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Moisture Relationships of Plant-based Agricultural Products



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Moisture Relationships of Plant-based Agricultural Products

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Keywords: Grains, Moisture, Plant materials, Seeds

1 Purpose and scope

1.1 This standard covers data and equations on plant-based agricultural materials and their products. This standard does not cover information on animal tissue and products.

1.2 This standard gives data and equations on moisture relations for agricultural products. The information is used in crop drying calculations and in design and analysis of storage systems for the material.

1.3 The data and equations given in the standard are limited in their range of applicability. Extrapolation of the data beyond the range of applicability may give erroneous results.

2 Normative references

The following standard contains provisions that, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Standards organizations maintain registers of currently valid standards.

ASAE S352.2 FEB03, Moisture Measurement—Unground Grain and Seeds

3 Wet-basis and dry-basis representations

Wet-basis moisture content

$$MC_W = \frac{G_W - G_D}{G_W} \times 100\%$$

Dry-basis moisture content

$$MC_D = \frac{G_W - G_D}{G_D} \times 100\%$$

where:

G_W is mass of wet material

G_D is mass of dry material (determined by the oven method specified in ASAE S352.2 or by an equivalent method)

4 Conversion formulas

$$MC_W = 100 MC_D / (100 + MC_D)$$

$$MC_D = 100 MC_W / (100 - MC_W)$$

$$G_W = 100 G_D / (100 - MC_W)$$

$$G_D = 100 G_W / (100 + MC_D)$$

where MC_W and MC_D are in percent basis.

5 Equilibrium moisture content—equilibrium relative humidity data

Tables 1a, 1b, 1c, and 1d list the experimentally recorded equilibrium moisture content (EMC)—equilibrium relative humidity (ERH) data for starchy materials, fibrous materials and selected feedstuffs, materials high in oil and protein, and agricultural by-products, respectively, as well as some background information on these data. Also, figures 1 through 11 give graphical representation of the EMC-ERH data for most commonly utilized agricultural products.

6 Isotherm equations

a. Modified Henderson equation

$$ERH = 1 - \exp[-A \times (T + C) \times (MC_D)B]$$

b. Modified Chung-Pfost equation

$$ERH = \exp\left[-\frac{A}{T + C} \exp(-B \times MC_D)\right]$$

c. Modified Halsey equation

$$ERH = \exp\left[-\frac{\exp(A + B \times T)}{(MC_D)^C}\right]$$

d. Modified Oswin equation

$$ERH = \left[\left(\frac{A + BT}{MC_D}\right)^2 + 1\right]^{-1}$$

e. Guggenheim-Anderson-deBoer (GAB) equation

$$MC_D = \frac{A \times B \times C \times ERH}{(1 - B \times ERH)(1 - B \times ERH + B \times C \times ERH)}$$

where:

ERH is equilibrium relative humidity

T is temperature

MC_D is dry-basis moisture content

A, B, C are constants

7 Isotherm equation constants

Table 2 lists isotherm equation constants and related data specifications based on which these constants were obtained.

Table 1a – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for starchy materials

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾							Source ³⁾	Reference							
				ERH	EMC	ERH	EMC	ERH	EMC	ERH			EMC						
1. Barley		25–28	Mix	ERH	15.0	30.0	45.0	60.0	75.0	90.0	20(a)	–							
				EMC	6.5	9.2	11.2	13.7	16.9	24.2									
2. Buckwheat	cv. Miyazaki-Ohtsubu	20	Mix	ERH	11.1	23.2	33.1	44.1	59.3	75.6	78(a)	20							
				EMC	8.3	11.7	13.1	14.4	17.2	21.6									
		30	Mix	ERH	6.8	11.1	21.6	32.4	43.8	56.2	73.0	75.2							
				EMC	5.8	6.9	9.1	11.2	13.0	15.3	18.8	19.4							
		40	Mix	ERH	19.7	31.6	43.4	53.0	71.0	75.0									
				EMC	8.0	10.2	11.9	13.4	16.8	17.9									
		50	Mix	ERH	5.8	11.0	19.5	49.7	68.0	74.9									
				EMC	5.3	6.7	7.7	12.7	16.5	17.6									
		60	Mix	ERH	4.6	10.9	49.9	67.5	74.9										
				EMC	5.1	6.2	12.5	14.9	15.8										
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3. Corn																			
a. Shelled corn	a1. Dekalb XL-66	10	Des	ERH	12.9	34.0	57.5	73.9	80.1	94.2	34(b)	20,22,80,82,30,16,56,35,15,79,19							
				EMC	7.5	11.1	15.2	20.1	21.1	34.7									
		32	Des	ERH	11.3	31.8	51.6	74.3	78.8	89.0									
				EMC	5.4	9.1	12.1	17.1	19.1	24.7									
		49	Des	ERH	11.3	31.2	47.7	73.4	78.3	84.2									
				EMC	4.6	8.3	10.3	16.4	17.0	20.1									
		68	Des	ERH	11.4	30.9	42.0	72.1	76.2	77.8									
				EMC	3.3	6.3	7.2	13.8	13.9	14.4									
	a2. Dekalb 484	5	Des	ERH	12.2	24.0	25.5	33.3	43.0	54.2	64.7	74.4	81.2	84.8	86.1	90.5	94.8	16(b)	Same as above
				EMC	5.8	8.9	9.6	11.2	13.2	15.6	18.7	21.2	23.2	24.5	25.8	28.1	30.1		
		15	Des	ERH	5.9	8.1	8.9	9.6	11.2	13.3	14.7	15.8	18.8	21.3	23.2	27.7	30.2		
				EMC	15.5	19.4	27.4	29.4	39.4	49.4	53.7	58.5	68.9	78.8	85.1	91.4	98.6		
		25	Des	ERH	5.9	8.2	8.9	9.6	11.2	13.3	15.8	18.8	21.3	23.2	25.9	27.8	28.2		
				EMC	18.8	24.3	31.4	33.9	43.6	54.2	64.8	73.0	83.3	88.2	90.8	93.9	94.9		
		35	Des	ERH	5.9	8.1	9.0	9.6	11.2	13.3	14.7	15.7	18.8	21.2	23.2	25.9	28.2		
				EMC	21.8	29.1	35.2	39.5	47.9	61.0	69.2	72.4	79.5	86.8	90.5	93.2	98.0		
		45	Des	ERH	5.9	8.2	9.0	9.6	11.2	13.3	14.7	15.7	18.8	21.3	23.2	24.7	25.9		
				EMC	26.1	31.9	40.4	42.8	53.8	68.1	76.2	77.9	85.0	89.6	93.0	94.1	96.5		
	a3. Pioneer 3780	20	Des	ERH	12.5	23.1	34.0	44.3	58.6	74.1	84.2	56(b)	Same as above						
				EMC	7.1	8.9	12.3	13.1	15.8	19.6	23.8								
		40	Des	ERH	11.8	20.8	32.6	43.7	52.6	74.3	83.1								
				EMC	6.1	7.1	11.3	12.0	14.5	17.1	21.7								
		60	Des	ERH	11.4	19.1	31.4	43.5	73.0	82.7									
				EMC	4.9	5.6	9.0	10.1	15.7	17.5									
		80	Des	ERH	11.5	18.4	29.6	43.4	72.5	81.8									
				EMC	4.1	4.6	7.2	8.4	14.7	15.3									
b. Popcorn		20	Des	ERH	18.9	41.1	59.9	73.5	84.3	90.0	91.3	30(a)	20						
				EMC	7.2	10.7	14.1	17.9	22.2	26.6	31.0								
		30	Des	ERH	23.8	45.7	63.3	76.9	85.4	90.5	92.0								
				EMC	7.1	10.7	13.9	17.7	21.7	26.1	30.9								
		40	Des	ERH	28.7	51.0	66.8	79.0	86.5	90.3	92.5								
				EMC	7.2	10.7	13.7	17.6	21.3	25.7	30.8								
		50	Des	ERH	33.3	55.3	70.3	81.9	87.5	90.8	92.5								
				EMC	7.4	10.6	13.5	17.1	20.9	25.5	30.2								
c. Cracked corn		25	Des	ERH	15.2	25.4	41.7	51.6	62.9	78.4	89.5	11(b)	80						
				EMC	7.4	8.4	11.5	12.3	13.6	16.8	22.6								
		45	Des	ERH	13.8	23.1	39.2	46.8	67.1	78.5	89.5								
				EMC	5.2	7.6	8.9	10.3	12.8	15.2	20.7								
		65	Des	ERH	14.8	23.0	37.4	51.7	67.2	77.5	91.0								
				EMC	4.1	5.8	7.9	9.7	11.9	13.9	20.0								
d. Dehulled corn	Dekalb 3F21 (kernel)	50	Des	ERH	10.7	29.5	50.9	69.9			82(b)	—							
				EMC	3.3	6.1	8.5	11.8											
		60	Des	ERH	10.4	28.1	47.5	63.9											
				EMC	2.9	5.0	8.0	11.6											

Table 1a – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for starchy materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference			
e. Ear corn		20	Des	ERH	12.5	23.9	34.2	44.2	58.7	85.5						56(b)	—	
				EMC	7.1	8.6	12.0	12.7	15.4	24.2								
		40	Des	ERH	12.1	20.5	32.7	43.7	52.7	74.1	84.3							
				EMC	5.9	6.8	11.1	11.6	14.0	15.3	21.3							
		60	Des	ERH	11.8	18.4	31.8	43.4	83.6									
				EMC	4.9	5.3	8.7	9.7	17.2									
		80	Des	ERH	11.8	17.1	30.1	43.0	83.1									
				EMC	4.1	4.6	7.1	8.4	14.9									
		f. Hybrid 647		→	(ERH)	10	20	30	40	50	60	70	80	90	107(b)			
						15	5	6	10	11	12	14	16	20				25
25	5			6	10	10	11	13	14	17	23							
35	4			5	9	9	10	12	13	14	20							
45	3.5			5.2	6	9	11	11	13	15	19							
55	3.5			5.1	5	7	8	9	10	13	17							
g. Hybrid 704				5	Ads	EMC	7	8	10	12	13	15	17	21		27	107(b)	
		15	6			7	9	10	11	14	16	19	26					
		25	5.5	6	8	9	10	13	14	17	25							
		35	5.5	6	7	8	9	12	12	14	22							
		45	5	6	6	7	8	11.5	12	13.5	20							
		55	4.9	5	5.5	6	7	9.5	11	13	18							
		h. Kernels		→	(ERH)	4	20	40	60	80	96							102(b)
25	2.4					7	10	14.2	19	30								
50	2			6.5	9.5	13.2	18	28										
25	2.5			8	11.5	16.2	20.5	30										
50	2.4			6.8	10	13.8	18	29										
4. Millet	cv. BX-Borno			20	Ads	ERH	10.1	19.8	29.5	39.2	48.9	58.8	68.7	78.1	87.3	3(b)	—	
		EMC	8.8			10.8	12.4	14.0	15.6	17.3	19.3	22.1	26.5					
		20	Des	ERH	9.5	19.7	29.4	39.3	49.1	58.8	68.6	78.5	88.1	96.0				
				EMC	9.6	11.9	14.0	15.9	17.9	20.4	23.0	25.3	27.5	36.6				
		25	Ads	ERH	10.1	19.8	29.6	39.0	48.6	58.8	68.6	78.1	87.2	95.5				
				EMC	8.3	10.3	11.9	13.5	15.1	16.9	18.8	21.6	26.1	36.3				
		25	Des	ERH	9.4	19.6	29.4	39.1	48.9	58.6	68.4	78.4	88.0	95.9				
				EMC	9.1	11.5	13.6	15.5	17.5	19.9	22.6	25.1	27.1	36.1				
		40	Ads	ERH	10.1	20.3	29.3	39.4	49.0	58.9	69.1	77.8	87.7	95.8				
				EMC	6.9	9.1	10.9	12.3	14.1	15.8	18.1	20.6	24.9	35.4				
		40	Des	ERH	9.9	20.0	29.5	39.2	49.2	58.8	68.6	78.8	88.4	96.2				
				EMC	8.0	10.6	12.9	14.8	16.9	19.2	22.0	24.2	26.6	35.4				
		5. Oats	Dumont	10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0	49(a)			20,29,75
						EMC	7.7	8.7	9.1	12.3	13.5	15.8	18.7	23.1				
				25	Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0				
						EMC	5.3	6.6	7.4	10.5	13.8	13.8	17.7	23.4				
40	Mix			ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0						
				EMC	4.8	5.9	7.2	8.0	13.0	14.2	15.9	19.7						
55	Mix			ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0						
				EMC	2.9	4.6	6.8	8.4	11.0	12.3	13.4	15.3						
Newman	10			Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0					
			EMC		7.3	7.7	9.5	12.1	14.0	16.0	19.0	23.7						
	25		Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0						
				EMC	5.7	6.3	7.1	10.6	13.7	14.9	18.1	23.9						
	40		Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0						
				EMC	4.7	5.8	7.0	8.3	13.1	14.3	16.1	20.6						
	55		Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0						
				EMC	2.4	4.5	6.7	8.2	10.7	11.9	13.1	15.4						
	Tibor		10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0					
EMC					7.9	8.3	10.2	13.4	13.4	16.2	19.4	24.3						

