	.80	.75	.71	.68	.65	.63	.60	.59	.58	.57	.56	.55	.53
Wt. of veg. in %	100	85.8	70.8	57.5	50.7	44.2	40.2	36.5	34.2	32.4	31.0	29.7	28.8	27.4	26.9	26.5	26.0	25.6	25.1	24.2
Total loss in %	0	14.2	29.2	42.5	49.3	55.8	59.8	63.5	65.8	67.6	69.0	70.3	71.2	72.6	73.1	73.5	74.0	74.4	74.9	75.8
Loss per period in %	0	14.2	15.0	13.3	6.8	6.5	4.0	3.7	2.3	1.8	1.4	1.3	0.9	1.4	0.5	0.4	0.5	0.4	0.5	0.9
CARROTS																				
Wt. of veg. in lbs.	3.24	2.81	2.24	1.89	1.53	1.28	1.06	.88	.75	.65	.59	.54	.49	.45	.43	.41	.40	.39	.38	.38
Wt. of veg. in %	100	86.7	69.1	58.3	47.2	39.5	32.8	27.1	23.1	20.2	18.2	16.7	15.1	13.9	13.3	12.7	12.3	12.0	11.7	11.7
Total loss in %	0	13.3	30.9	41.7	52.8	60.5	67.2	72.9	76.9	79.8	81.8	83.3	84.9	86.1	86.7	87.3	87.7	88.0	88.3	88.3

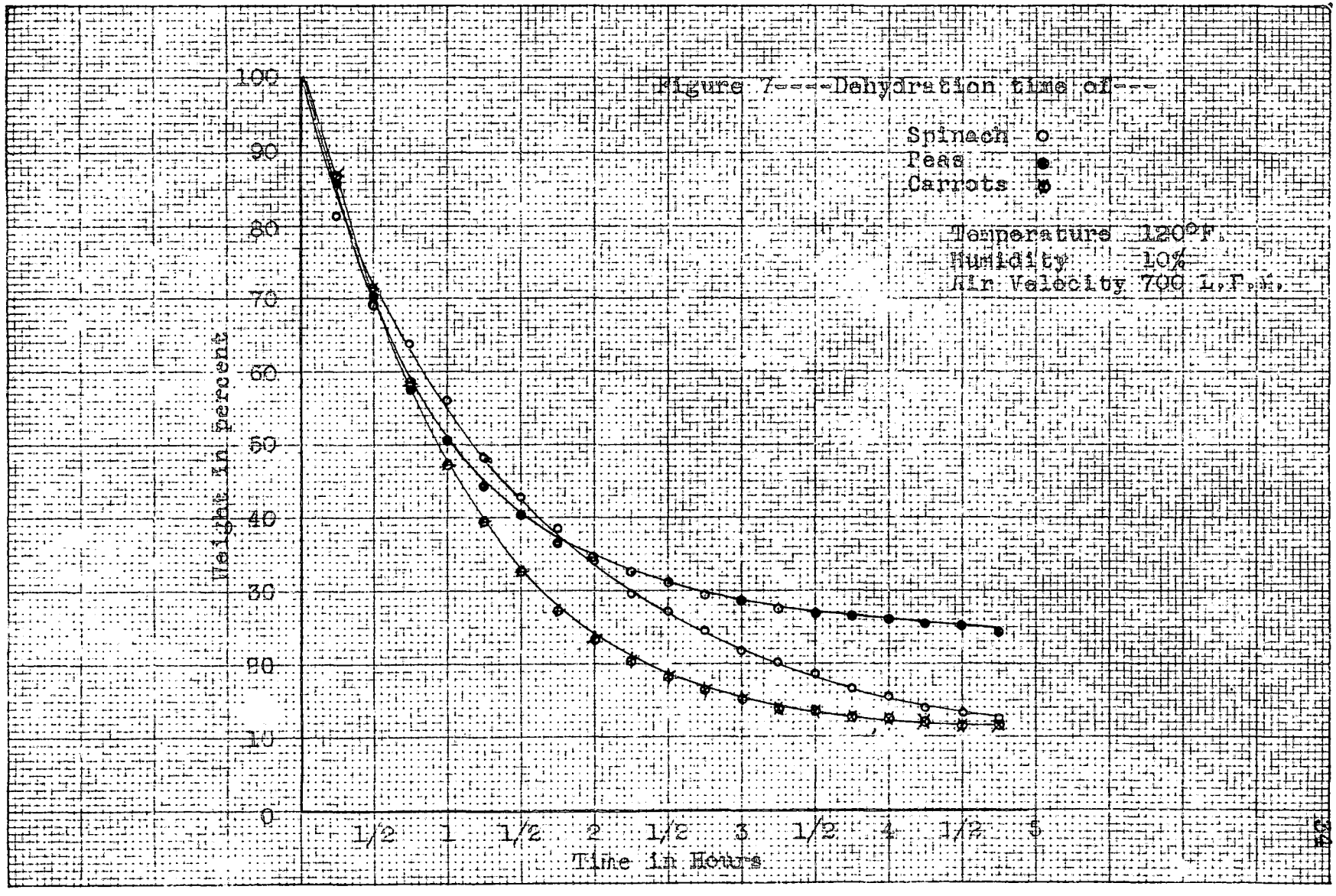
Figure 7----Dehydration time of---
Spinach
Peas
Carrots
Temperature 120°F.
Humidity 10%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
Time in Hours

TABLE 9 EXPERIMENT 8

Date March 25, 1939 Temperature 120°F. Humidity 25% Air velocity 700 L.P.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4	1/4	2/4	3/4
SPINACH																				
Wt. of veg. in lbs.	1.13	.99	.86	.74	.65	.57	.48	.42	.36	.32	.28	.24	.22	.19	.17	.15	.14	.13		
Wt. of veg. in %	100	87.5	76.0	65.4	57.5	50.4	42.5	37.2	31.8	28.3	24.8	21.2	19.5	16.8	15.0	13.3	12.4	11.5		
Total loss in %	0	12.5	24.0	34.6	42.5	49.6	57.5	62.8	68.2	71.7	75.2	78.8	80.5	83.2	85.0	86.7	87.6	88.5		
Loss per period in %	0	12.5	11.5	10.6	7.9	7.1	7.9	5.3	5.4	3.5	3.5	3.6	1.7	2.7	1.8	1.7	0.9	0.9		
PEAS																				
Wt. of veg. in lbs.	2.19	18.4	1.60	1.36	1.23	1.09	1.00	.93	.89	.84	.80	.78	.74	.73	.70	.69	.68	.66	.64	
Wt. of veg. in %	100	84.0	73.1	62.1	56.2	49.8	45.7	42.4	40.7	38.3	36.3	35.6	33.8	33.3	32.0	31.5	31.0	30.1	29.2	
Total loss in %	0	16.0	26.9	37.9	43.8	50.2	54.3	57.6	59.3	61.7	63.5	64.4	66.2	66.7	68.0	68.5	69.0	69.9	70.8	
Loss per period in %	0	16.0	10.9	11.0	5.9	6.4	4.1	3.3	1.7	2.4	1.8	0.9	1.8	0.5	1.3	0.5	0.5	0.9	0.9	
CARROTS																				
Wt. of veg. in lbs.	3.23	2.79	2.36	2.04	1.73	1.43	1.22	1.00	.87	.74	.66	.58	.53	.48	.46	.43	.41	.40	.39	.38
Wt. of veg. in %	100	86.4	73.1	63.2	53.6	44.3	37.8	31.0	26.9	22.9	20.4	18.0	16.4	14.9	14.2	13.3	12.7	12.4	12.1	11.8
Total loss in %	0	13.6	26.9	36.8	46.4	55.7	62.2	69.0	73.1	77.1	79.6	82.0	83.6	85.1	85.8	86.7	87.3	87.6	87.9	88.2
Loss per period in %	0	13.6	13.3	9.9	9.6	9.3	6.5	6.8	4.1	4.0	2.5	2.4	1.6	1.6	.7	.9	.6	.3	.3	.3

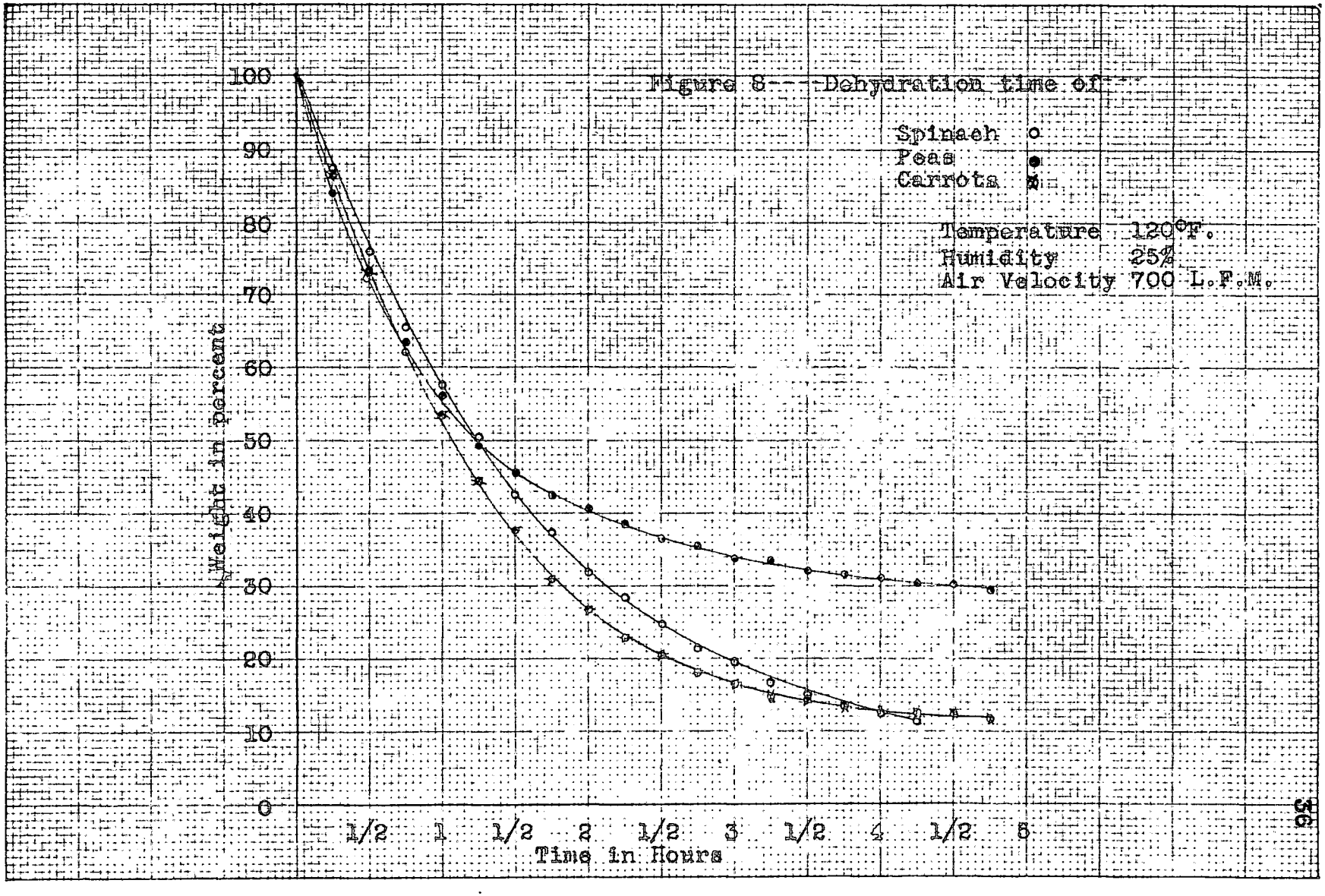
Figure 8---Dehydration time of
Spinach o
Peas ●
Carrots ⊗
Temperature 120°F.
Humidity 25%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
Time in Hours

TABLE 10 EXPERIMENT 9

Date March 26, 1939 Temperature 120°F. Humidity 40% Air velocity 700 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.11	.95	.81	.72	.64	.56	.48	.44	.40	.35	.31	.27	.25	.22	.20	.18	.16
Wt. of veg. in %	100	85.5	72.9	64.8	57.6	50.4	43.2	39.6	36.0	31.5	27.9	24.3	22.5	19.8	18.0	16.2	14.4
Total loss in %	0	14.5	27.1	35.2	42.4	49.6	56.8	60.4	64.0	68.5	72.1	75.7	77.5	80.2	82.0	83.8	85.6
Loss per period in %	0	14.5	12.6	8.1	7.2	7.2	7.2	3.6	3.6	4.5	3.6	3.6	1.8	2.7	1.8	1.8	1.8
PEAS																	
Wt. of veg. in lbs.	2.17	1.98	1.64	1.46	1.27	1.11	1.00	.91	.83	.80	.75	.71	.67	.64	.62	.61	.59
Wt. of veg. in %	100	91.2	75.5	67.3	58.5	51.1	46.1	41.9	38.2	36.8	34.5	32.7	30.8	29.5	28.6	28.1	27.2
Total loss in %	0	8.8	24.5	32.7	41.5	48.9	53.9	58.1	61.8	63.2	65.5	67.3	69.2	70.5	71.4	71.9	72.8
Loss per period in %	0	8.8	15.7	8.2	8.8	7.4	5.0	4.2	3.7	1.4	2.3	1.8	1.9	1.3	0.9	0.5	0.9
CARROTS																	
Wt. of veg. in lbs.	3.21	2.98	2.65	2.35	2.13	1.91	1.69	1.52	1.36	1.21	1.10	.98	.86	.78	.70	.62	.57
Wt. of veg. in %	100	92.8	82.5	73.2	66.4	59.5	52.7	47.4	42.4	37.7	34.3	30.5	26.8	24.3	21.8	19.3	17.8
Total loss in %	0	7.2	17.5	26.8	33.6	40.5	47.3	52.6	57.6	62.3	65.7	69.5	73.2	75.7	78.2	80.7	82.2
Loss per period in %	0	7.2	10.3	9.3	7.8	6.9	6.8	5.3	5.0	4.7	3.4	3.8	3.7	2.5	2.5	2.5	1.6

TABLE 10 EXPERIMENT 9 (Cont.)