Table 1a – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for starchy materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference
		25	Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0			
				EMC	6.0	6.9	7.5	10.8	14.3	13.4	17.8	23.9			
		40	Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0			
				EMC	5.1	6.1	7.2	8.6	13.6	14.7	16.3	21.5			
		55	Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0			
				EMC	2.9	4.8	7.1	8.9	11.5	12.5	13.9	15.5			
6. Rice															
a. Rough rice	a1. cv. Inga (long grain)	10	Ads	ERH	14.3	33.3	39.3	56.9	69.4	78.8	91.0	94.6	71(a)2	20,15,5,41,52,50	
				EMC	7.5	10.2	11.1	14.3	17.4	19.5	25.7	26.5			
		20	Ads	ERH	12.0	41.2	55.0	61.4	82.5	90.5	95.8				
				EMC	7.2	10.9	13.0	14.3	19.0	21.6	24.6				
		25	Ads	ERH	16.1	42.2	55.0	60.8	81.4	89.7	95.3				
				EMC	7.4	10.9	12.9	14.3	18.3	22.9	24.7				
		30	Ads	ERH	29.1	40.4	54.6	60.6	72.7	76.5	89.4				
				EMC	8.3	10.1	12.2	13.3	16.7	17.4	21.5				
		38	Ads	ERH	29.1	40.4	53.9	60.0	74.1	78.3	90.2				
				EMC	8.4	10.0	12.0	13.0	16.8	17.5	21.3				
		20	Des	ERH	19.3	23.8	29.8	51.1	67.7	80.6	90.3	96.9			
				EMC	8.6	9.1	10.2	13.8	16.3	19.1	23.8	28.0			
		25	Des	ERH	20.5	25.9	32.7	55.8	67.4	79.9	88.9	96.7			
				EMC	8.3	9.0	10.0	13.6	15.9	18.9	22.5	27.7			
		30	Des	ERH	22.5	25.1	26.2	30.8	36.6	53.3	72.1	86.6			
				EMC	7.3	8.1	8.3	9.2	9.9	12.2	16.7	20.7			
		38	Des	ERH	26.2	29.2	32.1	36.7	52.4	70.2	87.8				
				EMC	7.8	8.4	8.9	9.9	12.4	16.7	21.4				
	a2. Variety CSM5 (medium grain)	10	Des	ERH	11.2	34.2	40.0	57.8	75.2	81.7			95(a)	Same as above	
				EMC	8.0	12.0	12.8	16.3	19.6	21.3					
		20	Des	ERH	11.2	23.2	33.6	43.9	54.9	65.3	75.5	86.6			
				EMC	6.9	9.1	11.2	12.7	14.6	16.6	18.3	22.1			
		25	Des	ERH	11.2	22.7	32.5	43.7	53.4	64.3	75.8	86.5			
				EMC	6.2	8.6	10.4	11.9	13.7	15.3	18.1	20.9			
		30	Des	ERH	11.2	22.0	32.8	43.6	52.0	63.3	75.6	86.3			
				EMC	5.6	8.3	10.0	11.4	12.9	14.7	17.0	20.2			
		40	Des	ERH	11.2	32.1	43.3	49.2	57.2	75.4	87.9				
				EMC	4.7	8.8	10.2	11.3	12.1	15.6	18.9				
	a3. Nipponbare (short grain)	20	Des	ERH	11.2	22.4	32.8	42.7	54.7	65.5	74.7	85.0	50(b)	Same as above	
				EMC	6.1	8.8	10.7	12.4	14.0	16.1	18.8	21.0			
		30	Des	ERH	21.6	32.1	42.5	50.7	62.8	75.4	83.4				
				EMC	7.8	9.6	11.5	12.7	14.7	16.9	18.9				
		40	Des	ERH	10.7	20.1	30.6	42.7	47.7	59.5	74.8	82.1			
				EMC	5.0	7.0	8.7	10.5	11.4	13.2	15.7	17.6			
	a4		→	(ERH)	0.07	0.2	0.4	0.6	0.8	0.95			102(b)		
		25	Ads	EMC	3.75	7	10	13.5	18.5	29.5					
		50	Ads	EMC	2	5.5	8	12	16	26					
		25	Des	EMC	4	7.5	10.5	14	19.5	29.5					
		50	Des	EMC	2	6	8.5	12.5	16.5	28					
b. Brown rice	b1. Nipponbare (short grain)	20	Des	ERH	11.6	23.7	34.0	44.5	56.9	68.3	77.6	87.8	50(b)	43,44	
				EMC	6.4	9.2	11.1	13.2	15.2	17.2	19.5	22.0			
			→	(ERH)	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0		
	b2. Caloro	25	Mix	EMC	6.2	8.0	9.5	10.9	12.3	13.5	14.8	16.2	19.1	44(a)	43,50
	b3. Raw Brown Rice	13	Mix	ERH	0.232	0.336	0.439	0.535	0.653	0.755	0.837		110(a)		
				EMC	8.49	10.63	11.68	13.22	15.27	16.72	18.53				
		30	Mix	ERH	0.22	0.328	0.436	0.514	0.633	0.756	0.8				
				EMC	8.021	10.42	11.32	12.59	14.63	16.61	17.23				
		40	Mix	ERH	0.204	0.321	0.434	0.49	0.618	0.754	0.796				
				EMC	7.63	10.15	11	12.05	13.83	15.81	16.47				

Table 1a – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for starchy materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference									
b4. Parboiled Brown rice		13	Mix	ERH	0.232	0.336	0.439	0.535	0.653	0.755	0.837						110(a)							
				EMC	7.88	9.51	10.93	11.66	13.36	15.47	17.13													
		30	Mix	ERH	0.22	0.328	0.436	0.514	0.633	0.756	0.8													
				EMC	7.28	9.26	10.3	11.11	12.35	14.66	15.57													
		40	Mix	ERH	0.204	0.321	0.434	0.49	0.618	0.754	0.796													
				EMC	6.3	9.03	10	10.66	11.99	14.14	15.13													
		b5.		25	Des	(ERH)	5	20	40	60	80	90							102(b)					
						EMC	1.5	5	8	12.5	17	23												
		c. Parboiled rice	Variety Rexoro	25	Mix	EMC	5.9	8.0	9.5	10.9	12.2	13.3	14.1	15.2	19.1						44(a)	—		
						EMC	4.9	7.0	8.4	9.8	11.1	12.3	13.3	14.8	19.1									
d. Instant rice	Long-grain	25	Mix	EMC	5.5	7.4	8.9	9.7	10.5	11.5	13.1	15.4	20.1						44(a)	—				
				EMC	3.7	5.5	7.0	8.2	9.2	10.3	11.7	13.8												
e. Milled rice	Variety Rexoro	25	Mix	EMC	5.2	7.6	9.2	10.5	12.0	13.4	14.8	16.4	18.8						44(a)	9,52				
f. Raw Paddy		13	Mix	ERH	0.232	0.336	0.439	0.535	0.653	0.755	0.837						110(a)							
				EMC	6.95	8.69	10.14	10.93	12.87	14.94	16.14													
		30	Mix	ERH	0.22	0.328	0.436	0.514	0.633	0.756	0.8													
				EMC	6.59	8.28	9.62	10.34	12.24	14.52	15.33													
		40	Mix	ERH	0.204	0.321	0.434	0.49	0.618	0.754	0.796													
				EMC	6.3	7.89	9.23	9.9	11.68	13.94	15.18													
		g. Parboiled Paddy		13	Mix	ERH	0.232	0.336	0.439	0.535	0.653	0.755	0.837						110(a)					
						EMC	6.84	8.38	9.23	9.73	11.38	13.72	15.32											
				30	Mix	ERH	0.22	0.328	0.436	0.514	0.633	0.756	0.8											
						EMC	6.28	8.13	8.93	9.35	11.03	12.92	14.21											
		40	Mix	ERH	0.204	0.321	0.434	0.49	0.618	0.754	0.796													
				EMC	5.94	7.95	8.57	9.03	10.43	12.76	13.86													
7. Rye		25–28	Mix	ERH	15.0	30.0	45.0	60.0	75.0	90.0						20(a)	—							
8. Sorghum	Kalir	4	Mix	EMC	7.5	9.6	11.7	13.9	17.4	25.9														
				(ERH)	4.3	9.7	12.7	19.0	22.3	26.1	33.6	41.1	51.4	61.1	70.8	80.3	86.7	29(b)	—					
				EMC	5.7	7.3	8.0	9.2	9.7	10.2	11.3	12.3	13.9	15.7	17.8	20.9	23.9							
				EMC	4.5	6.4	7.1	8.4	9.0	9.5	10.5	11.5	12.9	14.6	18.4	19.1	21.6							
		32	Mix	EMC	3.4	5.3	6.1	7.5	8.0	8.6	9.6	10.6	12.0	13.5	15.2	17.3	19.0							
9. Wheat				(EMC)	9.9	11.1	13.6	16.3	19.0	22.0	25.0	28.2	31.6											
a. Durum (Canadian)	Wakooma	5	Ads	ERH	31.0	37.0	50.0	64.0	74.0	82.3	88.5	92.5	94.0						65(a)	20,25,28,67,86,88,93				
				ERH	34.0	40.0	53.5	66.7	76.5	83.5	89.0	92.5	94.0											
				ERH	36.0	42.5	57.0	69.5	78.0	84.5	89.5	92.5	94.0											
				Des	26.7	33.0	47.0	61.5	72.5	81.5	88.5	92.5	94.0											
				Des	29.5	36.0	50.0	64.0	74.5	83.5	89.0	92.5	94.0											
b. Hard red spring	Sinton (Canadian)	5	Ads	ERH	31.0	37.0	50.0	64.0	74.0	82.3	88.5	92.5	94.0						65(a)	Same as above				
				ERH	34.0	40.0	53.5	66.7	76.5	83.5	89.0	92.5	94.0											
				ERH	36.0	42.5	57.0	69.5	78.0	84.5	89.5	92.5	94.0											
				Des	26.7	33.0	47.0	61.5	72.5	81.5	88.5	92.5	94.0											
				Des	29.5	36.0	50.0	64.0	74.5	83.5	89.0	92.5	94.0											
c. Hard red winter	Maris Huntsman (English)	25	Ads	ERH	25.6	47.3	67.0	82.4	87.3	92.8						38(b)	Same as above							
				EMC	8.2	11.3	14.4	18.4	20.3	24.5														
				ERH	32.2	52.1	65.3	86.6	92.7															
				EMC	9.6	12.5	14.7	20.5	25.5															
				ERH	23.5	42.8	63.3	82.5	93.3															
d. Soft winter	Hobbit (English)	25	Ads	ERH	23.5	42.8	63.3	82.5	93.3						38(b)	Same as above								
				EMC	8.7	11.6	14.3	19.1	25.1															
				ERH	22.2	38.6	58.5	84.8	92.0															
				EMC	8.8	11.6	14.1	20.0	24.3															
				ERH	15.0	30.0	45.0	60.0	75.0	90.0														
e. White		25–28	Mix	ERH	15.0	30.0	45.0	60.0	75.0	90.0						20(a)	Same as above							
				EMC	7.3	9.4	11.0	13.3	17.6	24.5														

¹⁾Ads—Adsorption; 'Des'—Desorption; 'Mix'—Mixture of adsorption and desorption

²⁾(ERH) or (EMC) Indicates the same ERH or EMC corresponding to the multi-EMC or multi-ERH rows to follow for one single product '→' indicates the ERH or EMC pointed corresponds to both multiple EMC or ERH rows next and multiple products below

³⁾(a)—original data from reference; (b)—digitized values from figures in a reference

Table 1b – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for fibrous materials and selected feedstuffs

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾												Source ³⁾	Reference			
1. Pellets																				
a. Alfalfa pellet	a1. 1/4 in. dehy	10	Mix	ERH	14.5	29.3	33.2	46.7	56.2	65.2	71.3	83.2	90.0	96.1	28(b)	—				
				EMC	5.8	7.8	8.9	10.1	12.0	16.0	18.2	21.5	22.6	23.4						
		20	Mix	ERH	13.0	16.1	31.0	46.2	57.2	64.1	76.2	80.0	88.9	95.2						
				EMC	5.7	6.0	7.2	9.0	10.6	11.9	16.7	18.9	21.8	22.8						
		30	Mix	ERH	12.5	12.7	27.2	34.2	47.2	58.2	67.5	77.1	85.0	92.1						
				EMC	5.7	5.7	6.4	7.0	8.8	10.8	11.4	15.9	18.1	20.0						
		40	Mix	ERH	12.9	26.2	33.7	47.2	52.1	62.7	70.2	78.2	87.3	96.7						
				EMC	4.8	5.4	6.4	8.0	8.4	9.2	10.8	14.5	18.1	20.5						
		a2. 5/16 in. suncure	10	Mix	ERH	5.6	10.2	25.2	36.6	43.2	52.5	65.2	72.2	85.2			95.1			
	EMC				5.5	6.1	7.5	8.9	9.5	11.2	13.6	16.4	20.6	22.4						
	20		Mix	ERH	10.3	16.3	21.1	35.3	46.2	59.3	67.2	78.9	85.2	92.3						
				EMC	5.5	6.1	6.4	7.8	9.9	12.2	14.3	18.5	20.2	21.3						
	30		Mix	ERH	7.5	22.4	25.2	35.2	40.4	50.3	62.7	75.8	83.8	94.3						
				EMC	4.7	5.6	5.8	7.6	8.1	10.8	11.6	15.9	19.5	17.9						
	40		Mix	ERH	7.2	23.6	32.5	36.2	44.9	60.7	71.6	78.7	89.0	93.3						
				EMC	4.4	5.1	6.1	7.1	4.7	10.6	12.4	14.4	20.0	20.8						
	b. Laying mash pellet		25	Ads	ERH	14.1	24.0	39.8	50.9	63.3	77.5	86.9	11(b)	—						
		EMC			6.1	7.3	9.4	10.7	13.3	18.4	28.9									
45		Ads	ERH	12.7	20.9	36.8	45.7	67.9	77.9	87.3										
			EMC	4.4	6.1	7.6	8.7	12.6	16.7	27.5										
65		Ads	ERH	13.9	21.2	34.9	51.7	68.1	77.3	88.3										
			EMC	3.9	4.9	6.6	8.5	11.6	15.1	27.3										
2. Grass & hay																				
a. Alfalfa hay		a1. Fresh, undried	22	Mix	EMC	7.4	9.8	10.6	12.8	15.7	18.6 +	36.8 +			23(a)	23,76,94				
					ERH	10.0	20.0	30.0	40.0	50.0	60.0	70.0			80.0					
			22	Mix	EMC	6.4	9.4	13.3	19.0 +	23.5 +	23(a)									
					ERH	10.0	20.0	30.0	40.0	50.0	60.0	70.0			80.0					
			22	Mix	EMC	4.3	–	6.5	9.4	11.5	12.5	14.0			15.8		18.4	21.7 +	24.6 +	23(a)
	ERH	10.0			20.0	30.0	40.0	50.0	60.0	70.0	80.0									
	a2. Fresh, barn-dried	22	Mix	EMC	5.4	–	7.5	10.4	12.7	13.8	15.6	17.5	20.9	24.9 +	29.6 +		23(a)			
				ERH	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0								
		25	Mix	EMC	4.0	6.0	7.0	8.0	10.0	12.5	16.5	19.0	94(a)							
				ERH	6.0	6.5	7.5	8.5	9.5	11.0	12.0	14.5								
27		Mix	EMC	6.0	7.5	8.2	9.2	10.5	12.5	15.5	20.0	94(a)								
	ERH		6.0	7.5	8.2	9.2	10.5	12.5	15.5	20.0										
29	Mix	EMC	6.3	7.3	8.0	9.0	10.2	12.5	15.5	20.5	94(a)									
		ERH	6.3	7.3	8.0	9.0	10.2	12.5	15.5	20.5										
3. Straw																				
a. Oat straw (threshed)	Finely divided	29	Mix	EMC	5.0	6.0	7.2	8.2	9.3	11.0	13.0	17.0	94(a)	—						
				ERH	6.0	6.5	7.5	8.5	9.5	11.0	12.0	14.5								
b. Wheat straw	Whole material	5	Ads	ERH	38.0	57.0	72.0	92.0	26(a)	—										
				EMC	9.4	13.3	17.8	42.2												
		15	Ads	ERH	37.0	56.0	70.0	90.0												
				EMC	9.3	12.5	17.1	39.7												
		25	Ads	ERH	37.0	56.0	70.0	90.0												
				EMC	8.8	12.0	15.7	36.6												
		35	Ads	ERH	34.0	53.0	68.0	83.0												
				EMC	7.9	10.3	12.9	25.0												
		4. Cotton																		
		Lint	Lint	7.5	Ads	ERH	5.4	16.3			30.6	43.4	51.3	58.8	66.2	76.7	82.6	89.4	6(b)	31,32,83–85
EMC	1.2					3.3	5.5	6.5	7.5	8.3	9.5	11.2	12.8	15.7						
26	Ads			ERH	7.6	15.0	22.6	32.8	42.7	49.1	62.8	76.0	82.7	90.1						
				EMC	1.1	2.5	4.5	4.9	6.1	6.5	8.0	9.8	11.4	13.4						
36	Ads			ERH	6.9	18.7	26.5	39.7	46.9	56.6	67.2	77.7	88.3	97.9						
				EMC	1.3	3.4	3.7	5.1	5.7	6.4	8.1	10.1	12.6	17.7						
Des	ERH			15.5	23.8	39.3	55.3	56.7	69.7	88.0										
				EMC	2.9	3.8	4.6	7.2	6.5	9.4	14.0									
50	Ads			ERH	6.1	15.2	26.4	33.8	47.5	60.2	68.1	81.2	90.3	98.3						
				EMC	1.4	2.4	3.5	3.8	5.0	6.5	7.6	9.9	12.8	21.2						
Des	ERH			6.2	13.1	20.3	26.7	36.6	47.8	50.2	68.1	79.2	89.4							
				EMC	1.6	2.3	3.0	3.5	4.8	6.3	6.4	9.0	11.1	16.7						

Table 1b – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for fibrous materials and selected feedstuffs (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (% ²⁾)								Source ³⁾	Reference				
5. Corn cobs	a. Reduced	10	Ads	ERH	29.0	37.7	63.6	73.5	84.9	88.8	90(a)	56					
				EMC	6.7	9.5	13.4	17.5	25.2	29.4							
		10	Des	ERH	29.5	63.5	79.1	89.3	91.2								
				EMC	8.0	14.9	21.7	30.4	37.6								
		30	Ads	ERH	32.4	52.6	69.3	78.3	88.7	91.6							
				EMC	6.4	9.5	13.1	17.1	24.8	29.5							
		30	Des	ERH	38.9	69.6	83.2	90.6	93.7								
				EMC	8.0	14.9	21.2	29.7	38.1								
		50	Ads	ERH	38.1	57.5	72.6	83.1	90.1	92.0							
				EMC	6.2	9.1	12.6	16.4	22.7	28.5							
	50	Des	ERH	40.9	77.5	86.1	92.7	94.7									
			EMC	7.0	14.0	19.2	30.7	35.9									
	b. Whole cobs	20	Des	ERH	13.3	23.5	34.9	44.6	58.9	74.3	84.9	56(b)	90				
				EMC	4.7	6.8	9.3	10.3	13.4	17.3	23.3						
		40	Des	ERH	12.6	20.6	33.4	53.2	74.3	84.0							
				EMC	4.0	5.5	7.2	9.8	13.8	18.6							
		60	Des	ERH	12.1	18.8	32.3	44.2	73.6	83.7							
				EMC	3.4	4.5	6.3	7.7	10.2	13.9							
		80	Des	ERH	12.3	17.7	30.0	73.2	83.1								
				EMC	2.7	3.7	4.8	8.3	10.3								
c. Corn cobs				→	(ERH)	0.05	0.2	0.4	0.6	0.8	0.9			102(b)			
		25	Ads	EMC	1.5	4	7	11	16	22							
	50			Ads	EMC	1.5	2.5	5	9	15	21						
	25	Des	EMC	1.5	5	8	12.5	17	23								
			50	Des	EMC	1.5	3	5.1	9.5			15.5	21				
	6. Bran																
a. Rice bran	a1. Burmese (unextracted)		→	(EMC)	9.9	12.4	13.6	16.3	19.0	22.0	68(a)	18					
		15	Ads	ERH	45.0	62.5	70.0	80.0	85.0	89.5							
				15	Des	ERH	34.5	51.0	59.0	73.5			85.0	89.5			
		25	Ads	ERH	48.5	66.0	73.0	81.0	86.0	90.0							
				25	Des	ERH	37.5	54.5	62.0	76.0					86.0	90.0	
		35	Ads	ERH	50.5	67.0	74.0	82.0	87.0	90.5							
				35	Des	ERH	40.5	58.0	65.0	78.0					87.0	90.5	
				→	(ERH)	11.0	22.0	33.0	44.0	52.0			65.0	75.0	85.0	98.0	
		23	Mix	EMC	3.9	5.4	7.0	8.3	8.8	11.5			14.7	19.2	104.9	18(a)	68
				a3. Raw Bran	13	ERH	0.232	0.336	0.439	0.535			0.653	0.755	0.837		
			EMC			5.83	7.35	8.96	9.68	11.88	13.63	15.24					
	30			ERH	0.22	0.328	0.436	0.514	0.633	0.756	0.8						
						EMC	5.57	6.82	8.45	9.36	10.56	13.21	14.36				
	40			ERH	0.204	0.321	0.434	0.49	0.618	0.754	0.796						
						EMC	5.27	6.72	8.23	9	9.98			12.69	14.05		
	a4. Parboiled Bran	13			ERH	0.232	0.336	0.439	0.535	0.653	0.755	0.837	110(a)				
							EMC	5.93	7.65	9.32	10.35	11.92			13.86	15.44	
		30			ERH	0.22	0.328	0.436	0.514	0.633	0.756	0.8					
							EMC	5.65	7.35	9.13	9.76	11.26			13.52	14.39	
		40			ERH	0.204	0.321	0.434	0.49	0.618	0.754	0.796					
						EMC	5.37	7.03	8.94	9.44	10.6	12.96			14.21		
b. Corn bran	Flour	23	Mix	EMC	3.5	5.8	7.3	8.5	9.3	12.5	14.7	19.8	48.9	18(a)	–		
c. Oat bran	Flour	23	Mix	EMC	3.7	5.2	6.6	8.1	8.6	11.1	12.8	16.2	40.6	18(a)	–		
d. Wheat bran	Flour	23	Mix	EMC	3.4	5.4	7.3	8.8	9.7	12.7	14.3	21.2	110.3	18(a)	–		
e. Soy bran	Flour	23	Mix	EMC	3.5	5.2	6.8	7.5	8.8	11.0	13.7	18.7	56.0	18(a)	–		
f. Semi Defatted Pumpkin Seed	Flour	10	Ads	ERH	0.11	0.24	0.34	0.43	0.63	0.76	0.87	112(b)					
						EMC	6.5	7.5	9.1	9.5	10			13.5	18.5		
		25	Ads	ERH	0.11	0.24	0.34	0.43	0.58	0.75	0.85						
						EMC	5.9	6.8	8	8.5	9.2			13	15		