Date March 26, 1939 Temperature 120°F. Humidity 40% Air velocity 700 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4
SPINACH						
Wt. of veg. in lbs.	.15	.14				
Wt. of veg. in %	13.5	12.6				
Total loss in %	86.5	87.4				
Loss per period in %	0.9	0.9				
PEAS						
Wt. of veg. in lbs.	.58	.57	.56	.55	.54	.53
Wt. of veg. in %	26.7	26.2	25.8	25.3	24.8	24.4
Total loss in %	73.3	73.8	74.2	74.7	75.2	75.6
Loss per period in %	0.5	0.5	0.4	0.5	0.5	0.4
CARROTS						
Wt. of veg. in lbs.	.52	.49	.46	.45	.44	.43
Wt. of veg. in %	16.2	15.3	14.3	14.0	13.7	13.4
Total loss in %	83.8	84.7	85.7	86.0	86.3	86.6
Loss per period in %	1.6	0.9	1.0	0.3	0.3	0.3

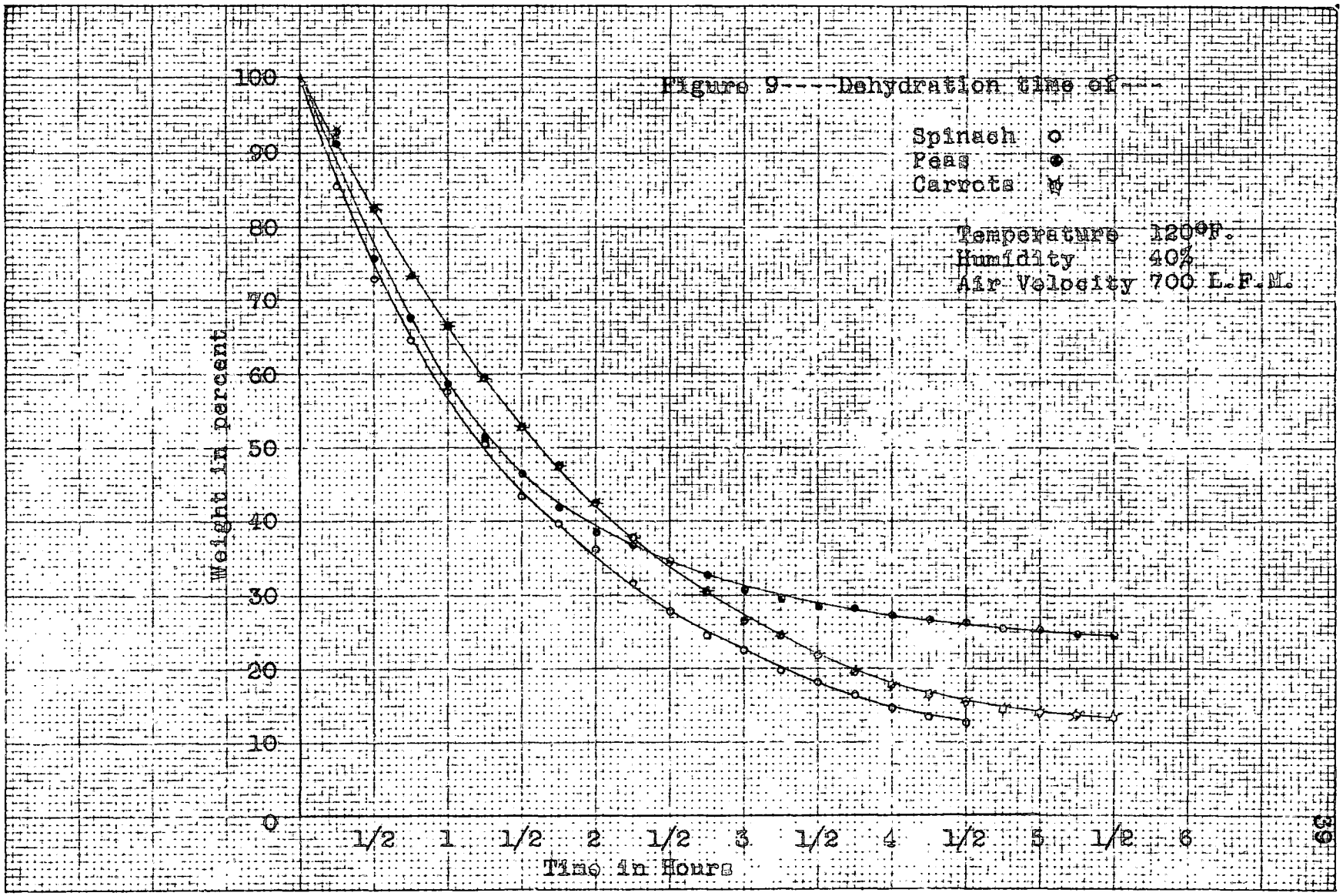
Figure 9----Dehydration time of---
Spinach
Peas
Carrots
Temperature 120°F.
Humidity 40%
Air Velocity 700 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
Time in Hours

TABLE 11 EXPERIMENT 10

Date March 3, 1939 Temperature 180°F. Humidity 40% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4	1/4	2/4	3/4
SPINACH																				
Wt. of veg. in lbs.	1.10	.96	.76	.59	.44	.30	.21	.15	.12	.09	.08	.07								
Wt. of veg. in %	100	87.2	69.1	53.6	40.0	27.1	19.1	13.7	10.9	8.2	7.3	6.4								
Total loss in %	0	12.8	30.9	46.4	60.0	72.9	80.9	86.3	89.1	91.8	92.7	93.6								
Loss per period in %	0	12.8	18.1	15.5	13.6	12.9	8.0	5.4	2.8	2.7	.9	.9								
PEAS																				
Wt. of veg. in lbs.	2.15	1.95	1.70	1.40	1.23	1.06	.89	.79	.69	.62	.58	.54	.50	.48	.46	.45	.45	.44		
Wt. of veg. in %	100	90.7	79.0	65.1	57.3	49.3	41.4	36.7	32.1	28.8	26.9	25.1	23.2	22.3	21.4	20.9	20.9	20.4		
Total loss in %	0	9.3	21.0	34.9	42.7	50.7	58.6	63.3	67.9	71.2	73.1	74.9	76.8	77.7	78.6	79.1	79.1	79.6		
Loss per period in %	0	9.3	11.7	13.9	7.8	8.0	7.9	4.7	4.6	3.3	1.9	1.8	1.9	0.9	0.9	.5	0	.5		
CARROTS																				
Wt. of veg. in lbs.	3.19	3.00	2.63	2.34	2.04	1.72	1.46	1.23	.99	.84	.68	.57	.48	.42	.39	.35	.34	.33	.32	.31
Wt. of veg. in %	100	94.0	82.5	73.4	64.0	53.9	45.8	38.6	31.0	26.3	21.3	17.9	15.1	13.2	12.2	11.0	10.6	10.3	10.0	9.7
Total loss in %	0	6.0	17.5	26.6	36.0	46.1	54.2	61.4	69.0	73.7	78.7	82.1	84.9	86.8	87.8	89.0	89.4	89.7	90.0	90.3
Loss per period in %	0	6.0	11.5	9.1	9.4	10.1	8.1	7.2	7.6	4.7	5.0	3.4	2.8	1.9	1.0	1.2	.4	.3	.3	.3

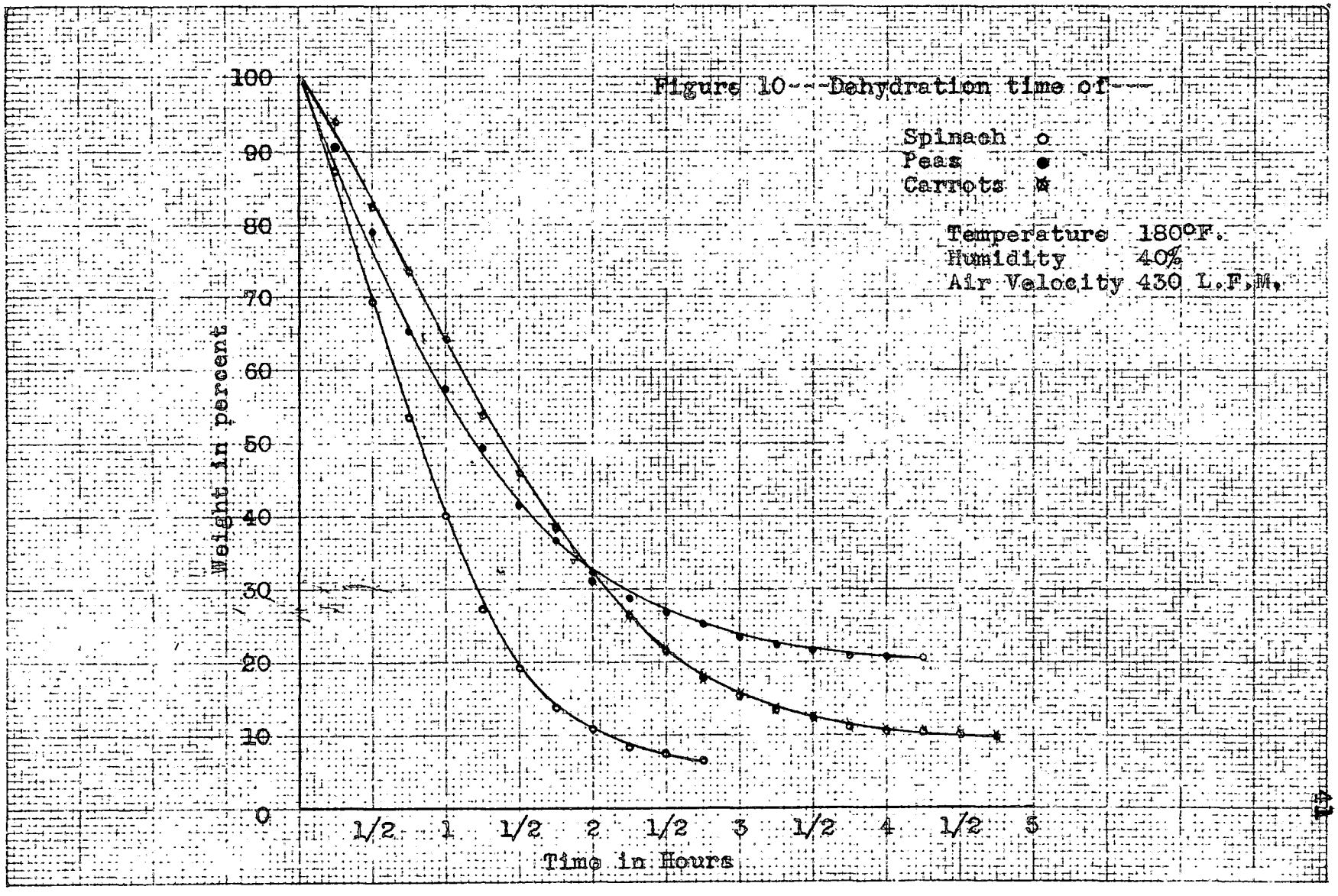
Figure 10---Dehydration time of---
Spinach ○
Peas ●
Carrots ✱
Temperature 180°F.
Humidity 40%
Air Velocity 430 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
Time in Hours

TABLE 12 EXPERIMENT 11

Date March 27, 1939 Temperature 120°F. Humidity 25% Air Velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.11	1.00	.83	.73	.63	.54	.48	.41	.35	.31	.26	.23	.20	.18	.15	.13	.12
Wt. of veg. in %	100	90.0	74.7	65.7	56.7	48.6	43.2	36.9	31.5	27.9	23.4	20.7	18.0	16.2	13.5	11.7	10.8
Total loss in %	0	10.0	25.3	34.3	43.3	51.4	56.8	63.1	68.5	72.1	76.6	79.3	82.0	83.8	86.5	88.3	89.2
Loss per period in %	0	10.0	15.3	9.0	9.0	8.1	5.4	6.3	5.4	3.6	4.5	2.7	2.7	1.8	2.7	1.8	0.9
PEAS																	
Wt. of veg. in lbs.	2.16	1.87	1.67	1.40	1.25	1.10	.97	.90	.83	.78	.74	.70	.67	.65	.63	.61	.59
Wt. of veg. in %	100	86.6	77.3	64.8	57.8	50.4	44.9	41.6	38.4	36.1	34.2	32.4	31.0	30.1	29.2	28.2	27.3
Total loss in %	0	13.4	22.7	35.2	42.2	49.1	55.1	58.4	61.6	63.9	65.8	67.6	69.0	69.9	70.8	71.8	72.7
Loss per period in %	0	13.4	9.3	12.5	7.0	6.9	6.0	3.3	3.2	2.3	1.9	1.8	1.4	0.9	0.9	1.0	0.9
CARROTS																	
Wt. of veg. in lbs.	3.21	2.92	2.58	2.29	2.01	1.74	1.49	1.30	1.10	0.95	0.84	0.74	0.63	0.57	0.53	0.48	0.45
Wt. of veg. in %	100	91.0	80.4	71.3	62.6	54.2	46.4	40.5	34.3	29.6	26.2	23.0	19.6	17.8	16.5	14.9	14.0
Total loss in %	0	9.0	19.6	28.7	37.4	45.8	53.6	59.5	65.7	70.4	73.8	77.0	80.4	72.2	83.5	85.1	86.0
Loss per period in %	0	9.0	10.6	9.1	8.7	8.4	7.8	5.9	6.2	4.7	3.4	3.2	3.4	1.8	1.3	1.6	0.9

TABLE 12 EXPERIMENT 11 (Cont.)

Date March 27, 1939 Temperature 120°F. Humidity 25% Air Velocity 430 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4	3/4	6
SPINACH								
Wt. of veg. in lbs.	.11	.10	.09					
Wt. of veg. in %	9.9	9.0	8.1					
Total loss in %	90.1	91.0	91.9					
Loss per period in %	0.9	0.9	0.9					
PEAS								
Wt. of veg. in lbs.	.58	.56	.55					
Wt. of veg. in %	26.8	25.8	25.4					
Total loss in %	73.2	74.2	74.6					
Loss per period in %	0.5	1.0	0.4					
CARROTS								
Wt. of veg. in lbs.	0.43	0.41	0.40	0.39	0.38	0.37	0.36	0.35
Wt. of veg. in %	13.4	12.8	12.5	12.1	11.8	11.5	11.2	10.9
Total loss in %	86.6	87.2	87.5	87.9	88.2	88.5	88.8	89.1
Loss per period in %	0.6	0.6	0.3	0.4	0.3	0.3	0.3	0.3

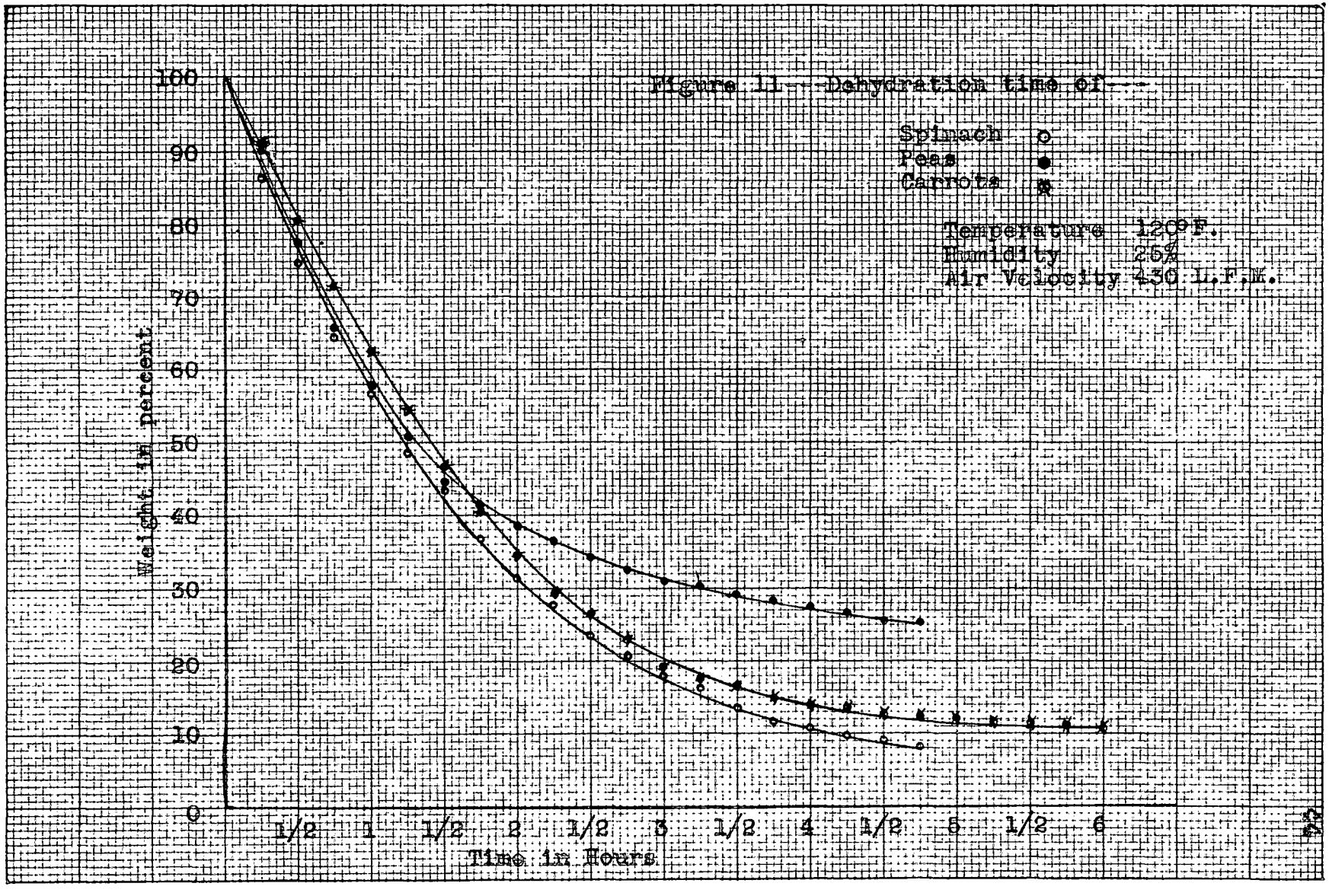
Figure 11---Dehydration time of---
Spinach o
Peas ●
Carrots ✱
Temperature 120°F.
Humidity 25%
Air Velocity 430 L.F.M.
Weight in Percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
Time in Hours