Table 1b – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for fibrous materials and selected feedstuffs (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference						
				ERH	0.11	0.2	0.32	0.43	0.54	0.76	0.82	EMC	4			4.9	5.8	6.7	9.2	13	15
		40	Ads	ERH	0.11	0.2	0.32	0.43	0.54	0.76	0.82										
				EMC	4	4.9	5.8	6.7	9.2	13	15										
		10	Des	ERH	0.1	0.23	0.33	0.42	0.61	0.78	0.88										
				EMC	6.5	7.5	9.5	10.2	12	13.5	19.5										
		25	Des	ERH	0.1	0.22	0.32	0.42	0.58	0.76	0.82										
				EMC	5.8	7	8.2	9.1	10.5	14	15.5										
		40	Des	ERH	0.1	0.2	0.31	0.42	0.53	0.74	0.81										
				EMC	4.1	6	6.2	8.5	9.7	12.5	15.3										
<hr/>																					
7. Hull & shell																					
a.	Cottonseed hull	25	Mix	ERH	31.0	43.0	62.0	71.2	81.1	93.0									51(a)	—	
				EMC	8.3	10.6	13.4	14.4	18.1	28.8											
b.	Sunflower hull	10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0							59(a)	—	
				EMC	5.4	7.2	8.7	10.9	12.6	15.1	21.4	35.0									
		25	Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0									
				EMC	3.9	6.0	7.0	9.1	12.2	13.4	18.4	16.2									
		40	Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0									
				EMC	3.5	5.0	6.2	8.3	11.4	12.0	15.7	20.8									
		55	Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0									
				EMC	1.9	2.8	3.4	4.5	6.9	8.4	10.1	13.3									
c.	Pumpkin seed hull		→	(ERH)	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0							4(a)	—	
		10	Ads	EMC	7.4	8.5	10.2	10.5	12.2	13.1	15.0	18.0									
		20	Ads	EMC	5.4	7.5	9.3	8.8	11.5	11.9	13.5	14.0									
		30	Ads	EMC	5.0	6.3	8.2	8.5	9.2	12.7	11.9	15.3									
		40	Ads	EMC	4.5	5.9	7.4	8.0	9.0	11.0	11.7	13.0									
		50	Ads	EMC	4.3	5.2	6.0	8.2	8.9	9.7	9.8	11.9									
		60	Ads	EMC	2.4	4.1	7.6	6.1	7.3	8.8	12.3	11.8									
		10	Des	EMC	6.4	7.9	10.6	12.3	13.8	15.1	18.2	22.0									
		20	Des	EMC	5.8	7.7	9.0	11.1	13.6	14.9	17.6	20.0									
		30	Des	EMC	4.0	5.9	8.0	9.5	11.5	12.0	14.8	17.2									
		40	Des	EMC	3.5	5.5	6.1	8.7	9.5	11.4	13.3										
		50	Des	EMC	3.6	5.1	7.9	7.6	9.4	10.2	12.3	13.4									
		60	Des	EMC	3.4	4.3	6.0	7.3	8.8	9.4	12.0	12.1									
d.	Peanut hull		→	(ERH)	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0							(c)	7,74,92,8,53	
		10	Des	EMC	7.9	10.0	12.0	14.0	16.1	18.8	22.0	26.9									
		21	Des	EMC	6.6	8.6	10.4	12.4	14.4	17.0	20.2	25.2									
		32	Des	EMC	5.9	7.6	9.4	11.4	13.4	15.7	18.9	23.9									
e.	Pistachio nut hull	20	Ads	ERH	43.6	53.2	75.6	80.8	81.1	84.1	85.2	88.1	89.3	91.3	90.3	93.2			10(b)	—	
				EMC	6.3	7.9	17.5	21.9	24.4	26.4	32.7	32.6	37.3	39.8	43.6	49.7	(fat-free)				
		20	Des	ERH	54.8	60.6	70.0	75.1	78.7	81.9	85.3	87.2	88.5	90.5	91.9	92.1					
				EMC	17.2	19.2	23.1	27.2	32.3	36.8	40.8	45.9	49.9	52.8	57.3	59.2	(fat-free)				
f.	Pistachio nut shell	20	Ads	ERH	41.8	69.0	76.9	80.3	86.0	90.0	91.2	94.0							10(b)	—	
				EMC	6.2	10.0	11.5	13.4	15.4	18.4	21.8	24.3	(fat-free)								
		20	Des	ERH	30.6	46.7	54.1	63.7	66.8	73.1	77.0	85.2	88.1	91.4	92.9	93.9					
				EMC	6.5	9.0	10.7	11.7	13.4	14.8	16.1	18.9	20.3	23.0	24.7	26.7	(fat-free)				
g.	Corn hull	50	Des	ERH	10.6	29.5	50.8	69.7	80.0										82(b)	19	
				EMC	4.2	7.2	9.6	12.7	15.7												
		60	Des	ERH	10.3	28.1	47.6	63.5	70.6	76.5											
				EMC	3.4	6.0	9.5	12.5	14.4	15.5											
h.	Rice hull	20	Des	ERH	11.1	23.0	33.4	43.9	55.9	67.3	75.7	85.9							50(b)	—	
				EMC	4.4	6.7	8.3	10.0	11.5	13.7	16.1	17.9									

Table 1b – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for fibrous materials and selected feedstuffs (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference					
8. DDGS																				
a. 10% Solubles	10	Ads	ERH	0.622	0.72	0.821	0.906											114(a)		
			EMC	18.74	21.15	27.85	38.01													
	20	Ads	ERH	0.591	0.7	0.792	0.91													
			EMC	9.56	16.05	21.96	29.96													
	30	Ads	ERH	0.56	0.691	0.803	0.89													
			EMC	8.61	18.42	23.16	35.61													
	40	Ads	ERH	0.57	0.68	0.794	0.89													
			EMC	9.85	23.61	29.34	47.07													
b. 15% Solubles	10	Ads	ERH	0.622	0.72	0.821	0.906											114(a)		
			EMC	14.15	18.74	25.98	43.41													
	20	Ads	ERH	0.591	0.7	0.792	0.91													
			EMC	21.21	18.11	40.74	42.94													
	30	Ads	ERH	0.56	0.691	0.803	0.89													
			EMC	23.02	28.74	32.2	46.47													
	40	Ads	ERH	0.57	0.68	0.794	0.89													
			EMC	11.58	30.21	32.93	83.49													
c. 20% Solubles	10	Ads	ERH	0.622	0.72	0.821	0.906											114(a)		
			EMC	17.87	23.41	32.16	56.84													
	20	Ads	ERH	0.591	0.7	0.792	0.91													
			EMC	17.72	32.07	51.22	55													
	30	Ads	ERH	0.56	0.691	0.803	0.89													
			EMC	14.42	28.39	32.61	56.73													
	40	Ads	ERH	0.57	0.68	0.794	0.89													
			EMC	13.72	34.08	37.58	90.7													
d. 25% Solubles	10	Ads	ERH	0.622	0.72	0.821	0.906											114(a)		
			EMC	18.07	24.71	57.66	66.17													
	20	Ads	ERH	0.591	0.7	0.792	0.91													
			EMC	30.15	42.2	55.05	61.54													
	30	Ads	ERH	0.56	0.691	0.803	0.89													
			EMC	15.03	28.39	33.62	58.64													
	40	Ads	ERH	0.57	0.68	0.794	0.89													
			EMC	15.98	35.49	43.08	132.01													
9. Corn Leaf																				
	10	Ads	ERH	0.113	0.234	0.335	0.431	0.574	0.721	0.757	0.868	0.982						100(a)		
			EMC	7.15	8.11	9.15	10.76	12.66	16.52	18.46	24.49	56.4								
	20	Ads	ERH	0.113	0.231	0.331	0.432	0.544	0.699	0.755	0.851	0.946	0.976							
			EMC	6.55	7.28	8.32	9.6	11.24	14.3	15.57	19.97	32.71	43.6							
	25	Ads	ERH	0.113	0.225	0.328	0.432	0.529	0.689	0.753	0.843	0.936	0.973							
			EMC	6.03	6.66	7.54	8.79	10.61	13.15	14.99	18.81	28.14	38.32							
	30	Ads	ERH	0.113	0.216	0.324	0.432	0.514	0.679	0.751	0.836	0.923	0.97							
			EMC	5.15	6	6.35	8	9.45	11.51	13.19	17.23	25.04	36.12							
	35	Ads	ERH	0.113	0.204	0.321	0.431	0.499	0.67	0.749	0.83	0.908	0.967							
			EMC	4.56	5.02	5.73	7.25	8.04	10.95	12.74	16.54	22.66	32.63							
	40	Ads	ERH	0.112	0.189	0.316	0.431	0.484	0.661	0.747	0.823	0.89	0.94							
			EMC	3.9	4.1	5.4	6.67	7.3	10.3	12	14.7	19.9	30.94							
	10. Corn Stalk Skin																			
		10	Ads	ERH	0.113	0.234	0.335	0.431	0.574	0.721	0.757	0.868	0.982							100(a)
				EMC	4.53	6.26	8	9.17	12.06	15.24	15.94	21	41.1							
		20	Ads	ERH	0.113	0.231	0.331	0.432	0.544	0.699	0.755	0.851	0.946	0.976						
EMC				3.92	5.65	7.06	9	10.88	14.36	15.39	18.45	29.32	38.35							
25		Ads	ERH	0.113	0.225	0.328	0.432	0.529	0.689	0.753	0.843	0.936	0.973							
			EMC	3.96	5.04	6.57	8.44	10.41	13.51	15.13	18.63	26.95	35.81							
30		Ads	ERH	0.113	0.216	0.324	0.432	0.514	0.679	0.751	0.836	0.923	0.97							
			EMC	3.27	3.94	5.95	7.45	9.3	12.22	14.2	16.88	21.75	34.29							
35		Ads	ERH	0.113	0.204	0.321	0.431	0.499	0.67	0.749	0.83	0.908	0.967							
			EMC	3.39	4.16	5.42	6.85	8.22	11.39	13.48	15.95	20.72	30.3							

Table 1b – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for fibrous materials and selected feedstuffs (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾											Source ³⁾	Reference
				ERH	EMC	ERH	EMC	ERH	EMC	ERH	EMC	ERH	EMC	ERH		
		40	Ads	ERH	0.112	0.189	0.316	0.431	0.484	0.661	0.747	0.823	0.89	0.94		
				EMC	3.14	3.4	4.8	6.59	7.52	11.29	13	15.29	18.2	26.79		
11. Corn Stalk Pith		10	Ads	ERH	0.113	0.234	0.335	0.431	0.574	0.721	0.757	0.868	0.982		100(a)	
				EMC	5.5	6.92	7.84	10.05	12.1	16.1	18	28.4	71.5			
		20	Ads	ERH	0.113	0.231	0.331	0.432	0.544	0.699	0.755	0.851	0.946	0.976		
				EMC	4.23	5.8	6.9	8.5	10	13.4	14.7	22.1	47.6	63.4		
		25	Ads	ERH	0.113	0.225	0.328	0.432	0.529	0.689	0.753	0.843	0.936	0.973		
				EMC	4.6	5	5.8	6.8	7.9	12.4	13.1	17	37.6	54.9		
		30	Ads	ERH	0.113	0.216	0.324	0.432	0.514	0.679	0.751	0.836	0.923	0.97		
				EMC	3.98	4.4	4.7	5.07	6.8	10.11	12	14.62	28.8	47.4		
		35	Ads	ERH	0.113	0.204	0.321	0.431	0.499	0.67	0.749	0.83	0.908	0.967		
				EMC	2.66	3.27	3.58	4.5	5.36	9.75	10.9	14.11	24	42.9		
		40	Ads	ERH	0.112	0.189	0.316	0.431	0.484	0.661	0.747	0.823	0.89	0.94		
				EMC	2.8	3	3.3	4.07	4.7	8.3	10.3	13.1	19.49	40		
12. Corn Stalk		10	Ads	ERH	0.113	0.234	0.335	0.431	0.574	0.721	0.757	0.868	0.982		100(a)	
				EMC	4.79	6.44	7.96	9.41	12.07	15.47	16.49	22.98	49.24			
		20	Ads	ERH	0.113	0.231	0.331	0.432	0.544	0.699	0.755	0.851	0.946	0.976		
				EMC	4	5.69	7.02	8.87	10.64	14.1	15.21	19.43	34.22	45.06		
		25	Ads	ERH	0.113	0.225	0.328	0.432	0.529	0.689	0.753	0.843	0.936	0.973		
				EMC	4.13	5.03	6.36	8	9.74	13.21	14.59	18.19	29.8	40.92		
		30	Ads	ERH	0.113	0.216	0.324	0.432	0.514	0.679	0.751	0.836	0.923	0.97		
				EMC	3.46	4.06	5.62	6.81	8.63	11.98	13.61	16.27	23.64	37.8		
		35	Ads	ERH	0.113	0.204	0.321	0.431	0.499	0.67	0.749	0.83	0.908	0.967		
				EMC	3.19	3.92	4.93	6.22	7.45	10.95	12.79	15.46	21.6	33.67		
		40	Ads	ERH	0.112	0.189	0.316	0.431	0.484	0.661	0.747	0.823	0.89	0.94		
				EMC	3.05	3.29	4.4	5.92	6.76	10.49	12.28	14.7	18.55	30.33		
13. Citrus Leaves		30	Ads	ERH	0.08	0.315	0.42	0.72	0.83	0.9					104(b)	
				EMC	6	9.8	11	15.8	27	32						
		40	Ads	ERH	0.07	0.31	0.41	0.71	0.82	0.9						
				EMC	5	9	10	14.5	24	29						
		50	Ads	ERH	0.065	0.3	0.405	0.7	0.81	0.89						
				EMC	4.8	8.5	9.8	12	19.7	28						
		30	Des	ERH	0.08	0.32	0.42	0.72	0.83	0.905						
				EMC	9	12	12.5	20	27.5	42						
		40	Des	ERH	0.07	0.31	0.415	0.705	0.82	0.9						
				EMC	7	10	12.5	19.5	26	38						
		50	Des	ERH	0.05	0.305	0.4	0.69	0.81	0.895						
				EMC	4	8	10	12.8	20.5	34.5						
14. Switchgrass pellets		6		ERH	0.165	0.36	0.56	0.7	0.785	0.825					101(b)	
				EMC	4.85	6.8	9.5	12	13.25	16						
		20		ERH	0.175	0.38	0.575	0.705	0.79	0.81						
				EMC	4.85	6.8	9.5	12	13.25	16						
		35		ERH	0.19	0.4	0.59	0.71	0.79	0.805						
				EMC	4.85	6.8	9.5	12	13.25	16						
		50		ERH	0.2	0.42	0.61	0.71	0.8	0.81						
				EMC	4.85	6.8	9.5	12	13.25	16						

¹⁾Ads—Adsorption; Des—Desorption; Mix—Mixture of adsorption and desorption

²⁾(ERH) or (EMC) Indicates the same ERH or EMC corresponding to the multi-EMC or multi-ERH rows to follow for one single product '→' sign before (ERH) or (EMC) indicates the ERH or EMC pointed corresponds to both multiple EMC or ERH rows next and multiple products below

³⁾(a)—original data from reference; (b)—digitized values from figures in a reference; (C)—values repeated from the previous ASAE DATA:D245.5

⁴⁾+' indicates mold growth

Table 1c – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for high oil & protein materials