TABLE 13 EXPERIMENT 12

Date March 28, 1939 Temperature 120°F. Humidity 10% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.14	1.01	.88	.77	.68	.59	.51	.46	.42	.38	.33	.30	.26	.23	.20	.19	.17
Wt. of veg. in %	100	88.6	77.2	67.5	59.6	51.7	44.7	40.3	36.8	33.4	28.9	26.3	22.8	20.2	17.5	16.7	14.9
Total loss in %	0	11.4	22.8	32.5	40.4	48.3	55.3	59.7	63.2	66.6	71.1	73.7	77.2	79.8	82.5	83.3	85.1
Loss per period in %	0	11.4	11.4	9.7	7.9	7.9	7.0	4.4	3.5	3.4	4.5	2.6	3.5	2.6	2.7	0.8	1.8
PEAS																	
Wt. of veg. in lbs.	2.19	1.94	1.70	1.43	1.22	1.01	.91	.85	.78	.73	.68	.64	.60	.58	.55	.54	.53
Wt. of veg. in %	100	88.5	77.6	65.3	55.7	46.1	41.5	38.8	35.6	33.3	31.0	29.2	27.4	26.5	25.1	24.6	24.2
Total loss in %	0	11.5	22.4	34.7	44.3	53.9	58.5	61.2	64.4	66.7	69.0	70.8	72.6	73.5	74.9	75.4	75.8
Loss per period in %	0	11.5	10.9	12.3	9.6	9.6	4.6	2.7	3.2	2.3	2.3	1.8	1.8	0.9	1.4	0.5	0.4
CARROTS																	
Wt. of veg. in lbs.	3.23	2.87	2.55	2.20	1.80	1.54	1.28	1.10	.92	.83	.73	.63	.57	.51	.45	.43	.41
Wt. of veg. in %	100	88.9	79.0	68.1	55.7	47.7	39.6	34.0	28.4	25.6	22.6	19.5	17.6	15.8	13.9	13.2	12.7
Total loss in %	0	11.1	21.0	31.9	44.3	52.3	60.4	66.0	71.6	74.4	77.4	80.5	82.4	84.2	86.1	86.8	87.3
Loss per period in %	0	11.1	9.9	10.9	12.4	8.0	8.1	5.6	5.6	2.8	3.0	3.1	1.9	1.8	1.9	0.7	0.5

TABLE 13 EXPERIMENT 12 (Cont.)

Date March 28, 1939 Temperature 120°F. Humidity 10% Air velocity 430 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4
SPINACH						
Wt. of veg. in lbs.	.16	.15	.14	.13		
Wt. of veg. in %	14.0	13.2	12.3	11.4		
Total loss in %	86.0	86.8	87.7	88.6		
Loss per period in %	0.9	0.8	0.9	0.9		
PEAS						
Wt. of veg. in lbs.	.52	.50	.49	.48	.47	
Wt. of veg. in %	23.8	22.8	22.4	21.9	21.4	
Total loss in %	76.2	77.2	77.6	78.1	78.6	
Loss per period in %	0.4	1.0	0.4	0.5	0.5	
CARROTS						
Wt. of veg. in lbs.	.39	.38	.37	.36	.35	.34
Wt. of veg. in %	12.1	11.7	11.4	11.1	10.8	10.5
Total loss in %	87.9	88.3	88.6	88.9	89.2	89.5
Loss per period in %	0.6	0.4	0.3	0.3	0.3	0.3

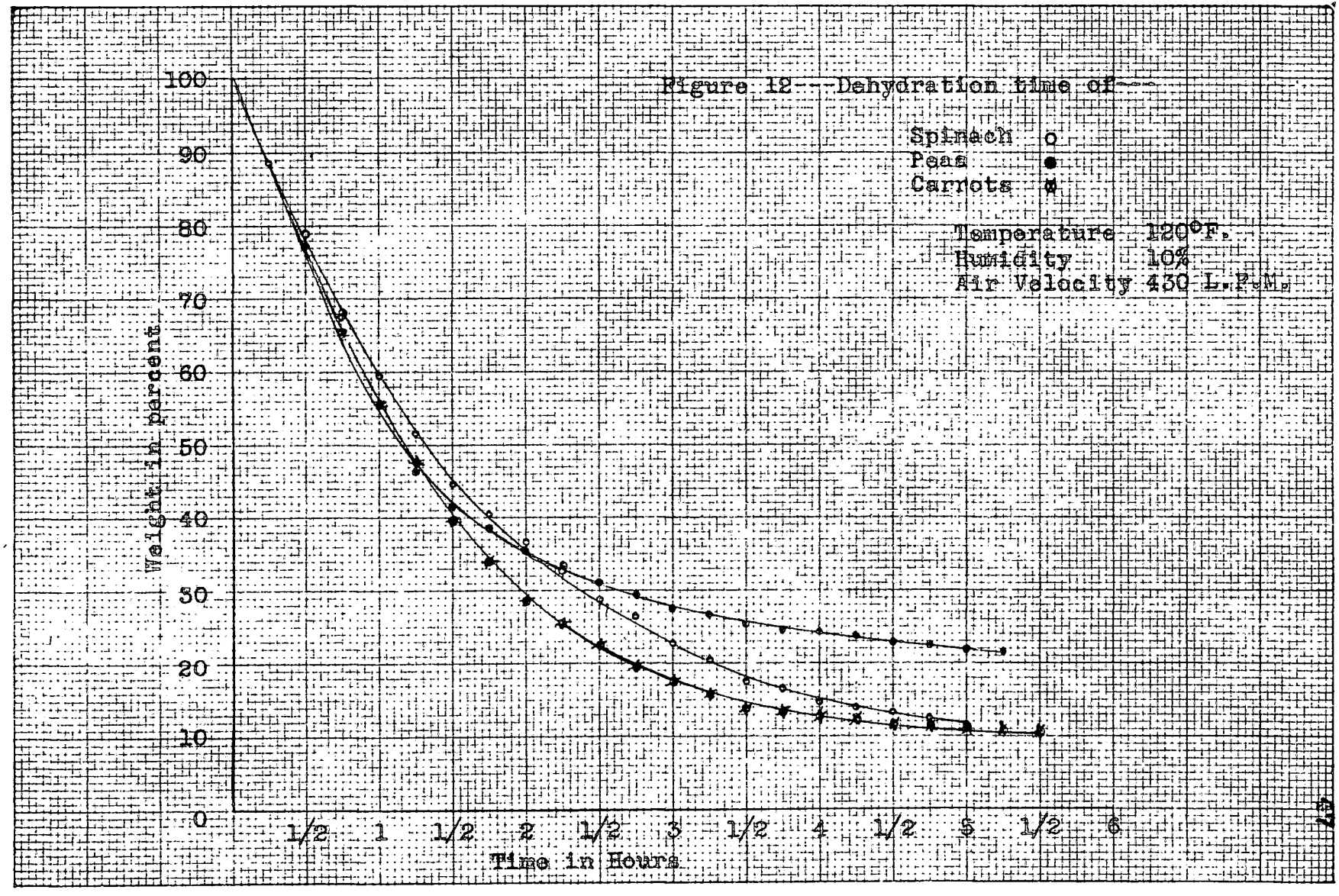
Figure 12---Dehydration time of---
Spinach o
Peas ●
Carrots ✱
Temperature 120°F.
Humidity 10%
Air Velocity 430 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
Time in Hours

TABLE 14 EXPERIMENT 13

Date March 29, 1939 Temperature 120°F. Humidity 40% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.15	1.09	1.00	.91	.83	.77	.71	.65	.59	.54	.48	.44	.41	.38	.35	.32	.30
Wt. of veg. in %	100	94.8	87.0	79.0	72.2	66.9	61.7	56.5	51.2	46.9	41.7	38.2	35.6	33.0	30.4	27.8	26.0
Total loss in %	0	5.2	13.0	21.0	27.8	33.1	38.3	43.5	48.8	53.1	58.3	61.8	64.4	67.0	69.6	72.2	74.0
Loss per period in %	0	5.2	7.8	8.0	6.8	5.3	5.2	5.2	5.3	4.3	5.2	3.5	2.6	2.6	2.6	2.6	1.8
PEAS																	
Wt. of veg. in lbs.	2.20	2.15	2.00	1.81	1.69	1.54	1.40	1.28	1.16	1.05	.98	.90	.84	.79	.74	.70	.65
Wt. of veg. in %	100	97.7	91.0	82.3	76.8	70.0	63.6	58.2	52.7	47.7	44.5	40.9	38.2	35.8	33.6	31.8	29.5
Total loss in %	0	2.3	9.0	17.7	23.2	30.0	36.4	41.8	47.3	52.3	55.5	59.1	61.8	64.2	66.4	68.2	70.5
Loss per period in %	0	2.3	6.7	8.7	5.5	6.8	6.4	5.4	5.5	6.0	3.2	3.6	2.7	2.4	2.2	1.8	2.3
CARROTS																	
Wt. of veg. in lbs.	3.27	3.15	2.93	2.74	2.58	2.39	2.23	2.07	1.89	1.73	1.58	1.44	1.29	1.17	1.05	.95	.87
Wt. of veg. in %	100	97.5	90.7	84.9	79.8	74.0	69.0	64.1	58.5	53.1	48.9	44.6	40.0	36.2	32.5	29.4	26.9
Total loss in %	0	2.5	9.3	15.1	20.2	26.0	31.0	35.9	41.5	46.9	51.1	55.4	60.0	63.8	67.5	70.6	73.1
Loss per period in %	0	2.5	6.8	5.8	5.1	5.8	5.0	4.9	5.6	5.4	4.2	4.3	4.6	3.8	3.7	3.1	2.5

TABLE 14 EXPERIMENT 13 (Cont.)

Date March 29, 1939 Temperature 120°F. Humidity 40% Air velocity 430 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4	3/4	6	1/4	2/4	3/4	7	1/4	2/4	3/4	8
SPINACH																
Wt. of veg. in lbs.	.28	.26	.24	.22	.21	.20	.19	.18	.17	.16	.15	.14	.13			
Wt. of veg. in %	24.4	22.6	20.8	19.1	18.2	17.4	16.5	15.6	14.8	13.9	13.0	12.2	11.3			
Total loss in %	75.6	77.4	79.2	80.9	81.8	82.6	83.5	84.4	85.2	86.1	87.0	87.8	88.7			
Loss per period in %	1.6	1.8	1.8	1.7	0.9	0.8	0.9	0.9	0.8	0.9	0.9	0.8	0.9			
PEAS																
Wt. of veg. in lbs.	.63	.61	.60	.59	.58	.57	.56	.55	.54	.53	.52	.51	.50	.49		
Wt. of veg. in %	28.6	27.7	27.3	26.8	26.4	25.9	25.4	25.0	24.5	24.1	23.6	23.2	22.7	22.3		
Total loss in %	71.4	72.3	72.7	73.2	73.6	74.1	74.6	75.0	75.5	75.9	76.4	76.8	77.3	77.7		
Loss per period in %	0.9	0.9	0.4	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.4		
CARROTS																
Wt. of veg. in lbs.	.79	.72	.66	.60	.57	.53	.50	.47	.45	.44	.43	.42	.41	.40	.39	.38
Wt. of veg. in %	24.4	22.5	20.4	18.6	17.6	16.4	15.5	14.6	13.9	13.6	13.2	13.0	12.7	12.4	12.1	11.8
Total loss in %	75.6	77.5	79.6	81.4	82.4	83.6	84.5	85.4	86.1	86.4	86.8	87.0	87.3	87.6	87.9	88.2
Loss per period in %	2.5	1.9	2.1	1.8	1.0	1.2	0.9	0.9	0.7	0.3	0.4	0.2	0.3	0.3	0.3	0.3

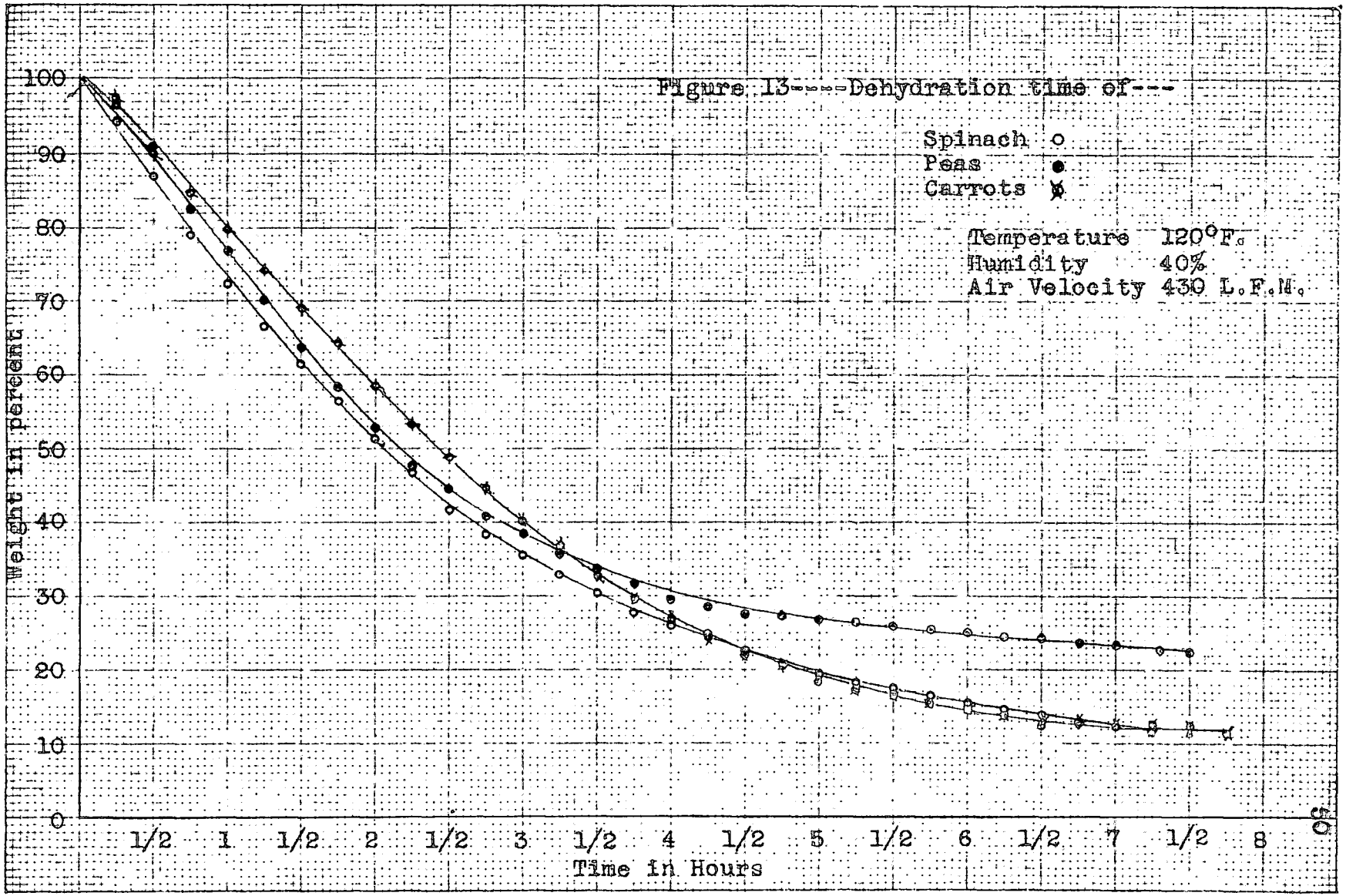
Figure 13----Dehydration time of---
Spinach o
Peas ●
Carrots ⊠
Temperature 120°F.
Humidity 40%
Air Velocity 430 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2 1 1/2 2 1/2 3 1/2 4 1/2 5 1/2 6 1/2 7 1/2 8
Time in Hours

TABLE 15 EXPERIMENT 14

Date March 30, 1939 Temperature 150°F. Humidity 10% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4
SPINACH																
Wt. of veg. in lbs.	1.10	.90	.74	.59	.48	.37	.27	.23	.18	.13	.10	.08	.07	.06		
Wt. of veg. in %	100	81.8	67.2	53.7	43.6	33.6	24.5	20.9	16.3	11.8	9.1	7.3	6.4	5.5		
Total loss in %	0	18.2	32.8	46.3	56.4	66.4	75.5	79.1	83.7	88.2	90.9	92.7	93.6	94.5		
Loss per period in %	0	18.2	14.6	13.5	10.1	10.0	9.1	3.6	4.6	4.5	2.7	1.8	0.9	0.9		
PEAS																
Wt. of veg. in lbs.	2.17	1.95	1.47	1.18	.95	.77	.65	.57	.50	.46	.43	.41	.39	.38	.37	.36
Wt. of veg. in %	100	89.9	67.7	54.4	43.7	35.4	29.9	26.2	23.0	21.2	19.8	18.9	17.9	17.5	17.0	16.6
Total loss in %	0	10.1	32.3	45.6	56.3	64.6	70.1	73.8	77.0	78.8	80.2	81.1	82.1	82.5	83.0	83.4
Loss per period in %	0	10.1	22.2	13.3	10.7	8.3	5.5	3.7	3.2	1.8	1.4	.9	1.0	.4	.5	.4
CARROTS																
Wt. of veg. in lbs.	3.20	2.73	2.35	1.87	1.46	1.17	.90	.73	.59	.49	.44	.39	.35	.33	.32	.31
Wt. of veg. in %	100	85.3	73.5	58.5	45.6	36.5	29.1	22.8	18.4	15.3	13.8	12.2	10.9	10.3	10.0	9.7
Total loss in %	0	14.7	26.5	41.5	54.4	63.5	71.9	77.2	81.6	84.7	86.2	87.8	89.1	89.7	90.0	90.3
Loss per period in %	0	14.7	11.8	15.0	12.9	9.1	8.4	5.3	4.4	3.1	1.5	1.6	1.3	.6	.3	.3

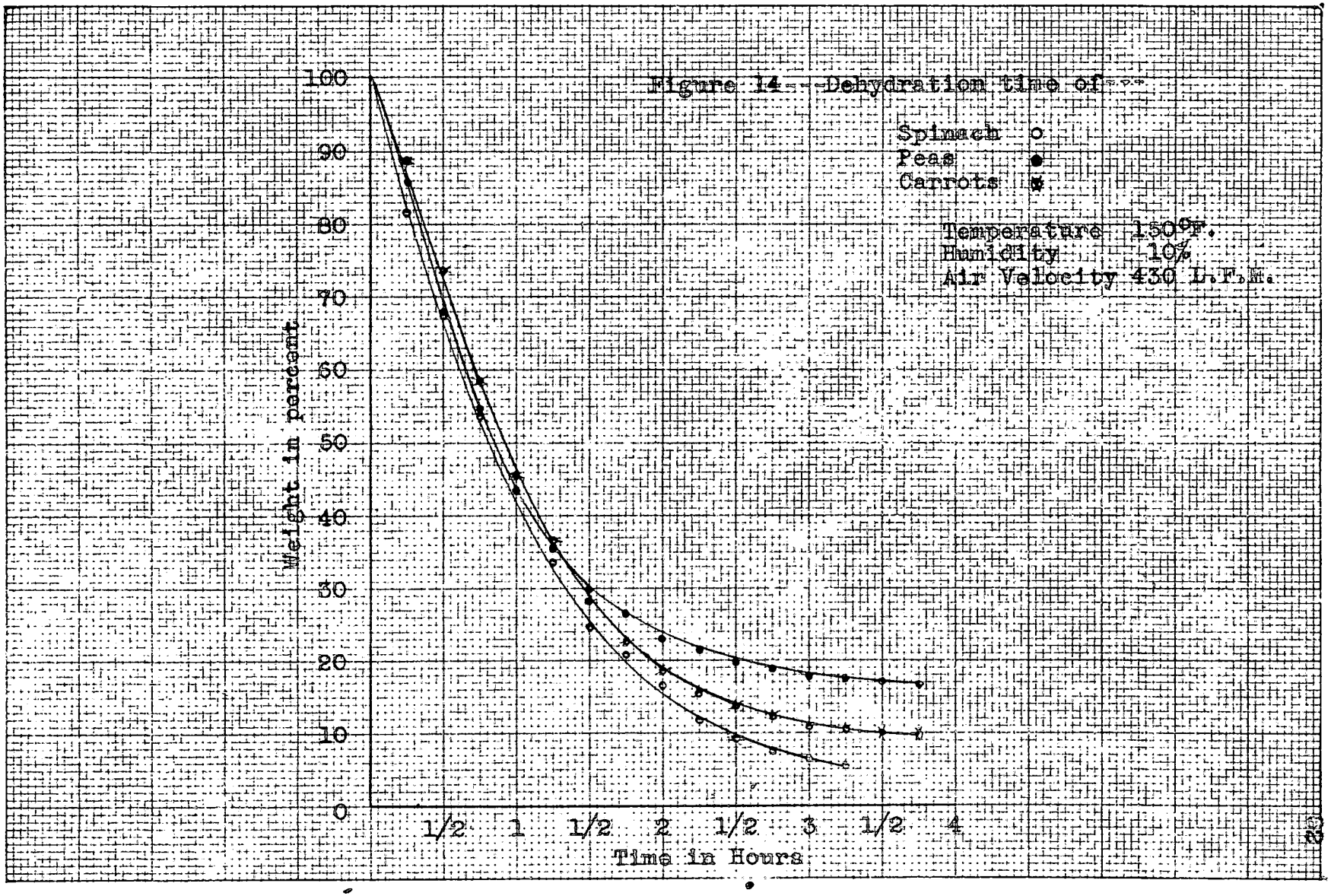
Figure 14--Dehydration time of--
Spinach ○
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 10%
Air Velocity 430 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
Time in Hours

TABLE 16 EXPERIMENT 15

Date April 1, 1939 Temperature 150°F. Humidity 25% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.16	.95	.84	.74	.64	.55	.46	.37	.31	.26	.21	.18	.16	.15	.13	.12	.11
Wt. of veg. in %	100	81.9	72.4	63.8	55.2	47.4	39.6	31.9	26.7	22.4	18.1	15.5	13.8	12.9	11.2	10.3	9.5
Total loss in %	0	18.1	27.6	36.2	44.8	52.6	60.4	68.1	73.3	77.6	81.9	84.5	86.2	87.1	88.8	89.7	90.5
Loss per period in %	0	18.1	9.5	8.6	8.6	7.8	7.8	7.7	5.2	4.3	4.3	2.6	1.7	0.9	1.7	0.9	0.8
PEAS																	
Wt. of veg. in lbs.	2.21	1.95	1.64	1.43	1.21	1.02	.86	.79	.72	.66	.62	.58	.56	.54	.52	.51	.50
Wt. of veg. in %	100	88.2	74.2	64.7	54.8	46.1	38.9	35.7	32.6	29.8	28.0	26.2	25.3	24.4	23.5	23.1	22.6
Total loss in %	0	11.8	25.8	35.3	45.2	53.9	61.1	64.3	67.4	70.2	72.0	73.8	74.7	75.6	76.5	76.9	77.4
Loss per period in %	0	11.8	14.0	9.5	9.8	8.7	7.2	3.2	3.1	2.8	1.8	1.8	0.9	0.9	0.9	0.4	0.5
CARROTS																	
Wt. of veg. in lbs.	3.25	2.95	2.60	2.26	1.92	1.65	1.38	1.19	1.01	.88	.77	.67	.60	.55	.50	.48	.46
Wt. of veg. in %	100	90.8	80.0	69.5	59.1	50.8	42.5	36.6	31.1	27.1	23.7	20.5	18.5	16.9	15.4	14.7	14.1
Total loss in %	0	9.2	20.0	30.5	40.9	49.2	57.5	63.4	68.9	72.9	7613	79.5	81.5	83.1	84.6	85.3	85.9
Loss per period in %	0	9.2	10.8	10.5	10.4	8.3	8.3	5.9	5.5	4.0	3.4	3.2	2.0	1.6	1.5	0.7	0.6

TABLE 16 EXPERIMENT 15 (Cont.)

Date April 1, 1939 Temperature 150°F. Humidity 25% Air velocity 430 L.F.M.

Time in hours	1/4	2/4	3/4	5
SPINACH				
Wt. of veg. in lbs.				
Wt. of veg. in %				
Total loss in %				
Loss per period in %				
PEAS				
Wt. of veg. in lbs.	.49	.48	.47	.46
Wt. of veg. in %	22.2	21.7	21.3	20.8
Total loss in %	77.8	78.3	78.7	79.2
Loss per period in %	0.4	0.5	0.5	0.5
CARROTS				
Wt. of veg. in lbs.	.45	.44	.43	.42
Wt. of veg. in %	13.8	13.5	13.2	12.9
Total loss in %	86.2	86.5	86.8	87.1
Loss per period in %	0.3	0.3	0.3	0.3

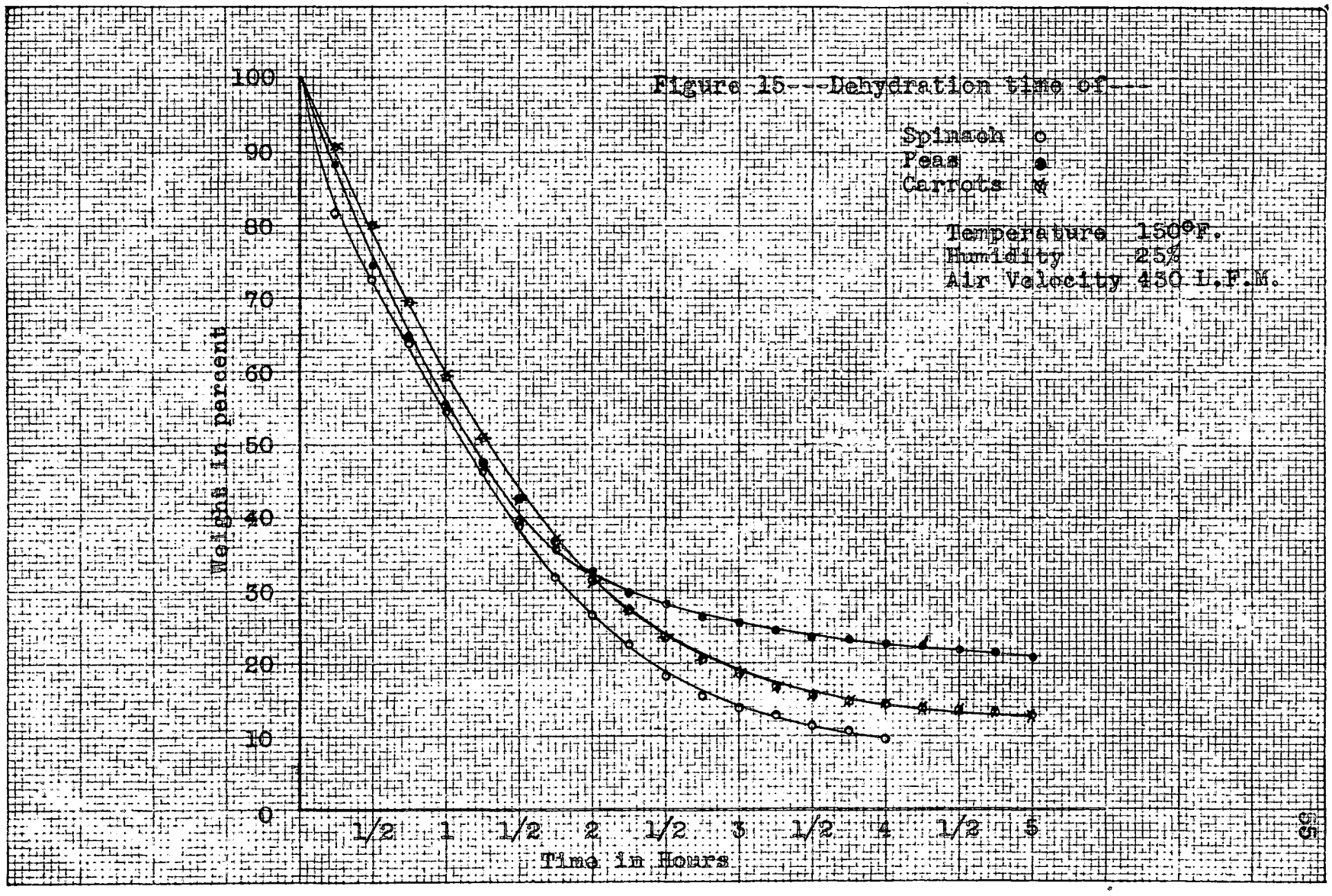
Figure 15---Dehydration time of---
Spinach ○
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 25%
Air Velocity 450 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
Time in Hours

TABLE 17 EXPERIMENT 16

Date March 31, 1939 Temperature 150°F. Humidity 40% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.14	1.04	.93	.80	.70	.60	.50	.43	.35	.30	.26	.23	.20	.18	.16	.15	.14
Wt. of veg. in %	100	91.3	81.5	70.1	61.4	52.6	43.8	37.7	30.7	26.3	22.8	20.2	17.5	15.8	14.0	13.2	12.3
Total loss in %	0	8.7	18.5	29.9	38.6	47.4	56.2	62.3	69.3	73.7	77.2	79.8	82.5	84.2	86.0	86.8	87.7
Loss per period in %	0	8.7	9.8	11.4	8.7	8.8	8.8	6.1	7.0	4.4	3.5	2.6	2.7	1.7	1.8	0.8	0.9
PEAS																	
Wt. of veg. in lbs.	2.20	2.07	1.85	1.70	1.52	1.35	1.19	1.07	.94	.85	.80	.72	.66	.63	.59	.56	.54
Wt. of veg. in %	100	94.1	84.1	77.3	69.1	61.4	54.1	48.6	42.7	38.6	36.4	32.7	30.0	28.6	26.8	25.4	24.6
Total loss in %	0	5.9	15.9	22.7	30.9	38.6	45.9	51.4	57.3	61.4	63.6	67.3	70.0	71.4	73.2	74.6	75.4
Loss per period in %	0	5.9	10.0	6.8	8.2	7.7	7.3	5.5	5.9	4.1	2.2	3.7	2.7	1.4	1.8	1.4	0.8
CARROTS																	
Wt. of veg. in lbs.	3.23	3.12	2.86	2.62	2.38	2.17	1.91	1.69	1.47	1.29	1.17	1.02	.93	.83	.70	.63	.58
Wt. of veg. in %	100	96.6	88.5	81.1	73.6	67.2	59.1	52.3	45.5	40.0	36.2	31.6	29.8	25.7	21.7	19.5	18.0
Total loss in %	0	3.4	11.5	18.9	26.4	32.8	40.9	47.7	54.5	60.0	63.8	68.4	71.2	74.3	78.3	80.5	82.0
Loss per period in %	0	3.4	8.1	7.4	7.5	6.4	8.1	6.8	6.8	5.5	3.8	4.6	2.8	3.1	4.0	2.2	1.5

TABLE 17 EXPERIMENT 16 (Cont.)