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾								Source ³⁾	Reference				
1. High-oil products																	
a. Canola (Rapeseed)	a1. Candle		→ (EMC)	4.2	6.4	8.7	11.1	13.6	16.3	19.1	22.0	65(a)	12,63,64,70,72,77,81,92				
		5	Ads	ERH	–	46.5	65.0	76.0	82.3	86.7	89.7			91.5			
		5	Des	ERH	–	42.0	62.5	75.2	82.3	86.7	89.7			91.5			
		15	Ads	ERH	–	48.7	66.0	76.5	83.0	87.5	90.0			91.7			
		15	Des	ERH	21.5	44.5	64.2	76.0	83.0	87.5	90.0			91.7			
		25	Ads	ERH	–	50.5	67.3	77.3	83.5	88.0	90.2			92.0			
		25	Des	ERH	23.5	47.7	66.5	77.0	83.5	88.0	90.2			92.0			
		35	Ads	ERH	–	52.5	68.7	78.8	84.0	88.3	90.5			92.3			
		35	Des	ERH	26.5	51.5	68.5	78.0	84.0	88.3	90.5			92.3			
		a2. Global	25	Mix	ERH	12.0	33.0	62.5	88.0							63(a)	12,63–65,70,72,77,81–92
					EMC	4.1	5.9	9.4	15.3								
			50	Mix	ERH	11.0	30.0	59.8	82.0								
					EMC	2.9	4.5	7.5	13.8								
					→ (ERH)	20.0	30.0	40.0	50.0	60.0	70.0			80.0	90.0		
	a3. Gulle		5	Ads	EMC	–	4.4	5.3	6.2	7.3	8.8	11.9	17.2	70(a)	12,63–65,70,72,77,81–92		
		Des			EMC	3.8	4.7	5.6	6.5	7.4	9.2	12.2	17.9				
		15	Ads	EMC	–	4.3	5.0	5.9	7.0	8.6	11.5	16.7					
				Des	EMC	3.5	4.4	5.3	6.2	7.3	8.8	11.9	17.2				
		25	Ads	EMC	–	4.0	4.8	5.7	6.7	8.3	11.4	16.4					
				Des	EMC	3.4	4.3	5.0	5.9	7.0	8.6	11.5	16.7				
		35	Ads	EMC	–	–	4.6	5.5	6.6	8.1	11.2	16.4					
				Des	EMC	3.2	4.0	4.8	5.7	6.7	8.3	11.4	16.4				
		a4. Hektor	5	Ads	EMC	–	–	4.9	5.6	7.1	8.7	11.4	17.6			70(a)	12,63–65,70,72,77,81–92
					Des	EMC	3.7	4.6	5.6	6.7	7.9	9.4	11.7				
	15		Ads	EMC	–	–	4.7	5.6	6.8	8.3	11.0	17.0					
				Des	EMC	–	4.4	5.4	6.5	7.6	9.2	11.5	17.0				
	25		Ads	EMC	–	–	4.6	5.5	6.6	8.1	10.6	16.6					
				Des	EMC	–	4.0	4.9	6.0	7.3	8.9	11.2	16.6				
35	Ads		EMC	–	–	4.4	5.3	6.4	7.9	10.5	16.0						
			Des	EMC	–	–	4.5	5.7	7.1	8.6	11.0	16.3					
a5. Tower	5		Ads	EMC	–	4.8	5.6	6.6	7.9	9.4	12.6	19.0	70(a)	12,63–65,70,72,77,81–92			
				Des	EMC	–	5.4	6.0	7.2	8.5	10.0	12.6			19.0		
	15	Ads	EMC	–	4.6	5.4	6.4	7.6	9.2	12.2	18.9						
			Des	EMC	–	5.3	5.8	7.0	8.2	9.8	12.2	19.0					
	25	Ads	EMC	–	4.4	5.2	6.2	7.4	9.1	11.9	18.3						
			Des	EMC	–	4.8	5.6	6.6	7.9	9.4	11.9	18.3					
	35	Ads	EMC	–	–	4.8	5.8	7.2	8.8	11.5	17.6						
			Des	EMC	–	–	5.3	6.3	7.4	9.1	11.6	17.9					
	a6. Tobin	5	Mix	ERH	18.0	37.0	53.0	66.0	75.0	89.0					77(a)	12,63–65,70,72,77,81–92	
				EMC	5.0	6.5	8.2	10.5	13.1	18.6							
10		Mix	ERH	47.0	54.0	64.0	79.0	87.0	90.0								
			EMC	6.5	7.9	9.3	12.1	17.6	19.0								
15		Mix	ERH	30.0	38.0	55.0	71.0	79.0	83.0								
			EMC	5.1	6.4	8.0	10.7	13.4	16.5								
20		Mix	ERH	32.0	55.0	76.0	78.0	86.0	88.0								
			EMC	5.0	8.1	11.5	12.8	16.1	18.8								
25		Mix	ERH	42.0	64.0	74.0	83.0	88.0									
			EMC	6.3	8.6	10.5	13.2	16.7									
a7. Westar			→ (ERH)	18.6	23.6	33.9	55.4	70.0	76.2	87.4	91(a)	12,63–65,70,72,77,81–92					
	4	Ads	EMC	4.7	5.5	6.1	8.2	10.8	13.0	19.5							
			Des	EMC	5.1	6.1	6.8	8.8	11.5	13.9			19.8				
				→ (ERH)	13.0	19.4	35.3	47.8	57.7	64.4							
	25	Ads	EMC	4.7	5.1	5.8	6.9	8.0	9.5								
			Des	EMC	4.8	5.4	5.9	7.2	8.3	9.8							
				→ (ERH)	34.0	44.9	46.9	55.1	64.4	72.3							
	40	Ads	EMC	5.3	5.9	6.2	7.4	8.9	11.2								
			Des	EMC	5.2	6.0	6.3	7.5	9.0	11.7							

Table 1c – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for high oil & protein materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (% ²⁾)										Source ³⁾	Reference			
b. Canola meal	10	Mix	ERH	5.1	36.0	36.1	59.1	67.4	71.2							47(a)	–	
			EMC	4.5	8.8	9.1	14.9	17.8	20.5									
	20	Mix	ERH	6.0	27.1	47.7	58.9	67.3	75.3									
			EMC	4.5	7.8	11.3	14.5	17.7	21.6									
	30	Mix	ERH	10.2	31.0	49.5	61.1	71.3	79.7									
			EMC	5.3	8.0	11.1	14.2	17.4	21.6									
	40	Mix	ERH	15.4	30.9	45.9	60.4	75.6	80.7									
			EMC	5.3	7.8	10.5	13.9	17.0	19.5									
	50	Mix	ERH	23.6	33.2	48.3	57.1	72.8	83.6									
			EMC	6.7	7.7	10.7	13.3	16.0	19.5									
c. Cotton seed	→	(ERH)		31.0	43.0	62.0	71.2	81.1	93.0					51(a)	–			
				6.4	7.8	10.2	11.4	15.2	28.5									
	c1. Whole seed	25	Mix	EMC	6.4	7.8	10.2	11.4	15.2	28.5								
	c2. Meats	25	Mix	EMC	5.4	6.3	8.4	9.8	13.3	27.2								
	c3. Meats (oil-free)	25	Mix	EMC	9.1	10.3	13.8	15.9	22.4	48.8								
	d. Flaxseed	d1. cv. Linnot	10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0				60(a)	20,25,40,52
					EMC	5.3	6.2	7.2	9.0	10.2	11.0	15.3	22.6					
25		Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0							
			EMC	2.9	4.7	6.1	8.0	10.0	9.6	13.7	20.5							
40		Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0							
			EMC	2.9	3.7	5.0	6.5	9.2	10.1	12.2	16.3							
55		Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0							
			EMC	2.8	3.7	4.5	5.5	8.3	9.1	10.5	12.8							
→		(ERH)		11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0							
				3.6	5.0	5.9	7.4	9.7	10.6	13.8	20.5							
d2. cv. Dufferin	25	Mix	EMC	3.6	5.0	5.9	7.4	9.7	10.6	13.8	20.5							
			d3. cv. McGregor	25	Mix	EMC	3.7	5.1	6.0	7.6	9.8	10.8	14.1	21.4				
			d4. cv. Norlin	25	Mix	EMC	3.8	5.1	5.9	7.5	9.9	10.8	14.2	21.6				
			d5. cv. Norman	25	Mix	EMC	3.9	5.1	5.9	7.5	9.7	10.6	13.8	20.5				
			e. Melon seed	Unshelled	→	(ERH)	11.1	31.1	35.0	46.3	54.4	64.0	74.1	78.7	84.0	94.0	27(b)	–
7	Des	EMC	3.6	5.6	6.1	7.1	7.9	9.0	11.3	12.7	17.2	24.0						
		30	Des	EMC	2.9	4.4	4.6	5.2	5.6	6.3	8.2	9.7	12.2	21.4				
40	Des	EMC	2.5	3.9	4.2	4.7	5.1	5.7	7.3	8.5	10.4	18.5						
50	Des	EMC	2.1	3.5	3.7	4.2	4.7	5.1	6.6	7.4	8.6	16.1						
55	Des	EMC	1.7	3.1	3.3	3.7	4.1	4.6	5.9	6.8	7.9	14.2						
60	Des	EMC	1.6	2.5	2.6	3.1	3.4	3.9	5.2	6.0	7.0	12.9						
75	Des	EMC	1.2	2.0	2.1	2.4	2.5	3.0	3.9	4.7	5.6	11.9						
f. Peanut	f1. Whole pods	→	(ERH)	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0			(c)	7,74,8,53			
				10	Des	EMC	4.4	5.7	7.1	8.3	9.8	11.5	13.6			17.1		
	21	Des	EMC	4.2	5.4	6.6	7.8	9.2	10.6	12.6	15.5							
	32	Des	EMC	3.7	4.8	5.9	7.1	8.3	9.8	11.7	14.5							
	f2. Kernels	10	Des	EMC	4.2	5.2	6.0	6.8	7.8	8.8	10.0	11.7				(c)	1,7,22,74,92	
				21	Des	EMC	3.5	4.5	5.4	6.3	7.2	8.3	9.8					11.9
	32	Des	EMC	3.1	4.1	4.9	5.9	7.0	8.1	9.6	11.9							
			g. Safflower seed	cv. Saffire	10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0			87.0	96.0	48(a)
	EMC	4.6	5.2				6.0	8.4	9.6	11.0	13.2	17.5						
	25	Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0							
EMC			3.9	4.6	5.3	7.4	9.4	10.7	13.6	18.7								
40	Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0								
		EMC	3.0	4.0	4.8	6.1	8.6	10.0	11.7	15.3								
55	Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0								
		EMC	2.2	3.1	4.2	5.1	7.1	8.6	9.4	11.1								

Table 1c – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for high oil & protein materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (% ²⁾)										Source ³⁾	Reference						
h. Sunflower	h1. Seeds	10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0					59(a)	14,54,57			
				EMC	3.7	4.8	5.4	6.9	8.2	9.9	13.5	24.4									
		25	Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0									
				EMC	3.2	4.1	4.6	6.0	7.7	9.0	12.1	18.3									
		40	Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0									
				EMC	2.5	3.4	4.2	5.4	7.9	8.4	10.6	14.0									
	55	Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0										
			EMC	1.8	2.6	3.5	4.5	5.8	8.0	9.4	11.0										
	h2. Kernels	10	Mix	ERH	11.0	23.0	34.0	57.0	68.0	76.0	87.0	96.0									
				EMC	3.0	3.7	4.1	5.3	6.2	6.9	11.9	33.7									
		25	Mix	ERH	11.0	23.0	33.0	53.0	67.0	75.0	84.0	94.0									
				EMC	2.6	3.2	3.6	4.5	5.7	7.3	11.5	16.6									
		40	Mix	ERH	11.0	22.0	32.0	48.0	67.0	75.0	82.0	89.0									
				EMC	1.9	2.5	3.1	3.9	5.7	6.0	12.2	13.3									
55		Mix	ERH	11.0	21.0	30.0	45.0	67.0	74.0	81.0	84.0										
			EMC	1.4	2.1	2.7	3.3	4.0	6.1	6.9	9.3										
i. Pistachio nuts	i1. Whole nut	20	Ads	ERH	53.3	74.0	83.1	88.3	90.6	94.6	97.9					10(b)	–				
				EMC	7.2	11.7	15.5	20.4	23.2	27.6	33.1	(fat-free)									
	i2. Kernel	20	Ads	ERH	49.9	75.8	91.8	94.0	100.0												
				EMC	5.0	12.0	18.0	23.2	30.7	(fat-free)											
			20	Des	ERH	53.2	55.4	63.6	66.7	72.9	76.5	80.8	83.3	85.8	87.4			88.6	91.0		
					EMC	10.1	11.7	12.7	14.0	16.9	18.0	21.0	22.4	24.9	27.4			28.1	28.7	(fat-free)	
j. Pumpkin seed	j1. Seed		→	(ERH)	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0					4(a)	–		
				EMC	4.2	6.1	6.6	7.6	8.0	8.8	10.4	11.7	14.0								
				20	Ads	EMC	3.9	5.3	6.6	7.4	7.9	8.7	10.2	11.4	13.2						
						30	Ads	EMC	3.5	5.0	6.2	7.1	7.5	8.4	10.1	11.2					
				40	Ads	EMC	3.1	4.5	5.0	6.9	7.2	8.1	10.1	10.7							
						50	Ads	EMC	2.6	3.9	5.1	6.1	6.8	8.0	8.4	10.6					
				60	Ads	EMC	2.0	3.8	4.3	4.7	6.1	7.0	7.2	9.9							
						10	Des	EMC	4.8	6.1	7.1	8.2	8.9	9.8	11.3	13.3	16.5				
				20	Des	EMC	4.3	5.9	6.6	7.8	8.6	9.2	10.8	12.3	15.8						
						30	Des	EMC	3.6	5.0	6.0	6.9	7.9	8.7	10.3	12.3					
				40	Des	EMC	3.3	4.5	5.2	6.3	7.3	8.2	10.3	13.9							
						50	Des	EMC	3.1	4.5	4.7	5.8	6.7	7.5	9.7	11.6					
				60	Des	EMC	2.5	3.4	4.2	4.9	5.7	6.8	8.4	10.4	14.1						
						10	Ads	EMC	4.5	5.6	5.8	6.6	6.9	8.0	8.6	10.5					
				20	Ads			EMC	3.7	5.0	5.9	6.4	6.7	7.6	8.4	9.8					
						30	Ads	EMC	3.3	4.4	5.4	6.2	6.7	7.6	8.3	10.5	14.3				
				40	Ads			EMC	3.0	4.2	4.6	6.0	6.3	7.2	8.5	8.5					
						50	Ads	EMC	2.5	3.3	4.5	5.4	5.8	6.9	6.7	7.7					
				60	Ads			EMC	2.1	3.0	4.1	4.3	4.8	6.1	5.3	7.1					
						10	Des	EMC	4.5	5.6	6.3	7.3	7.7	8.2	9.6	11.2					
				20	Des			EMC	4.0	5.4	6.0	6.9	7.5	8.0	8.9						
						30	Des	EMC	3.5	4.8	5.5	6.0	6.7	7.3	8.7	10.3					
40	Des	EMC	3.2	4.1	4.8			5.6	6.4	7.0	8.4										
		50	Des	EMC	2.9	3.9	4.6	5.2	5.6	6.5	7.8	9.1	11.8								
60	Des			EMC	2.5	3.2	3.9	4.3	5.1	6.2	7.1	7.6									
		2. Legumes			→	(ERH)	11.0	22.4	33.0	42.8	53.3	64.4	75.3								
a. Dry bean	a1. Red Mexican	25	Mix	EMC	6.5	8.5	9.9	11.2	13.0	15.9	19.9					89(a)	61				
				a2. Great northern	25	Mix	EMC	6.4	8.3	9.5	11.1	12.7	15.6	19.6							
		a3. Light red kidney	25	Mix	EMC	6.6	8.5	10.0	11.5	13.1	16.0	19.9									
		a4. Dark red kidney	25	Mix	EMC	6.0	8.2	9.6	11.0	12.7	15.7	19.9									

Table 1c – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for high oil & protein materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference										
b. White bean	a5. Flat small white	25	Mix	EMC	6.5	8.0	9.3	11.1	13.1	15.6	19.9														
	a6. Mich-elite	25	Mix	EMC	6.4	8.3	9.8	11.2	13.0	15.7	19.8														
	a7. Pinto	25	Mix	EMC	6.6	8.5	9.8	11.2	12.9	15.9	20.0														
	a8. Red beans		→	(ERH)	5	20	40	60	80	90											102(b)				
			25	Ads	EMC	6	7.5	10.5	14	27.5	32.5														
			25	Des	EMC	6.5	8	11	15	22.5	32.5														
			50	Des	EMC	5.5	7.25	10	13.5	20	32.5														
		Seafarer	18	Mix	ERH	24.3	34.0	55.4	72.9	78.3												45(b)	–		
					EMC	9.0	10.2	14.2	20.9	23.6															
			32	Mix	ERH	22.3	33.2	51.4	73.3	77.1															
c. Lentil				EMC	7.1	8.7	12.1	19.5	21.9																
			38	Mix	ERH	21.1	32.9	47.1	72.5	76.4															
				EMC	6.8	8.3	10.8	18.9	21.0																
			49	Mix	ERH	18.9	32.3	47.2	72.7	76.7															
				EMC	5.6	7.1	9.3	17.3	19.4																
		Laird	5	Des	ERH	10.2	19.2	35.8	45.2	51.1	56.2	57.8	70.7	78.1	82.9	84.1	85.6						13(b)	–	
				EMC	6.6	8.3	10.9	12.8	14.0	15.4	16.9	20.4	24.7	28.4	30.8	34.5									
			30	Des	ERH	15.1	21.2	26.6	32.5	41.2	58.0	64.6	73.6	78.2	78.5	80.4	84.7								
				EMC	6.7	7.2	8.2	8.6	10.3	11.9	14.2	16.9	20.1	21.0	20.8	28.7									
		c1. Lentil seeds	5	Ads	ERH	0.113	0.245	0.336	0.431	0.589	0.635	0.757	0.771	0.851	0.877								113(b)		
d. Soybean				EMC	6.36	8.3	8.86	10.64	13.09	15.1	17.43	18.13	21.23	23.92											
			20	Ads	ERH	0.113	0.231	0.331	0.432	0.544	0.591	0.725	0.755	0.817	0.851										
				EMC	4.61	5.93	8.04	9.15	10.91	12.99	16.27	17.29	21.04	21.79											
			40	Ads	ERH	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823										
				EMC	3.39	5.07	6.45	7.79	8.51	9.44	11.83	14.9	15.92	18.06											
			60	Ads	ERH	0.11	0.16	0.293	0.432	0.44	0.497	0.58	0.745	0.789	0.803										
				EMC	3.1	4.36	5.95	7.13	7.2	8.23	9.05	12.29	13.84	14.15											
			5	Des	ERH	0.113	0.245	0.336	0.431	0.589	0.635	0.757	0.771	0.851	0.877										
				EMC	7.58	10.2	11.29	13.24	15.13	16.97	20.55	21.35	23.05	26.23											
			20	Des	ERH	0.113	0.231	0.331	0.432	0.544	0.591	0.725	0.755	0.817	0.851										
d. Soybean				EMC	5.73	8.05	9.62	11.83	13.06	13.37	17.91	18.15	20.64	21.9											
			40	Des	ERH	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823										
				EMC	4.3	6.1	8.1	9.58	10.23	10.87	13.72	17.34	19.18	21.31											
			60	Des	ERH	0.11	0.16	0.293	0.432	0.44	0.497	0.58	0.745	0.789	0.803										
				EMC	3.8	4.86	5.84	7.24	7.63	8.69	10.08	13.75	14.74	15.51											
		d1. var. Kobott	25	Mix	ERH	31.0	43.0	51.0	62.0	71.2	61.1	93.0											57(a)	22,62,66,69	
				EMC	6.5	8.0	9.1	11.6	14.2	19.6	33.5														
		d2. cv. Essex	5	Des	ERH	13.8	14.7	38.4	39.2	58.6	60.1	68.4	68.8	75.3	74.5	80.3	80.5							62(a)	57,22,69
				EMC	5.4	5.5	9.0	8.9	12.9	12.6	15.7	15.7	19.1	19.3	24.0	23.2									
			10	Des	ERH	15.0	14.4	42.4	42.1	61.2	61.1	69.1	69.1	74.6	74.3	80.6	80.5								
			EMC	5.5	5.2	8.6	8.7	12.7	12.7	15.7	15.6	18.8	18.3	23.2	23.2										
		15	Des	ERH	16.9	16.6	45.4	45.3	62.0	63.0	69.8	69.2	74.1	75.8	80.7	81.1									
			EMC	5.4	5.1	8.8	8.8	12.6	12.8	15.5	15.5	18.6	18.3	23.3	23.0										
		25	Des	ERH	20.7	19.5	46.9	47.0	62.7	63.0	69.7	69.4	75.6	75.9	81.0	81.9									
			EMC	5.5	5.1	9.0	8.7	12.8	12.4	15.5	15.0	17.9	19.1	23.1	22.9										
		35	Des	ERH	21.4	21.4	49.3	49.9	64.1	64.2	71.1	70.3	76.7	76.0	82.8	81.7									
			EMC	5.3	5.3	8.8	8.7	12.5	12.5	15.4	15.1	18.1	18.2	23.6	22.6										
	d3. var. Nigerian		→	(ERH)	14.8	27.2	41.7	54.3	65.8	76.3	88.1											22(b)	57,62,69		
		30	Ads	EMC	4.2	4.8	6.1	7.9	10.4																
		30	Des	EMC	4.5	5.1	6.4	8.3	10.7	13.6	17.5														
	d4. Soybean			ERH	0.07	0.12	0.22	0.32	0.51	0.61	0.71	0.82	0.89	0.97									99(a)		
				EMC	8.52	9.24	10.43	13.1	17.59	19.04	20.57	22.72	25.77	35.11											

Table 1c – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for high oil & protein materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference					
e. Soybean meal		50	Des	ERH	0.07	0.114	0.12	0.314	0.5	0.6	0.7	0.81	0.89	0.96	69(a)	–				
				EMC	6.4	7.85	8.58	9.1	10.28	12.39	13.09	19.44	26.3	27.96						
		60	Des	ERH	0.07	0.112	0.21	0.31	0.5	0.6	0.7	0.8	0.88	0.95						
				EMC	5.79	6.85	8.19	8.67	9.97	10.45	11.53	16.75	23.05	25.98						
		70	Des	ERH	0.07	0.111	0.20	0.3	0.5	0.6	0.7	0.8	0.88	0.94						
				EMC	5.28	6.49	7.87	7.9	9.19	9.57	10.6	12.93	17.54	25.68						
			→	(EMC)	6.3	8.5	22.2	33.9	54.6											
			15	Ads	ERH	29.9	49.5	66.5	79.0	85.8										
			25	Ads	ERH	33.7	51.6	68.1	80.0	86.6										
			35	Ads	ERH	36.3	53.1	68.1	80.2	86.9										
				→	(EMC)	7.4	9.8	14.3	21.4	30.7										
			15	Des	ERH	18.3	37.2	79.4	88.0	93.5										
	25	Des	ERH	20.0	40.9	79.2	88.9	95.9												
f. Winged bean	Nigerian	40	Des	ERH	11.8	22.0	31.8	51.0	61.0	75.0	82.0			2(a)	–					
				EMC	3.7	5.3	6.5	8.6	11.3	14.1	16.5									
		50	Des	ERH	11.4	21.0	31.4	47.0	60.0	74.0	81.0									
				EMC	3.1	4.3	4.7	5.9	7.8	13.1	15.3									
		60	Des	ERH	11.2	21.0	30.8	50.0	60.0	69.0	80.0									
				EMC	2.4	3.2	4.3	5.6	7.5	12.2	14.9									
		70	Des	ERH	11.1	20.0	29.8	46.0	60.0	69.0	80.0									
				EMC	1.8	2.8	4.2	5.1	6.4	9.6	12.7									
		30	Ads	ERH	13.5	26.7	38.7	54.6	67.9	80.4	90.4									
				EMC	6.4	7.9	10.4	13.0	16.3	19.2	23.4									
		30	Des	ERH	13.7	26.6	39.0	54.3	67.8	80.1	90.4									
				EMC	6.8	8.3	10.9	13.6	16.7	19.7	23.9									
50	Ads	ERH	14.3	26.7	39.4	54.5	81.0	90.7												
		EMC	5.3	6.8	8.8	11.4	17.5	22.3												
50	Des	ERH	14.2	26.7	39.3	54.6	80.9	90.6												
		EMC	5.7	7.2	9.2	11.9	17.9	22.8												
g. Cowpea	Nigerian	25	Ads	ERH	17.7	41.8	64.3	79.0					22(b)	24						
				EMC	2.3	4.7	8.7	13.5												
		25	Des	ERH	23.1	53.1	62.4	77.5	89.7											
				EMC	2.7	6.7	8.5	13.2	20.2											
		10		ERH	0.38	0.59	0.671	0.81	0.955											
				EMC	10.08	14.68	16.58	24.52	32.73											
		20		ERH	0.49	0.592	0.726	0.816	0.932											
				EMC	11.96	14	16.01	19.95	32.22											
		30		ERH	0.514	0.633	0.714	0.8	0.907											
				EMC	11.89	13.99	14.9	18.67	31.41											
		40		ERH	0.492	0.618	0.677	0.817	0.879											
				EMC	11.28	13.31	14.51	18.33	0.04											
50		ERH	0.463	0.745	0.791	0.958														
		EMC	9.28	13.96	17.37	31.49														
h. White Lupin		10	Des	ERH	0.38	0.59	0.671	0.81	0.955				103(a)	–						
				EMC	11.73	15.81	17.3	22	34.57											
		20		ERH	0.49	0.592	0.726	0.816	0.932											
				EMC	12.13	14.77	18.06	21.08	32.68											
		30		ERH	0.514	0.633	0.714	0.8	0.907											
				EMC	11.89	14.48	17.34	18.76	29.17											
		40		ERH	0.492	0.618	0.677	0.817	0.879											
				EMC	11.46	14.19	16.48	18.13	28.97											
		50		ERH	0.463	0.745	0.791	0.958												
				EMC	11.33	16.46	17.72	28.42												
		i. Pigeon pea grain		5	Ads	ERH	0.113	0.245	0.336	0.431	0.589	0.635			0.757	0.771	0.581	0.877	98(a)	–
						EMC	5.2	7.7	9.2	10.6	13	14			17.7	19.2	23.1	24.8		
20	Ads			ERH	0.113	0.231	0.331	0.432	0.544	0.591	0.725	0.755	0.817	0.851						
				EMC	4.8	7.6	8.8	10.3	10.9	11.9	14.5	16.9	21.2	22.6						