Date March 31, 1939 Temperature 150°F. Humidity 40% Air velocity 430 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4	3/4
SPINACH							
Wt. of veg. in lbs.	.13	.12					
Wt. of veg. in %	11.4	10.5					
Total loss in %	88.6	89.5					
Loss per period in %	0.9	0.9					
PEAS							
Wt. of veg. in lbs.	.52	.50	.49	.48	.47	.46	.45
Wt. of veg. in %	23.6	22.8	22.3	21.8	21.4	20.9	20.4
Total loss in %	76.4	77.2	77.7	78.2	78.6	79.1	79.6
Loss per period in %	1.0	0.8	0.5	0.5	0.4	0.5	0.5
CARROTS							
Wt. of veg. in lbs.	.53	.48	.46	.45	.44	.43	.42
Wt. of veg. in %	16.4	14.9	14.2	13.9	13.6	13.3	13.0
Total loss in %	83.6	85.1	85.8	86.1	86.4	86.7	87.0
Loss per period in %	1.6	1.5	0.7	0.3	0.3	0.3	0.3

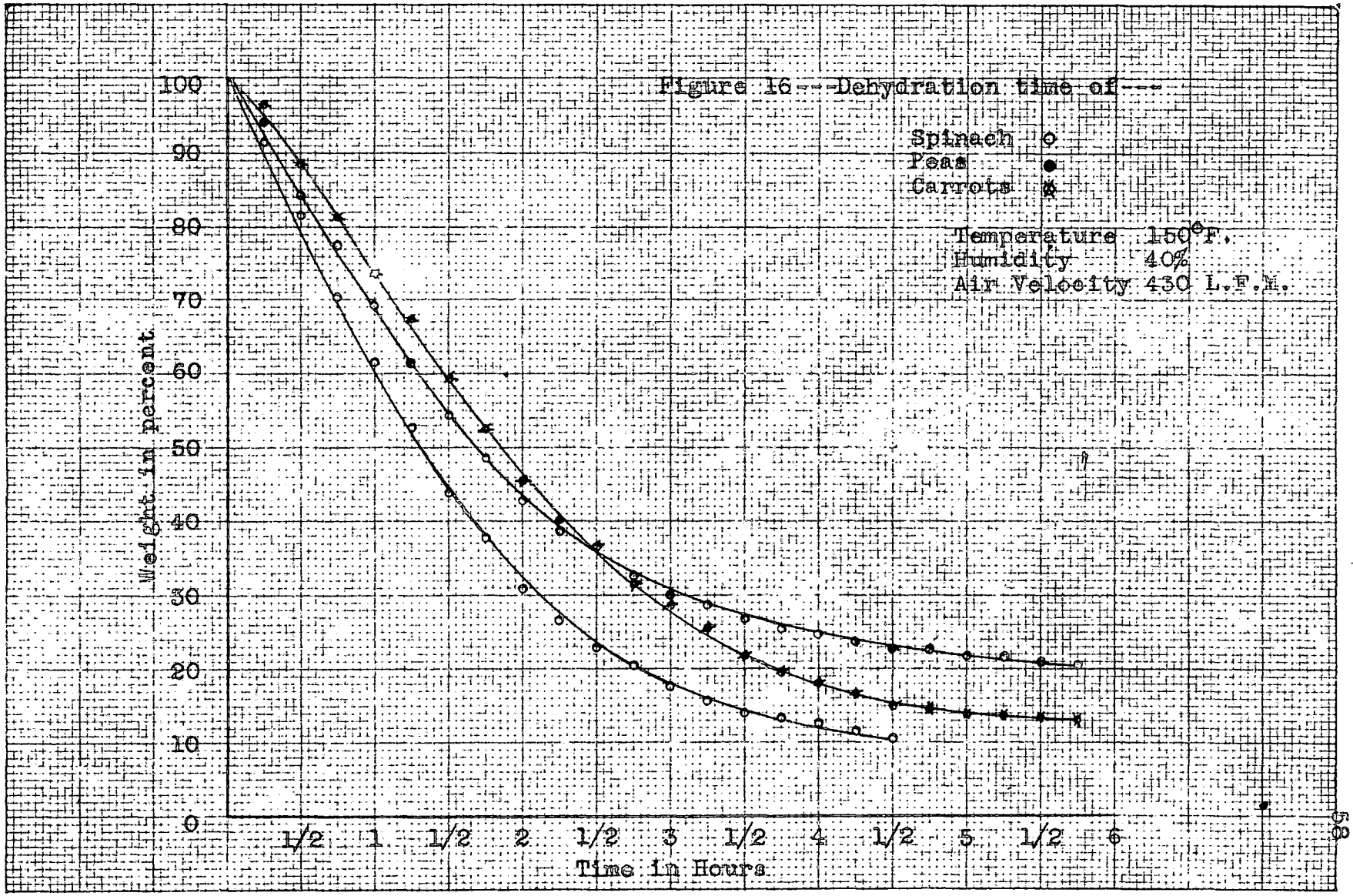
Figure 16---Dehydration time of---
Spinach o
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 40%
Air Velocity 430 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
Time in Hours

TABLE 18 EXPERIMENT 17

Date April 1, 1939 Temperature 180°F. Humidity 25% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4
SPINACH																
Wt. of veg. in lbs.	1.11	.88	.66	.47	.35	.23	.15	.10	.07	.06	.05	.04				
Wt. of veg. in %	100	79.2	59.5	42.3	31.5	20.7	13.5	9.0	6.3	5.4	4.5	3.6				
Total loss in %	0	20.8	40.5	57.7	68.5	79.3	86.5	91.0	93.7	94.6	95.5	96.4				
Loss per period in %	0	20.8	19.7	17.2	10.8	1.08	7.2	4.5	2.5	.9	.9	.9				
PEAS																
Wt. of veg. in lbs.	2.17	1.76	1.46	1.18	.92	.76	.62	.52	.46	.42	.39	.38	.37	.36	.35	
Wt. of veg. in %	100	81.1	67.3	54.4	42.4	35.0	28.6	24.0	21.2	19.3	17.9	17.5	17.0	16.6	16.1	
Total loss in %	0	18.9	32.7	45.6	57.6	65.0	71.4	76.0	78.8	80.7	82.1	82.5	83.0	83.4	83.9	
Loss per period in %	0	18.9	13.8	12.9	12.0	7.4	6.4	4.6	2.8	1.9	1.4	.4	.5	.4	.5	
CARROTS																
Wt. of veg. in lbs.	3.21	2.99	2.61	2.22	1.86	1.55	1.24	1.01	.79	.64	.53	.46	.41	.38	.36	.35
Wt. of veg. in %	100	93.1	81.3	69.1	57.9	48.2	38.6	31.4	24.6	19.9	16.5	14.3	12.8	11.8	11.2	10.9
Total loss in %	0	6.9	18.7	30.9	42.1	51.8	61.4	68.6	75.4	80.1	83.5	85.7	87.2	88.2	88.8	89.1
Loss per period in %	0	6.9	1.18	12.2	11.2	9.7	9.6	7.2	6.8	4.7	3.4	2.2	1.5	1.0	.6	.3

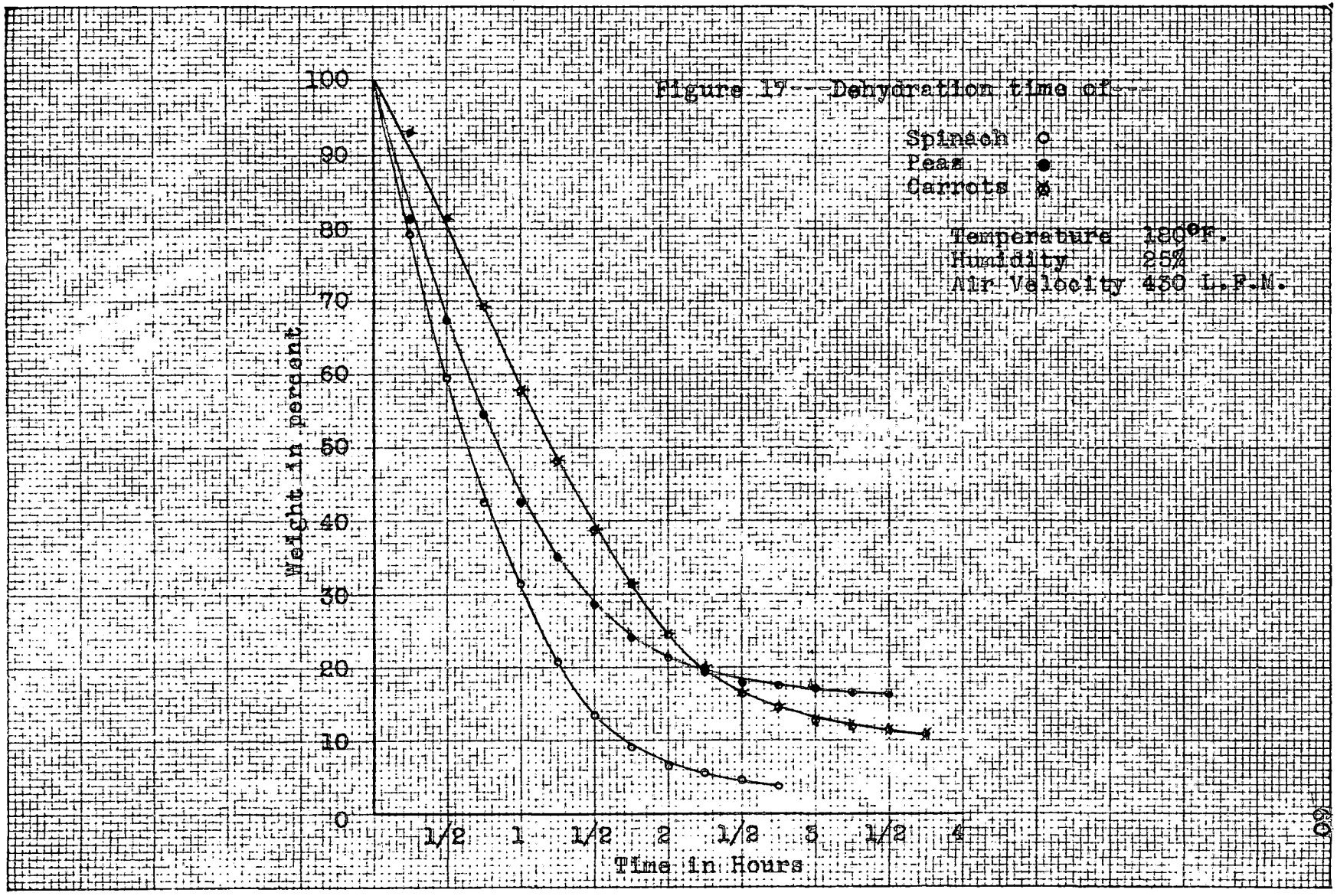
Figure 17--Dehydration time of--
Spinach
Peas
Carrots
Temperature 180°F.
Humidity 25%
Air Velocity 450 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
Time in Hours

TABLE 19 EXPERIMENT 18

Date March 3, 1939 Temperature 180°F. Humidity 10% Air velocity 430 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4
SPINACH														
Wt. of veg. in lbs.	1.12	.83	.60	.40	.27	.18	.12	.09	.08	.07	.06			
Wt. of veg. in %	100	74.1	53.6	35.7	24.1	16.1	10.7	8.0	7.1	6.3	5.4			
Total loss in %	0	25.9	46.4	64.3	75.9	83.9	89.3	92.0	92.9	93.7	94.6			
Loss per period in %	0	25.9	20.5	17.9	11.6	8.0	5.4	2.7	.9	.8	.9			
PEAS														
Wt. of veg. in lbs.	2.17	1.62	1.24	.97	.79	.65	.57	.51	.47	.44	.42	.40	.39	.38
Wt. of veg. in %	100	74.6	57.1	44.7	36.4	29.9	26.2	24.5	21.6	20.2	19.3	18.4	17.9	17.5
Total loss in %	0	25.4	42.9	55.3	63.6	70.1	73.8	75.5	78.4	79.8	80.7	81.6	82.1	82.5
Loss per period in %	0	25.4	17.5	12.4	8.3	6.5	3.7	2.7	1.9	1.4	.9	.9	.5	.4
CARROTS														
Wt. of veg. in lbs.	3.23	2.69	2.15	1.62	1.28	1.00	.76	.62	.52	.45	.42	.39	.36	.34
Wt. of veg. in %	100	83.3	66.6	50.2	39.6	31.0	23.5	19.2	16.1	13.9	13.0	12.1	11.1	10.5
Total loss in %	0	16.7	33.4	49.8	60.4	69.0	76.5	80.8	83.9	86.1	87.0	87.9	88.9	89.5
Loss per period in %	0	16.7	16.7	16.4	10.6	8.6	7.5	4.3	3.1	2.2	.9	.9	1.0	.6