Table 1c – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for high oil & protein materials (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference
40	Ads	ERH	→	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823		
				4.1	5.5	7.7	8.4	8.7	9.8	12.8	15.6	16.7	18.8		
60	Ads	ERH	→	0.11	0.16	0.293	0.432	0.44	0.497	0.58	0.745	0.789	0.803		
				3.6	4.6	5.8	7.3	7.5	8.3	9.5	12.9	14.1	14.5		
5	Des	ERH	→	0.113	0.245	0.336	0.431	0.589	0.635	0.757	0.771	0.581	0.877		
				6.5	9.8	10.8	12.2	15.5	17.1	19	21.2	23.3	29.2		
20	Des	ERH	→	0.113	0.231	0.331	0.432	0.544	0.591	0.725	0.755	0.817	0.851		
				5.5	8	9.8	11.1	12.1	13	17.2	21.7	23	24.5		
40	Des	ERH	→	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823		
				4.5	6.4	7.8	9.8	10	10.5	13.5	16.9	17.4	20.2		
60	Des	ERH	→	0.11	0.16	0.293	0.432	0.44	0.497	0.58	0.745	0.789	0.803		
				3.7	4.7	6	7.8	7.8	8.5	10	14.1	15.4	17		

¹⁾Ads—Adsorption; 'Des'—Desorption; 'Mix'—Mixture of adsorption and desorption

²⁾'(ERH)' or '(EMC)' indicates the same ERH or EMC corresponding to the multi-EMC or multi-ERH rows to follow for one single product; '→' indicates the ERH to EMC pointed corresponds to both multiple EMC or ERH rows next and multiple products below

³⁾'(a)'—original data from a reference; '(b)'—digitized values from figures in a reference; '(c)'—values repeated from the previous ASAE Data:D245.5

Table 1d – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for agricultural by-products

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference						
1. Cocoa beans	Nigerian	→	(EMC)	4.5	5.5	7.5	10.9	16.3									37(a)	36			
				15	Ads	ERH	28.7	46.7	73.4	86.2	93.2										
				25	Ads	ERH	30.9	49.0	75.0	86.6	93.9										
				35	Ads	ERH	32.1	51.3	74.3	86.5	93.8										
				→	(EMC)	4.2	5.3	7.5	10.3	12.7	19.0										
				15	Des	ERH	16.8	38.9	66.2	84.3	88.2	93.8									
				25	Des	ERH	18.4	40.8	69.4	85.3	88.7	94.6									
				35	Des	ERH	21.5	46.4	72.1	85.8	89.0	94.4									
				2. Hops	California Clusters	25	Ads	ERH	9.5	35.6	45.6	51.0	58.0	67.5	75.0	81.1			80.8		
EMC	3.2	4.8	5.5					6.1	6.9	8.1	9.2	10.2	11.4								
Des	ERH	9.6	18.1				32.0	41.3	47.6	55.2	54.5	68.9	72.1	74.7							
	EMC	3.4	3.8				4.9	5.6	6.2	6.9	7.2	8.9	10.1	12.1							
3. Potatoes	Desiree	40	Ads				ERH	5.8	12.5	19.7	29.2	37.7	53.2	75.3	88.4			87(b)	58		
							EMC	2.4	3.2	4.0	5.1	7.1	8.9	13.3	18.7						
			Des	ERH	5.8	12.6	19.8	29.0	37.3	53.0	75.1	88.2									
				EMC	2.2	2.9	3.5	5.0	6.3	8.5	12.9	18.4									
			50	Ads	ERH	6.2	13.3	20.6	30.4	38.7	54.3	76.2	88.8								
					EMC	2.1	3.1	3.7	4.9	6.4	8.1	12.1	16.6								
			Des	ERH	6.2	13.0	20.5	29.7	38.3	54.1	76.2	88.6									
				EMC	2.1	2.8	3.3	4.5	6.0	8.2	12.8	17.1									
			60	Ads	ERH	7.0	14.2	22.1	31.2	39.8	56.1	76.2	88.8								
					EMC	2.0	2.7	3.4	4.4	5.4	6.5	9.9	14.7								
			Des	ERH	7.0	14.4	22.0	30.9	39.3	55.9	76.3	88.8									
				EMC	1.8	2.4	3.1	4.2	5.3	7.6	11.8	16.3									
70	Ads	ERH	7.4	15.2	23.0	32.3	40.5	57.9	76.8	88.7											
		EMC	1.8	2.2	2.3	3.4	4.2	6.0	8.4	13.6											
Des	ERH	7.5	15.4	22.8	31.9	40.0	57.6	76.6	88.7	7.0											
	EMC	1.5	2.0	2.4	3.1	4.8	7.2	11.0	14.7	1.8											
4. Sugarbeet root	Raw roots	20	Des	ERH	5.4	10.4	24.6	33.9	42.6	50.2	57.3	67.8			46(b)	-					
				EMC	2.3	3.5	5.0	6.7	9.4	13.1	15.9	21.5									
			35	Des	ERH	0.7	2.2	7.8	11.5	16.4	23.6	25.7	32.8	39.8			41.7	47.9	59.2	68.0	
					EMC	1.8	2.0	1.6	2.9	3.0	4.2	3.8	5.9	7.9			8.6	10.1	13.1	20.4	
			47	Des	ERH	3.7	8.5	11.6	25.0	29.8	32.4	40.3	46.2	48.0			56.2	60.1			
					EMC	1.2	1.8	1.9	4.1	4.5	5.3	7.2	8.2	8.7			15.1	16.8			
			65	Des	ERH	6.3	11.9	18.3	19.7	34.9	34.1	41.1	42.1	53.4			64.0	60.7			
					EMC	0.7	1.5	2.2	2.3	2.6	3.7	6.8	6.9	12.5			17.5	18.5			

Table 1d – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for agricultural by-products (continued)

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾										Source ³⁾	Reference			
				ERH	EMC	ERH	EMC	ERH	EMC	ERH	EMC	ERH	EMC					
5. Tobaccos	a. Burley-21	15	Mix	ERH	0.113	0.234	0.333	0.432	0.559	0.607	0.741	0.756	0.826	0.859	97(a)			
				EMC	1.79	3.56	4.29	5.26	6.26	6.82	8.89	9.27	10.71	11.97				
		20	Mix	ERH	4.5	9.5	14.0	18.9	23.7	28.5	37.9	47.8	57.3	66.1	74.5		73(b)	
				EMC	1.8	2.7	3.5	4.4	5.1	5.8	7.2	8.7	10.6	14.6	22.9			
		25	Mix	ERH	0.113	0.225	0.328	0.432	0.529	0.576	0.709	0.753	0.809	0.843				
				EMC	1.72	2.71	4.21	5.21	5.48	5.72	7.64	8.9	9.84	12.05				
	40	Mix	ERH	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823					
			EMC	1.34	2.06	2.74	3.41	3.71	4.75	5.79	7.35	8.44	9.6					
	b. BY-4	20	Mix	ERH	4.8	10.0	14.9	19.7	24.3	29.1	38.2	47.7	56.8	65.6	72.3			
				EMC	1.2	1.9	2.4	3.0	3.8	4.6	6.8	9.4	13.2	19.9	32.1			
	c. Matsukawa	20	Mix	ERH	4.8	9.8	14.2	19.2	23.9	28.8	37.9	47.8	57.7	66.9	75.3			
				EMC	2.1	3.2	4.0	4.9	5.6	6.3	7.6	8.7	10.1	13.9	21.9			
	d. Krou-mougrad	15	Mix	ERH	0.113	0.234	0.333	0.432	0.559	0.607	0.741	0.756	0.826	0.859	97(a)			
				EMC	2.96	3.91	4.65	4.9	6.61	7.27	8.48	9.75	11.04	13.43				
		20	Mix	ERH	5.0	10.0	15.2	19.9	24.5	29.3	38.8	47.9	57.1	66.2	73.9			
				EMC	0.9	1.7	2.1	2.6	3.4	4.1	5.8	8.2	11.3	15.6	25.7			
		25	Mix	ERH	0.113	0.225	0.328	0.432	0.529	0.576	0.709	0.753	0.809	0.843				
				EMC	2.42	3.21	3.5	4.61	5.69	5.91	7.59	7.98	9	10.25				
		40	Mix	ERH	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823				
				EMC	1.14	1.9	2.68	3.56	3.94	4.58	5.89	6.84	7.92	8.86				
		e. Midrib	20	Mix	ERH	4.8	10.0	14.9	19.7	24.3	29.2	38.0	47.1	56.0	64.5		70.7	
					EMC	1.2	2.0	2.5	3.1	4.0	5.0	7.1	10.6	15.4	23.1		37.7	
		f. Plovdiv 187	15	Mix	ERH	0.113	0.234	0.333	0.432	0.559	0.607	0.741	0.756	0.826	0.859		97(a)	
					EMC	2.71	3.52	4.38	4.65	6.77	7.31	8.29	9.34	10.73	12.45			
25	Mix		ERH	0.113	0.225	0.328	0.432	0.529	0.576	0.709	0.753	0.809	0.843					
			EMC	2.63	3.13	4.08	4.48	4.98	6.41	7.98	8.43	9	10.38					
40	Mix		ERH	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823					
			EMC	1.33	1.96	2.66	3.57	3.86	4.38	5.44	6.62	7.34	8.41					
g. Virginia 454	15	Mix	ERH	0.113	0.234	0.333	0.432	0.559	0.607	0.741	0.756	0.826	0.859	97(a)				
			EMC	2.85	3.75	4.58	5.23	6.17	6.89	8.34	8.7	10.12	11.54					
25	Mix	ERH	0.113	0.225	0.328	0.432	0.529	0.576	0.709	0.753	0.809	0.843						
		EMC	2.03	3.08	3.68	4.11	5.1	5.54	7.18	7.58	9.04	10.24						
40	Mix	ERH	0.112	0.201	0.316	0.432	0.484	0.532	0.658	0.747	0.794	0.823						
		EMC	1.68	2.11	2.93	3.43	3.98	4.47	5.87	6.43	7.71	8.5						
6. Yam	20	Des	ERH	0.112	0.234	0.332	0.43	0.592	0.653	0.74	0.8				111(a)			
			EMC	7	12.5	14.8	16.3	19	21	23.8	26							
	34	Des	ERH	0.112	0.211	0.32	0.43	0.55	0.62	0.74	0.8							
			EMC	6.5	10	12	13.8	17	18.3	21	23							
	46	Des	ERH	0.115	0.315	0.505	0.605	0.74	0.86									
			EMC	8.9	11	13.5	15.4	19	26									
	62	Des	ERH	0.305	0.5	0.59	0.74	0.81										
			EMC	7.5	11.5	13	16	19										
7. Sweet Potato	5		ERH	0.08	0.1	0.23	0.36	0.52	0.58	0.7	0.84				105(b)			
			EMC	0.105	0.11	0.13	0.15	0.17	0.19	0.22	0.28							
	20		ERH	0.095	0.12	0.24	0.37	0.56	0.68	0.72	0.85							
			EMC	0.1	0.108	0.128	0.145	0.16	0.18	0.22	0.28							
	35		ERH	0.12	0.15	0.26	0.4	0.58	0.7	0.73	0.84							
			EMC	0.096	0.104	0.125	0.132	0.15	0.18	0.22	0.28							
	50		ERH	0.125	0.155	0.27	0.42	0.6	0.705	0.78	0.9							
			EMC	0.096	0.1	0.118	0.125	0.15	0.18	0.22	0.28							
8. Carrot Un-Osmosed		→	(ERH)	18	33	55	78	89	96					108(b)				
			EMC	0.05	0.05	0.06	0.2	0.6	1									
			EMC	0.05	0.05	0.05	0.15	0.5	1									
			EMC	0.05	0.05	0.05	0.13	0.55	1									
			EMC	0.05	0.05	0.05	0.15	0.5	0.9									
			EMC	0.05	0.05	0.05	0.15	0.5	0.9									

¹⁾Ads'—Adsorption; 'Des'—Desorption; 'Mix'—Mixture of adsorption and desorption

²⁾(EMC)' indicates the same EMC corresponding to the multi-ERH rows to follow for one single product

³⁾(a)'—original data from a reference; '(b)'—digitized values from figures in a reference

Table 1e – Equilibrium moisture content (EMC) and equilibrium relative humidity (ERH) data for agricultural by-products