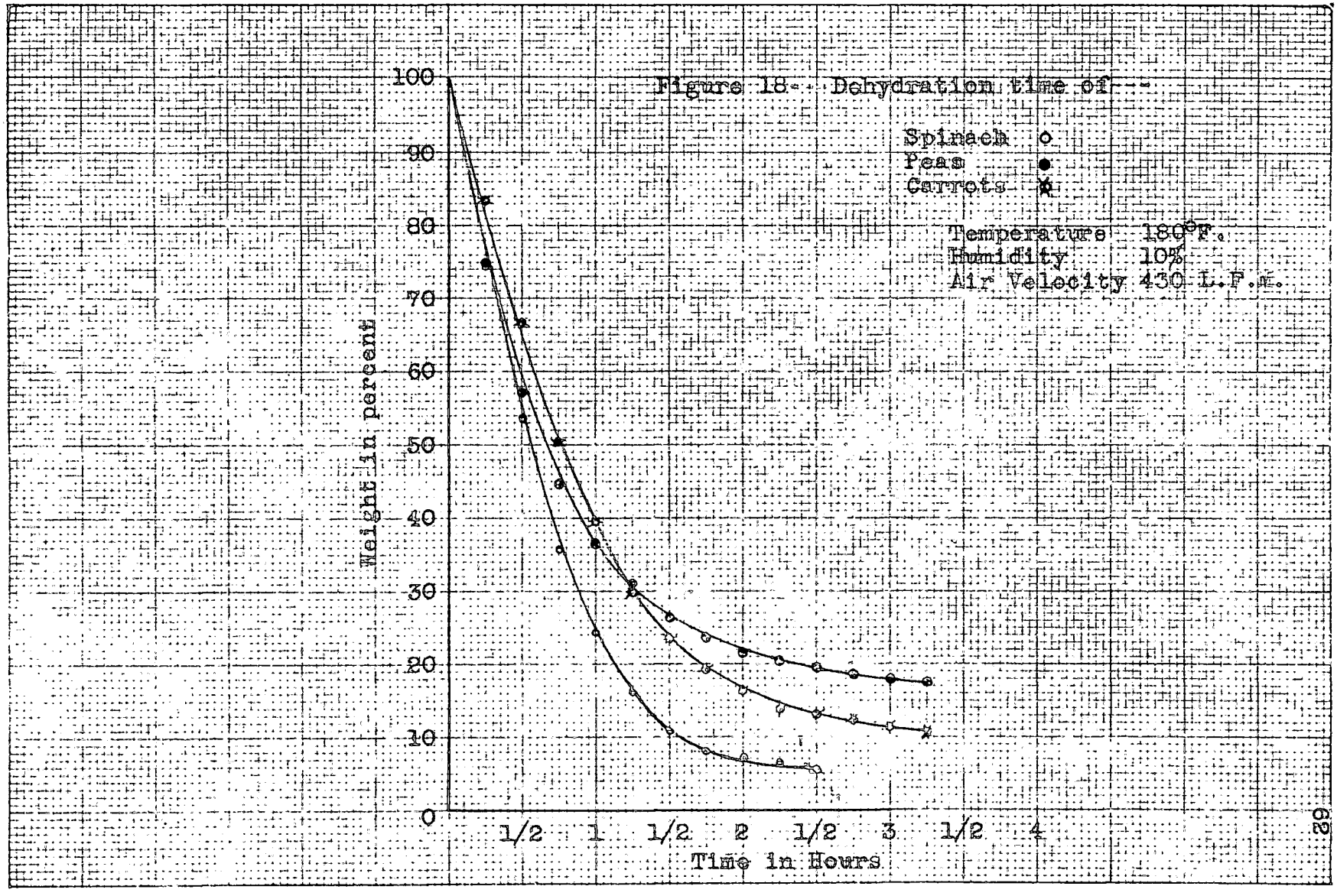
Figure 18-- Dehydration time of --
Spinach
Peas
Carrots
Temperature 180°F.
Humidity 10%
Air Velocity 430 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
Time in Hours

TABLE 20 EXPERIMENT 19

Date April 4, 1939 Temperature 180°F. Humidity 10% Air velocity 180 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.12	.95	.79	.64	.54	.43	.32	.25	.18	.13	.10	.07	.05	.04			
Wt. of veg. in %	100	84.7	70.5	57.1	48.2	38.4	28.6	22.3	16.1	11.6	8.9	6.3	4.5	3.6			
Total loss in %	0	15.3	29.5	42.9	51.8	61.6	71.4	77.7	83.9	88.4	91.1	93.7	95.5	96.4			
Loss per period in %	0	15.3	14.2	13.4	8.9	9.8	9.8	6.3	6.2	4.5	2.7	2.6	1.8	0.9			
PEAS																	
Wt. of veg. in lbs.	2.20	1.97	1.63	1.39	1.21	1.04	.92	.83	.75	.69	.64	.59	.55	.52	.51	.49	.48
Wt. of veg. in %	100	89.5	74.1	63.2	55.0	47.2	41.8	37.7	34.1	31.3	29.0	26.8	25.0	23.6	23.2	22.2	21.8
Total loss in %	0	10.5	25.9	36.8	45.0	52.8	58.2	62.3	65.9	68.7	71.0	73.2	75.0	76.4	76.8	77.8	78.2
Loss per period in %	0	10.5	15.4	10.9	8.2	7.8	5.4	4.1	3.6	2.8	2.3	2.2	1.8	1.4	0.4	1.0	0.4
CARROTS																	
Wt. of veg. in lbs.	3.23	2.98	2.58	2.24	1.97	1.60	1.34	1.13	.93	.77	.66	.56	.48	.43	.41	.38	.37
Wt. of veg. in %	100	92.3	79.9	69.3	61.0	49.5	41.5	35.0	28.8	23.8	20.4	17.3	14.8	13.3	12.7	11.7	11.4
Total loss in %	0	7.7	20.1	30.7	39.0	50.5	58.5	65.0	71.2	76.2	79.6	82.7	85.2	86.7	87.3	88.3	88.6
Loss per period in %	0	7.7	12.4	10.6	8.3	11.5	8.0	6.5	6.2	5.0	3.4	3.1	2.5	1.5	0.6	1.0	0.3

TABLE 20 EXPERIMENT 19 (Cont.)

Date April 4, 1939 Temperature 180°F. Humidity 10% Air velocity 180 L.F.M.

Time in hours	1/4	2/4	3/4
SPINACH			
Wt. of veg. in lbs.			
Wt. of veg. in %			
Total loss in %			
Loss per period in %			
PEAS			
Wt. of veg. in lbs.	.47	.46	.45
Wt. of veg. in %	21.4	20.9	20.4
Total loss in %	78.6	79.1	79.6
Loss per period in %	0.4	0.5	0.5
CARROTS			
Wt. of veg. in lbs.	.36	.35	.34
Wt. of veg. in %	11.1	10.8	10.5
Total loss in %	88.9	89.2	89.5
Loss per period in %	0.3	0.3	0.3

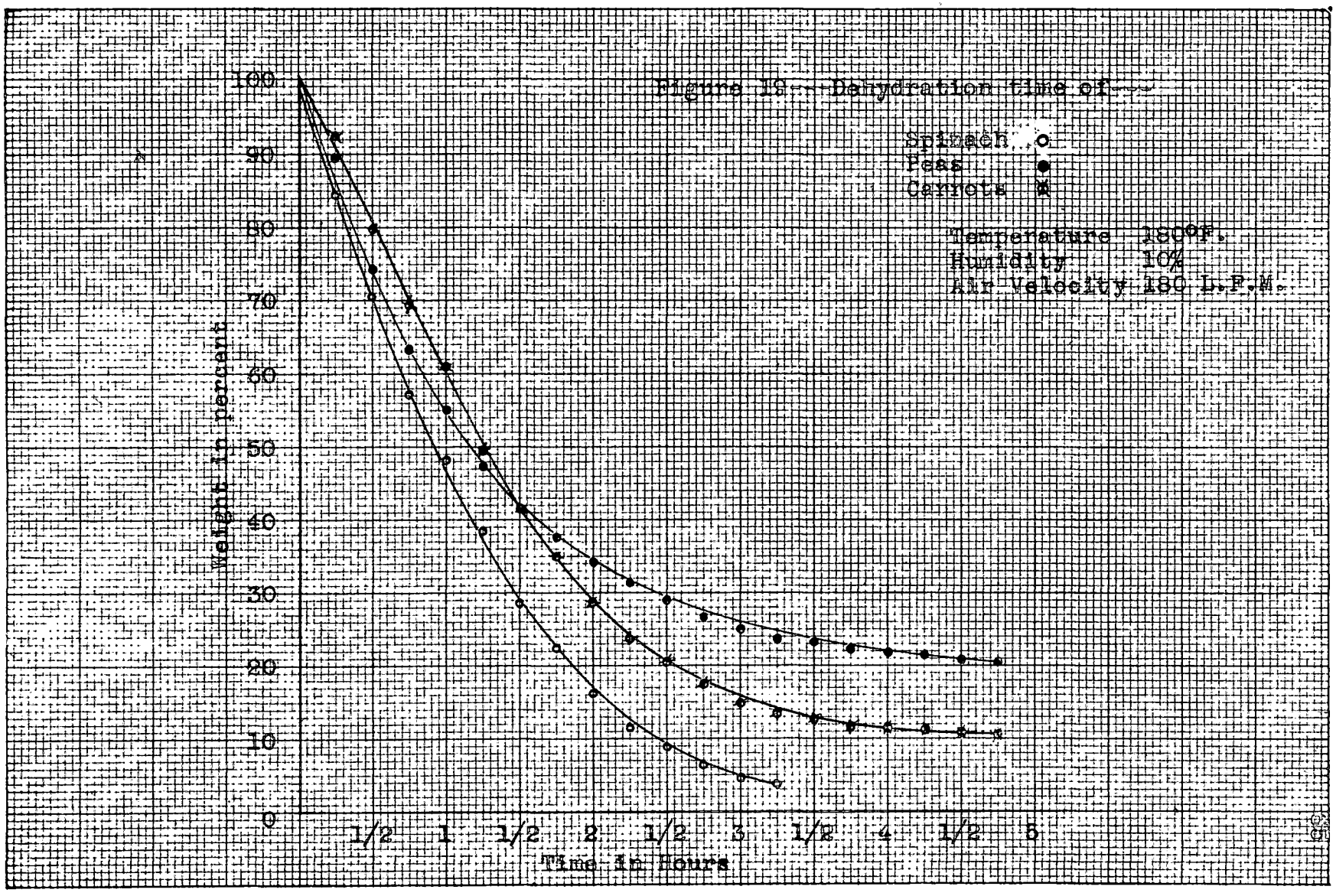
Figure 18.--Dehydration time of--
Spinach
Peas
Carrots
Temperature 180°F.
Humidity 10%
Air Velocity 180 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
Time in Hours

TABLE 21 EXPERIMENT 20

Date April 5, 1939 Temperature 180°F. Humidity 25% Air velocity 180 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.18	1.04	.88	.74	.60	.50	.42	.34	.26	.21	.18	.16	.14	.13	.12	.11	
Wt. of veg. in %	100	88.2	74.5	62.6	50.8	42.4	35.6	28.8	22.0	17.8	15.2	13.5	11.9	11.0	10.2	9.3	
Total loss in %	0	11.8	25.5	37.4	49.2	57.6	64.4	71.2	78.0	82.2	84.7	86.4	88.1	89.0	89.8	90.7	
Loss per period in %	0	11.8	13.7	11.9	11.8	8.4	6.8	6.8	6.8	4.2	2.5	1.7	1.7	0.9	0.8	0.9	
PEAS																	
Wt. of veg. in lbs.	2.24	2.06	1.79	1.60	1.43	1.24	1.04	.90	.79	.69	.63	.58	.53	.50	.47	.45	.44
Wt. of veg. in %	100	92.0	79.9	71.4	63.8	55.3	46.4	40.1	35.3	30.8	28.1	25.9	23.6	22.3	21.0	20.1	19.6
Total loss in %	0	8.0	20.1	28.6	36.2	44.7	53.6	59.9	64.7	69.2	71.9	74.1	76.4	77.7	79.0	79.9	80.4
Loss per period in %	0	8.0	12.1	8.5	7.6	8.5	8.9	6.3	4.8	4.5	2.7	2.2	2.3	1.3	1.3	0.9	0.5
CARROTS																	
Wt. of veg. in lbs.	3.29	3.10	2.84	2.55	2.27	2.05	1.84	1.63	1.44	1.25	1.08	.93	.79	.69	.60	.54	.50
Wt. of veg. in %	100	94.3	86.4	77.5	69.0	62.3	55.9	49.5	43.8	38.0	32.8	28.2	24.0	21.0	18.2	16.4	15.2
Total loss in %	0	5.7	13.6	22.5	31.0	37.7	44.1	50.5	56.2	62.0	67.2	71.8	76.0	79.0	81.8	83.6	84.8
Loss per period in %	0	5.7	7.9	8.9	8.5	6.7	6.4	6.4	5.7	5.8	5.2	4.6	4.2	3.0	2.8	1.8	1.2

TABLE 21 EXPERIMENT 20 (Cont.)

Date April 5, 1939 Temperature 180°F. Humidity 25% Air Velocity 160 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4
SPINACH					
Wt. of veg. in lbs.					
Wt. of veg. in %					
Total loss in %					
Loss per period in %					
PEAS					
Wt. of veg. in lbs.	.43	.42	.41		
Wt. of veg. in %	19.2	18.7	18.3		
Total loss in %	80.8	81.3	81.7		
Loss per period in %	0.4	0.5	0.4		
CARROTS					
Wt. of veg. in lbs.	.47	.45	.44	.43	.42
Wt. of veg. in %	14.3	13.7	13.4	13.1	12.8
Total loss in %	85.7	86.3	86.6	86.9	87.2
Loss per period in %	0.9	0.6	0.3	0.3	0.3

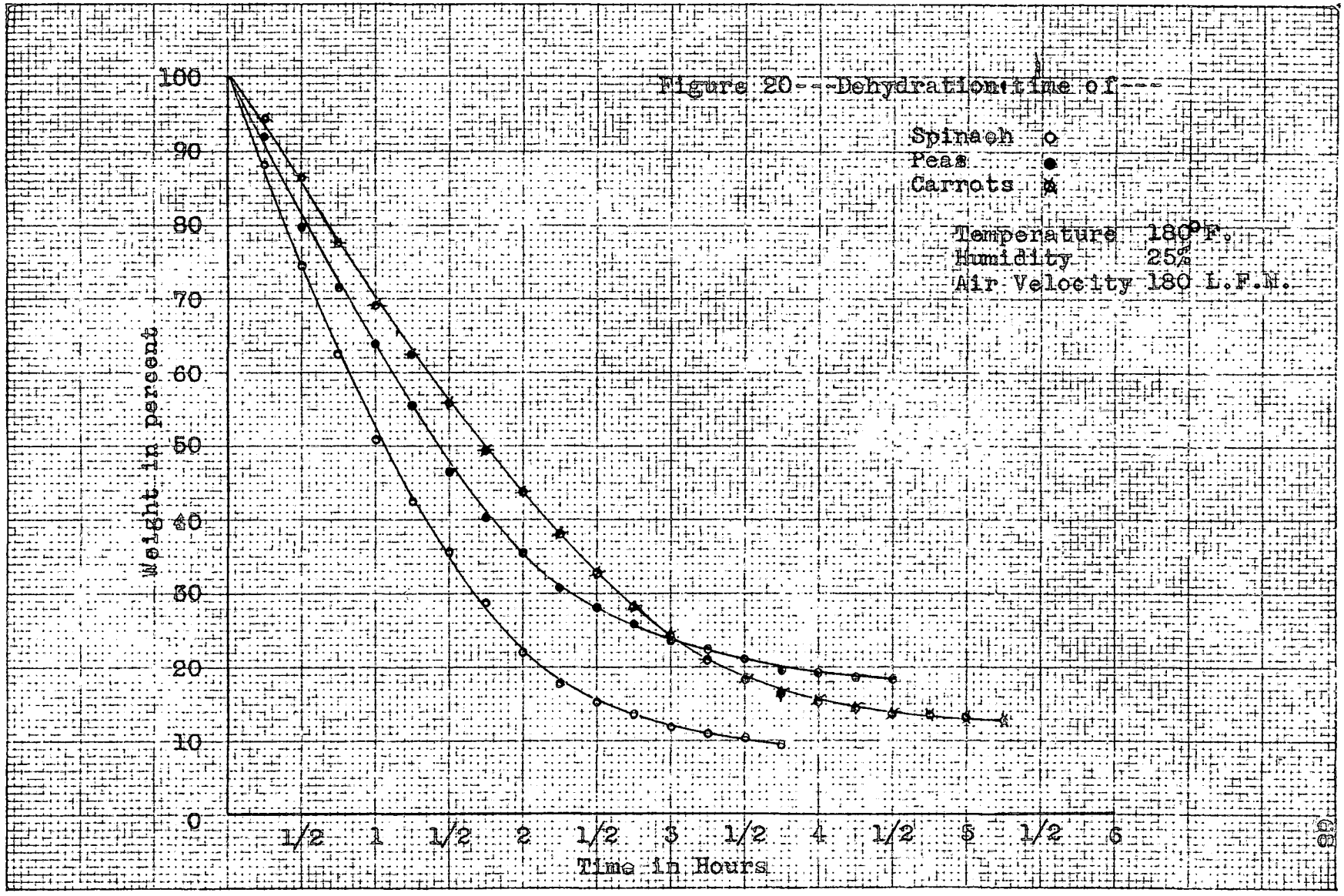
Figure 20---Dehydration: time of---
Spinach ○
Peas ●
Carrots ✱
Temperature 180°F.
Humidity 25%
Air Velocity 180 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
Time in Hours

TABLE 22 EXPERIMENT 21

Date April 6, 1939 Temperature 150°F. Humidity 10% Air velocity 180 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.18	1.05	.91	.80	.69	.58	.49	.42	.35	.30	.26	.23	.20	.17	.15	.14	.12
Wt. of veg. in %	100	89.0	76.1	67.8	58.5	49.2	41.5	35.6	29.6	25.4	22.0	19.5	16.9	14.4	12.7	11.9	10.2
Total loss in %	0	11.0	23.9	32.2	41.5	50.8	58.5	64.4	70.4	74.6	78.0	80.5	83.1	85.6	87.3	88.1	89.8
Loss per period in %	0	11.0	12.9	9.3	9.3	9.3	7.7	5.9	6.0	4.2	3.4	2.5	2.6	2.7	1.7	0.8	1.7
PEAS																	
Wt. of veg. in lbs.	2.23	2.03	1.81	1.67	1.47	1.28	1.14	1.00	.88	.80	.72	.67	.62	.58	.55	.52	.50
Wt. of veg. in %	100	91.0	81.1	74.9	65.9	57.4	51.1	44.8	39.4	35.8	32.3	30.0	27.8	26.0	24.6	23.3	22.4
Total loss in %	0	9.0	18.9	25.1	34.1	42.6	48.9	55.2	60.6	64.2	67.7	70.0	72.2	74.0	75.4	76.7	77.6
Loss per period in %	0	9.0	9.9	6.2	9.0	8.5	6.3	6.3	4.4	3.6	3.5	2.3	2.2	1.8	1.4	1.3	0.9
CARROTS																	
Wt. of veg. in lbs.	3.28	3.07	2.83	2.62	2.32	2.12	1.89	1.67	1.46	1.29	1.14	1.01	.89	.80	.72	.65	.59
Wt. of veg. in %	100	93.6	86.2	79.8	70.7	64.6	57.6	50.9	44.5	39.3	34.7	30.8	27.1	24.4	21.9	19.8	18.0
Total loss in %	0	6.4	13.8	20.2	29.3	35.4	42.4	49.1	55.5	60.7	65.3	69.2	72.9	75.6	78.1	80.2	82.0
Loss per period in %	0	6.4	7.4	6.4	9.1	6.1	7.0	6.7	6.4	5.2	4.6	3.9	3.7	2.7	2.5	2.1	1.8

TABLE 22 EXPERIMENT 21 (Cont.)

Date April 6, 1939 Temperature 150°F. Humidity 10% Air velocity 180 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4	3/4	6
SPINACH								
Wt. of veg. in lbs.	.11	.10	.09	.08				
Wt. of veg. in %	9.3	8.5	7.6	6.8				
Total loss in %	90.7	91.5	92.4	93.2				
Loss per period in %	0.9	0.8	0.9	0.8				
PEAS								
Wt. of veg. in lbs.	.48	.47	.46	.45	.44	.43		
Wt. of veg. in %	21.5	21.1	20.6	20.2	19.7	19.3		
Total loss in %	78.5	78.9	79.4	79.8	80.3	80.7		
Loss per period in %	0.9	0.4	0.5	0.4	0.5	0.4		
CARROTS								
Wt. of veg. in lbs.	.55	.52	.49	.48	.46	.45	.49	.43
Wt. of veg. in %	16.8	15.8	14.9	14.6	14.0	13.7	13.4	13.1
Total loss in %	83.2	84.2	85.1	85.4	86.0	86.3	86.6	86.9
Loss per period in %	1.2	1.0	0.9	0.3	0.6	0.3	0.3	0.3

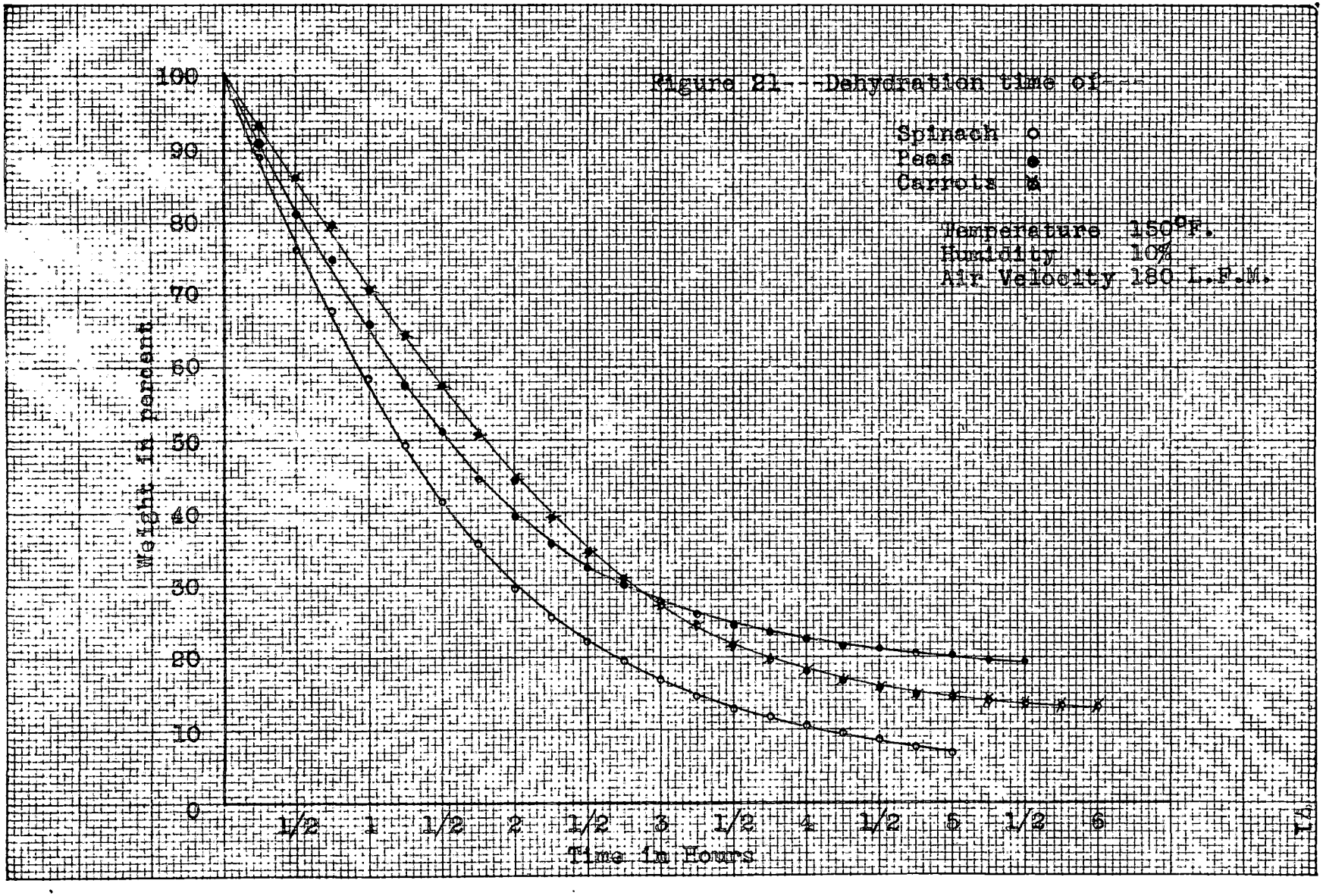
Figure 21.--Dehydration time of--
Spinach ○
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 10%
Air Velocity 180 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
Time in Hours

TABLE 23 EXPERIMENT 22

Date April 7, 1939 Temperature 150°F. Humidity 25% Air velocity 180 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4
SPINACH																	
Wt. of veg. in lbs.	1.18	1.08	.97	.84	.74	.66	.58	.49	.41	.33	.30	.27	.23	.20	.18	.16	.14
Wt. of veg. in %	100	91.5	82.1	71.2	63.7	55.9	49.1	41.5	34.7	28.0	25.4	22.9	19.5	16.9	15.2	13.6	11.9
Total loss in %	0	8.5	17.9	28.8	36.3	44.1	50.9	58.5	65.3	72.0	74.6	77.1	80.5	83.1	84.8	86.4	88.1
Loss per period in %	0	8.5	9.4	10.9	8.5	7.8	6.8	7.6	6.8	6.7	2.6	2.5	3.4	2.6	1.7	1.6	1.7
PEAS																	
Wt. of veg. in lbs.	2.23	2.09	1.92	1.77	1.61	1.47	1.33	1.20	1.08	.98	.89	.82	.75	.69	.64	.60	.57
Wt. of veg. in %	100	93.8	86.2	79.4	72.2	65.9	59.6	53.8	48.4	43.9	39.9	36.7	33.6	30.9	28.7	26.9	25.5
Total loss in %	0	6.2	13.8	20.6	27.8	34.1	40.4	46.2	51.6	56.1	60.1	63.3	66.4	69.1	71.3	73.1	74.5
Loss per period in %	0	6.2	7.6	6.8	7.2	6.3	6.3	5.8	5.4	4.5	4.0	3.2	3.1	2.7	2.2	1.8	1.4
CARROTS																	
Wt. of veg. in lbs.	3.28	3.19	3.08	2.85	2.66	2.48	2.29	2.11	1.93	1.76	1.62	1.48	1.33	1.19	1.07	.95	.86
Wt. of veg. in %	100	97.3	93.9	87.0	81.1	75.6	69.8	64.3	58.8	53.7	49.4	45.2	40.5	36.3	32.6	29.0	26.2
Total loss in %	0	2.7	6.1	13.0	18.9	24.4	30.2	35.7	41.2	46.3	50.6	54.8	59.5	63.7	67.4	71.0	73.8
Loss per period in %	0	2.7	3.4	6.9	5.9	5.5	5.8	5.5	5.5	5.1	4.3	4.2	4.7	4.2	3.7	3.6	2.8

TABLE 23 EXPERIMENT 22 (Cont.)

Date April 7, 1939 Temperature 150°F. Humidity 25% Air velocity 180 L.F.M.

Time in hours	1/4	2/4	3/4	5	1/4	2/4	3/4	6	1/4	2/4
SPINACH										
Wt. of veg. in lbs.	.13	.12								
Wt. of veg. in %	11.0	10.2								
Total loss in %	89.0	89.8								
Loss per period in %	0.9	0.8								
PEAS										
Wt. of veg. in lbs.	.54	.52	.50	.49	.48	.47	.46			
Wt. of veg. in %	24.2	23.3	22.4	22.0	21.5	21.0	20.6			
Total loss in %	75.8	76.7	77.6	78.0	78.5	79.0	79.4			
Loss per period in %	1.3	0.9	0.9	0.4	0.5	0.5	0.6			
CARROTS										
Wt. of veg. in lbs.	.77	.67	.58	.55	.52	.50	.48	.47	.46	.45
Wt. of veg. in %	23.4	20.4	17.7	16.7	15.9	15.2	14.6	14.3	14.0	13.7
Total loss in %	76.6	79.6	82.3	83.3	84.1	84.8	85.4	85.7	86.0	86.3
Loss per period in %	2.8	3.0	2.7	1.0	0.8	0.6	0.7	0.3	0.3	0.3

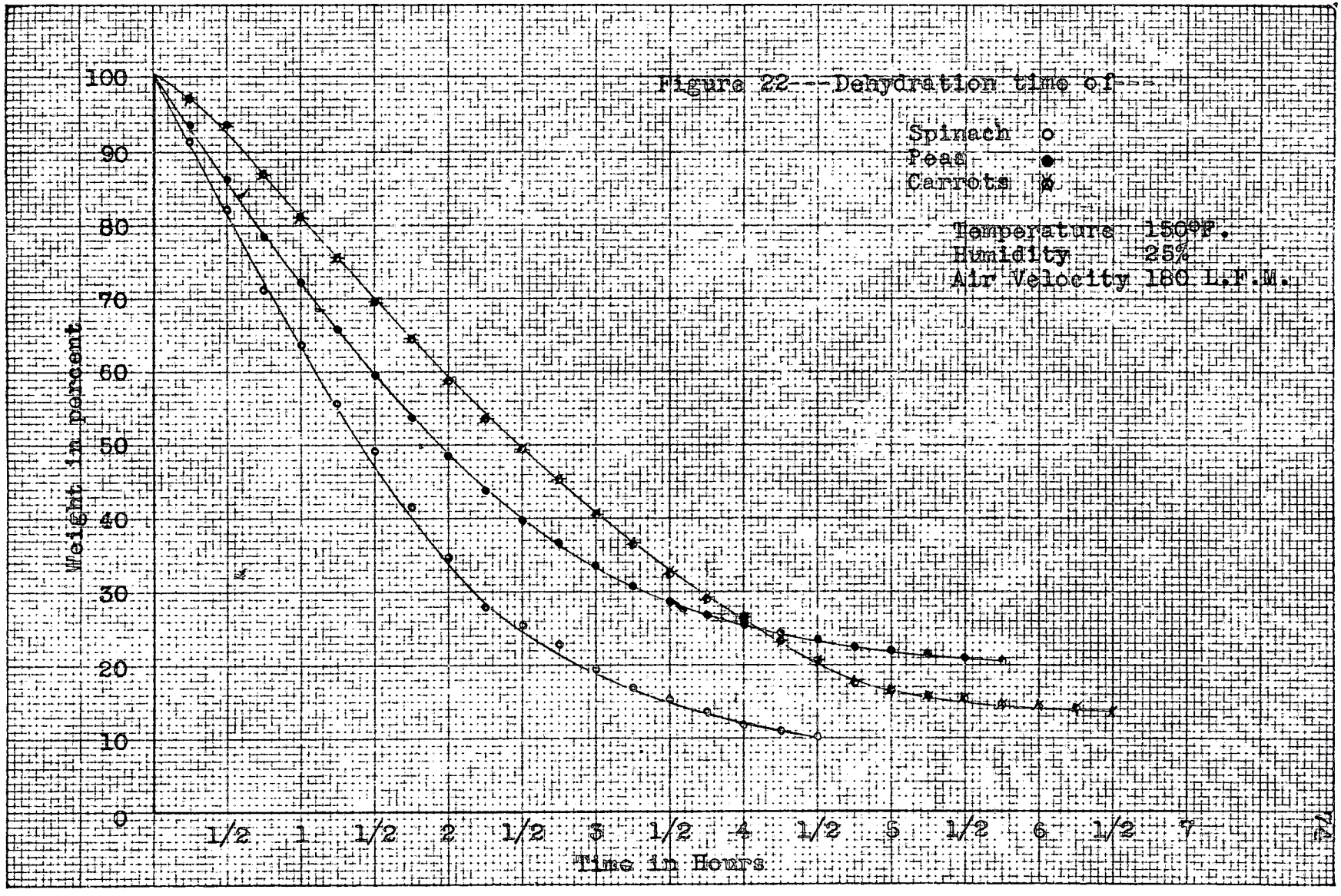
Figure 22--Dehydration time of---
Spinach o
Peas ●
Carrots ✱
Temperature 150°F.
Humidity 25%
Air Velocity 180 L.F.M.
Weight in percent
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
1/2
7
Time in Hours

TABLE 24 EXPERIMENT 23

Date April 8, 1939 Temperature 120°F. Humidity 10% Air velocity 180 L.F.M.

Time in hours	0	1/4	2/4	3/4	1	1/4	2/4	3/4	2	1/4	2/4	3/4	3	1/4	2/4	3/4	4	1/4
SPINACH																		
Wt. of veg. in lbs.	1.17	1.06	.94	.87	.80	.74	.67	.62	.57	.52	.48	.44	.41	.37	.34	.31	.29	.26
Wt. of veg. in %	100	90.5	80.3	74.4	68.4	63.3	57.3	53.0	48.7	44.5	41.0	37.6	35.0	31.6	29.1	26.5	24.8	22.2
Total loss in %	0	9.5	19.7	25.6	31.6	36.7	42.7	47.0	51.3	55.5	59.0	62.4	65.0	68.4	70.9	73.5	75.2	77.8
Loss per period in %	0	9.5	10.2	5.9	6.0	5.1	6.0	4.3	4.3	4.2	3.5	3.4	2.6	3.4	2.5	2.6	1.7	2.6
PEAS																		
Wt. of veg. in lbs.	2.22	2.01	1.82	1.66	1.48	1.33	1.21	1.07	.98	.89	.81	.75	.70	.66	.62	.58	.54	.52
Wt. of veg. in %	100	90.5	82.0	74.8	66.6	60.0	54.5	48.2	44.1	40.0	36.4	33.8	31.5	29.7	27.9	26.1	24.3	23.4
Total loss in %	0	9.5	18.0	25.2	33.4	40.0	45.5	51.8	55.9	60.0	63.6	66.2	68.5	70.3	72.1	73.9	75.7	76.6
Loss per period in %	0	9.5	8.5	7.2	8.2	6.6	5.5	6.3	4.1	4.1	3.6	2.6	2.3	1.8	1.8	1.8	1.8	0.9
CARROTS																		
Wt. of veg. in lbs.	3.27	3.14	2.96	2.72	2.54	2.38	2.17	2.01	1.88	1.70	1.57	1.42	1.27	1.18	1.09	.94	.84	.77
Wt. of veg. in %	100	96.0	90.5	83.2	77.6	72.8	66.4	61.5	57.5	52.0	48.0	43.4	38.8	36.1	33.4	29.4	25.7	23.5
Total loss in %	0	4.0	9.5	16.8	22.4	27.2	33.6	38.5	42.5	48.0	52.0	56.6	61.2	63.9	66.6	70.6	74.3	76.5
Loss per period in %	0	4.0	5.5	7.3	5.6	4.8	6.4	4.9	4.0	5.5	4.0	4.6	4.6	2.7	2.7	4.0	3.7	2.2

TABLE 24 EXPERIMENT 23 (Cont.)

Date April 8, 1939 Temperature 120°F. Humidity 10% Air velocity 180 L.F.M.

Time in hours	2/4	3/4	5	1/4	2/4	3/4	6	1/4	2/4	3/4	7	1/4	2/4	3/4	8	1/4
SPINACH																
Wt. of veg. in lbs.	.24	.22	.20	.18	.17	.16	.14	.12	.12	.11	.10	.09				
Wt. of veg. in %	20.5	18.8	17.1	15.4	14.5	13.7	12.0	10.3	10.3	9.4	8.6	7.7				
Total loss in %	79.5	81.2	82.9	84.6	85.5	86.3	88.0	89.7	89.7	90.6	91.4	92.3				
Loss per period in %	1.7	1.7	1.7	1.7	0.9	0.8	1.7	1.7	0	0.9	0.8	0.9				
PEAS																
Wt. of veg. in lbs.	.51	.50	.49	.48	.47	.47	.46	.45	.45	.44	.43	.42				
Wt. of veg. in %	23.0	22.5	22.0	21.6	21.2	21.0	20.7	20.2	20.2	19.8	19.4	18.9				
Total loss in %	77.0	77.5	78.0	78.4	78.8	78.8	79.3	79.8	79.8	80.2	80.6	81.1				
Loss per period in %	0.4	0.5	0.5	0.4	0.4	0.0	0.5	0.5	0.0	0.4	0.4	0.5				
CARROTS																
Wt. of veg. in lbs.	.72	.67	.63	.58	.55	.52	.50	.48	.47	.46	.45	.44	.43	.42	.41	.40
Wt. of veg. in %	22.0	20.5	19.3	17.7	16.8	15.9	15.3	14.7	14.4	14.1	13.8	13.5	13.2	12.9	12.5	12.2
Total loss in %	78.0	79.5	80.7	82.3	83.2	84.1	84.7	85.3	85.6	85.9	86.2	86.5	86.8	87.1	87.5	87.8
Loss per period in %	1.5	1.5	1.2	1.6	0.9	0.9	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3

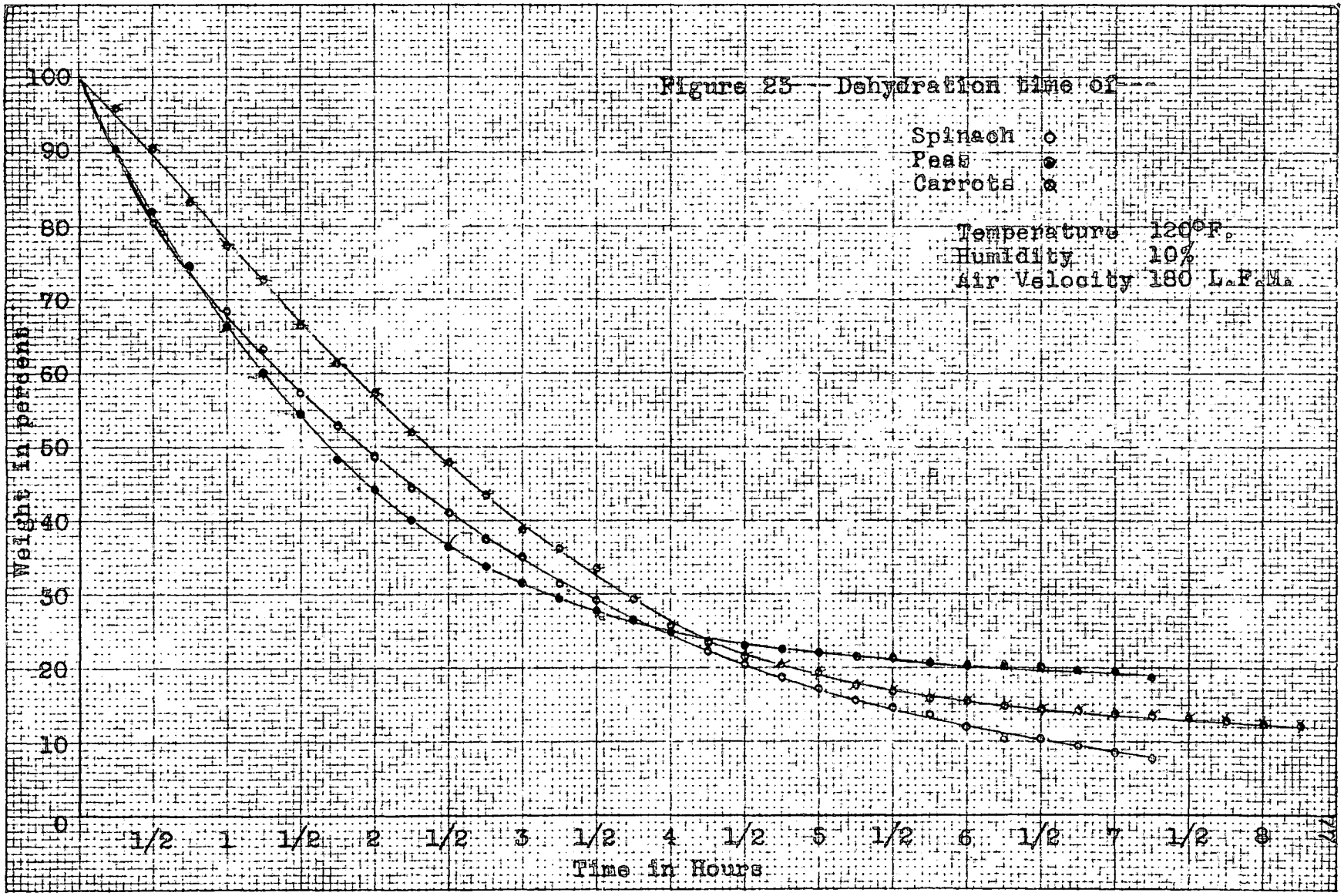
Figure 23 -- Dehydration time of--
Spinach
Peas
Carrots
Temperature 120°F.
Humidity 10%
Air Velocity 180 L.F.M.
Weight in perdens
100
90
80
70
60
50
40
30
20
10
0
1/2
1
1/2
2
1/2
3
1/2
4
1/2
5
1/2
6
1/2
7
1/2
8
Time in Hours

DISCUSSION

In order to discuss the influence of either temperature, humidity or air velocity in connection to its relation to efficiency of drying, an analysis of the data was necessary. When temperature, humidity and air velocity were the three main factors each was tested with itself as the variable while the other two factors were held constant.

If the factor temperature is variable, then the factors of air velocity and humidity were held constant; air velocity was variable with humidity and temperature constant; and humidity had constants of temperature and air velocity. Therefore, any difference in drying time in these tests must have been due to the variable.

From an examination of the data the following conclusions may be drawn regarding the effect of temperature, humidity and air velocity respectively.

In a general it may be said that the length of time required for drying was not necessary in inverse ratio to the temperature used.

The length of time necessary for drying varied depending on the influence of the other two factors i.e. humidity and air velocity.

It was noted that of the three temperatures used, 180°F. seemed to be most desirable as far as time is con-

cerned. It dried the product in about 80% as much time as was required when 150°F. was used and in about 55% as much time as when 120°F. was used (Table 2, 7, 8). This was probably due mainly to the fact that higher temperature had a greater affect of hastening the transpiration of moisture from inside of the product to its surface. Further, this may be due to the capacity of air to absorb more moisture at higher than at lower temperatures. Because of the above characteristics of high temperature, decreased drying time logically would be expected.

Extreme high drying temperatures, however, would not be successfully applied to certain products for it might damage the product by carmelization or burning.

Another factor which influenced the drying period was the humidity. Theoretically, the less the humidity in the dehydrater, the more rapid would be the drying. This however, did not prove to be the case in some of the experiments (Table 2, 3, 4).

When a temperature of either 180°F. or 150°F. with high air velocity of 700 L.F.M. was used, the drying time was on an average only about 10% less for spinach or peas, and about 20% less for carrots with a humidity of 25% . than with a 10% humidity.

This may be explained by the fact that the product had the capacity to transpire moisture sufficiently fast

to allow for evaporation at near a maximum rate when 25% humidity was used. As humidity was purposely used to regulate the dehydrating conditions, therefore an optimum humidity to use would be such a one as would accomplish the process successfully and give the shortest drying time. Under such conditions 25% humidity proved most efficient when high temperature and high air speed were used.

It is true that the drying rate usually increases (drying time decreases) when the humidity is lowered. Also the drying time is reduced when temperature is increased. Sometimes however, an increase in temperature may cause such rapid evaporation that the surface of the product dries hard because evaporation had taken place so fast that transpiration did not bring moisture from the interior of the material fast enough to keep the surface cells moist and able to transmit moisture. Such a hard surface is known as case-hardened. This is very detrimental to fast drying for it may prevent the normal transpiration of moisture to the surface where it might have evaporated.

By increasing the humidity the case-hardening may be avoided for the higher humidity slows down the surface evaporation to a point where transpiration can keep up with evaporation. In these experiments 25% humidity was the most effective in producing rapid drying.

Using temperatures of 150°F. or 120°F. with 430 L.F.M. or 180 L.F.M. air velocity, a humidity of 10% gave faster drying than 25% or 40% humidity. (Tables 15, 16, 17, and 12, 13, and 14)

Decreasing the air flow or reducing the temperature will reduce the rate of evaporation. However, the decreased evaporation is more evident when a high humidity is used. It was found that these results coincided with the theoretical statement, that, the lower the humidity the faster the drying provided a suitable combination of the factors of temperature and circulation is likewise obtained. Therefore the increase of relative humidity in the dehydrator even to 25% has disturbed this balance and resulted in slower drying.

For all products used and at all temperatures and air speeds a humidity of 40% increased the drying time in all tests and it decreased the quality of the product in all cases.

The third factor which influenced the drying efficiency was the air velocity. Under all conditions of temperatures and humidity for which figures were available from these experiments an air velocity of 700 L.F.M. seemed to give somewhat the best drying efficiency.

In tests (Tables 2, 19, 20) a temperature of 180°F. was used with a 10% humidity and a velocity of 700 and 430 L.F.M. while the velocities are quite different still

the results are similar. It is significant however that the higher air velocity increased the drying rate at the higher humidities. At 25% humidity the decrease in drying time was 10% for spinach, 20% for peas and 30% for carrots. (Tables 3, 18, 21)

When a temperature of 150°F. was employed, air velocity of 700 L.F.M. gave only a slight advantage over 430 L.F.M. when they were maintained at the same humidity of 10%. However at a humidity of 25%, 700 L.F.M. had a noticeable advantage over the lower air velocity (430 L.F.M.) of 25% for spinach, peas and carrots (Tables 6, 16, 23).

From the above results it was noted that an air velocity of 700 L.F.M. did not affect the time for drying at high temperatures with low humidities very much. But, it did affect the drying rate when the humidity was high and the temperature low.

In all tests an air velocity of 180 L.F.M. had the longest drying time and was therefore undesirable from an efficiency standpoint.

Spinach had the highest moisture content of any of the vegetables dried thus naturally gave lower yields per pound of material dried.

Spinach, being a leafy product, very thin and presenting a larger surface, was hard to handle. It was easily damaged by burning from high temperatures. When

using high humidity drying time was delayed, high air velocities likewise proved undesirable because the product was blown from the trays.

Peas which has the highest solids content did not give satisfactory results with high temperature or high humidity drying.

Carrots seemed the only crop that could stand the high temperature without discoloring and becoming dark.

SUMMARY

1. In the drying industry, factors most effecting the rate of drying and consequent efficiency of the dehydrater and the quality of product are temperature, humidity, and circulation.
2. Temperature has the most decided influence on decreasing drying time. Under all conditions of humidity and circulation, its influence is marked.
3. The second most influential factor is circulation. At high or medium temperature its increase does not decrease the drying time to any extent. When low temperatures with a high humidity are maintained, increased air velocity is advantageous.
4. When vegetables were dried as in these experiments reducing the humidity decreased the drying time in most cases.

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