Product	Description	Temp (C)	Path ¹⁾	EMC (% db) and ERH (%) ²⁾								Source ³⁾	Reference		
E. Fruits and Vegetables															
1. Pitted cherries	a. Freeze dried	10	Ads	ERH	11	23	34	57	68	76	87	96	106(a)		
				EMC	4.9	5.7	7.6	14.7	17.6	37.7	56.5	70.5			
		25	Ads	ERH	11	23	33	53	67	75	84	94			
				EMC	3.9	5.1	7.5	14.2	25.3	38.7	61.9	86.5			
		40	Ads	ERH	11	22	32	48	67	75	82	89			
				EMC	1.9	3.2	4.9	10.8	28.6	36.1	48	91.1			
	b. Osmo-Freeze dried	10	Ads	ERH	11	23	34	57	68	76	87	96		106(a)	
				EMC	6.6	6.3	6.8	13.7	29.4	40.1	57.1	79.3			
		25	Ads	ERH	11	23	33	53	67	75	84	94			
				EMC	5.1	6.1	6.3	14.2	25.9	36.3	45.8	89			
		40	Ads	ERH	11	22	32	48	67	75	82	89			
				EMC	1.7	2.8	5.3	10.6	28.8	37.2	52.5	92.2			
	c. Osmotic air dried	10	Ads	ERH	11	23	34	57	68	76	87	96	106(a)		
				EMC	10.3	10.7	10.7	12.7	24.8	34.3	58.2	76.2			
		25	Ads	ERH	11	23	33	53	67	75	84	94			
				EMC	6.6	5.3	7.2	11.9	24.1	36.4	62.2	89.4			
		40	Ads	ERH	11	22	32	48	67	75	82	89			
				EMC	0.9	0.8	28.7	26.1	37.3	53.9	95.9				
	2. Blue berries	a. Freeze dried	10	Ads	ERH	11	23	34	57	68	76	87		96	106(a)
					EMC	4.6	6.8	9.1	19.1	27.3	36.2	50.2		77.8	
			25	Ads	ERH	11	23	33	53	67	75	84		94	
EMC					3	5	8	15.8	23.4	31.5	48.4	73.4			
40			Ads	ERH	11	22	32	48	67	75	82	89			
				EMC	2.2	3.9	6.8	12.4	24.6	33.7	44.1	70.3			
b. Osmo-Freeze dried		10	Ads	ERH	11	23	34	57	68	76	87	96	106(a)		
				EMC	5.4	6.8	9	19.2	27.4	33.1	55.2	75.3			
		25	Ads	ERH	11	23	33	53	67	75	84	94			
				EMC	3.4	5.5	7.8	15	24.7	32.4	48.2	73.4			
		40	Ads	ERH	11	22	32	48	67	75	82	89			
				EMC	2.6	4.2	6.8	12.9	25	33.2	46.5	71.3			
c. Osmotic air dried		10	Ads	ERH	11	23	34	57	68	76	87	96		106(a)	
				EMC	5.8	6.5	7.5	14.6	25.4	32.6	57.7	78.4			
		25	Ads	ERH	11	23	33	53	67	75	84	94			
				EMC	4.2	4.8	6.7	13.7	24.6	33.1	44.4	69.7			
		40	Ads	ERH	11	22	32	48	67	75	82	89			
				EMC	2.4	3	5.9	12.3	23	32.3	40.1	72.4			
3. Longan		30	Ads	ERH	0.118	0.328	0.525	0.756	0.966				109(a)		
				EMC	24.9	41.2	54.6	94.5	192.8						
		40	Ads	ERH	0.116	0.321	0.498	0.754	0.962						
	EMC			18.2	34.2	45.1	80.9	172.3							
	50	Ads	ERH	0.114	0.314	0.463	0.745	0.958							
			EMC	12.4	27.6	34.8	68.4	152.1							

¹⁾Ads'—Adsorption; 'Des'—Desorption; 'Mix'—Mixture of adsorption and desorption

²⁾'(EMC)' indicates the same EMC corresponding to the multi-ERH rows to follow for one single product

³⁾(a)—original data from a reference

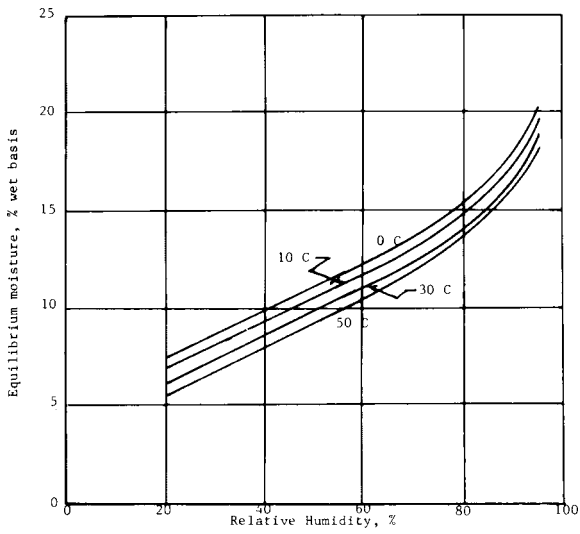


Figure 1 - Equilibrium moisture content, barley

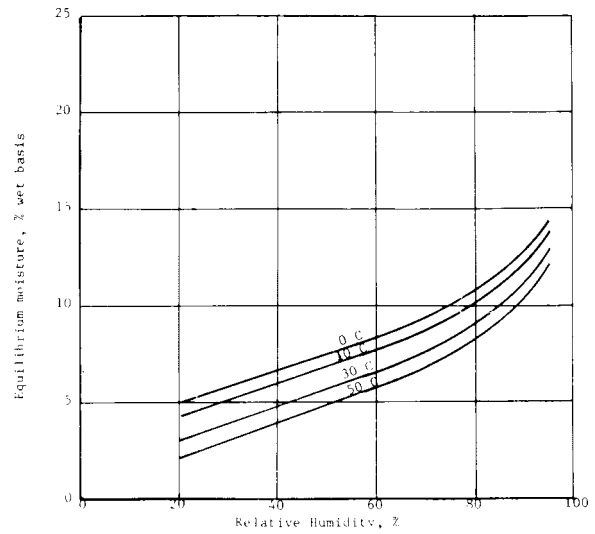


Figure 4 - Equilibrium moisture content, peanut kernel

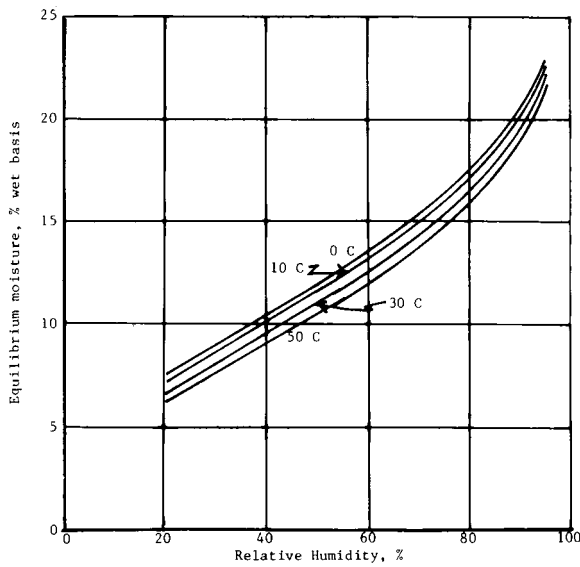


Figure 2 - Equilibrium moisture content, edible beans

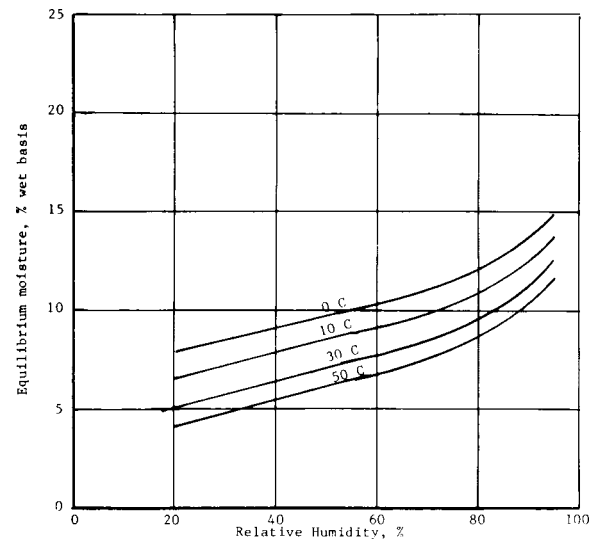


Figure 5 - Equilibrium moisture content, peanuts in pod

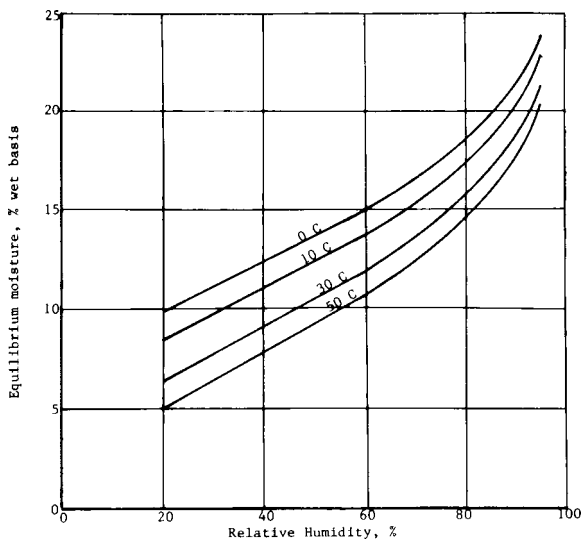


Figure 3 - Equilibrium moisture content, yellow dent corn

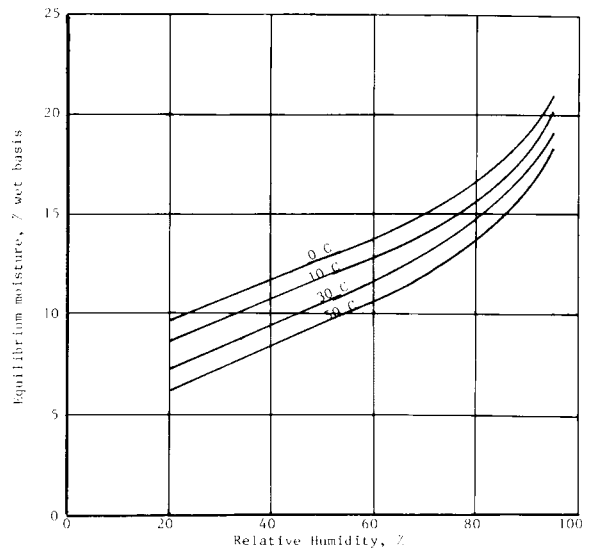


Figure 6 - Equilibrium moisture content, rough rice

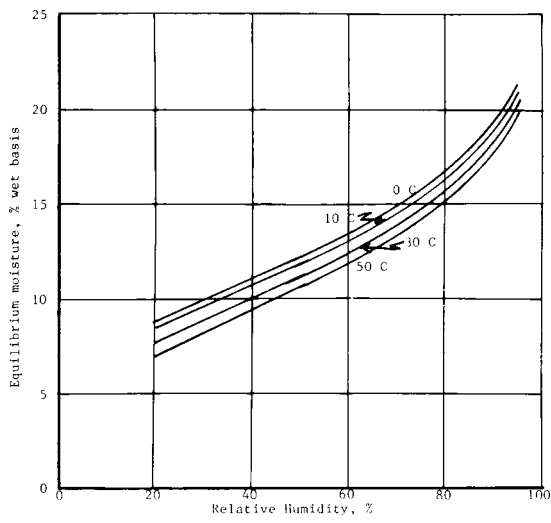


Figure 7 - Equilibrium moisture content, sorghum

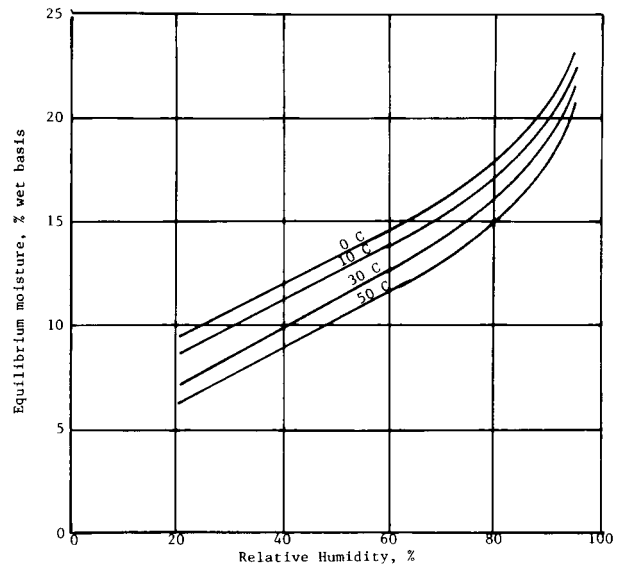


Figure 10 - Equilibrium moisture content, hard wheat

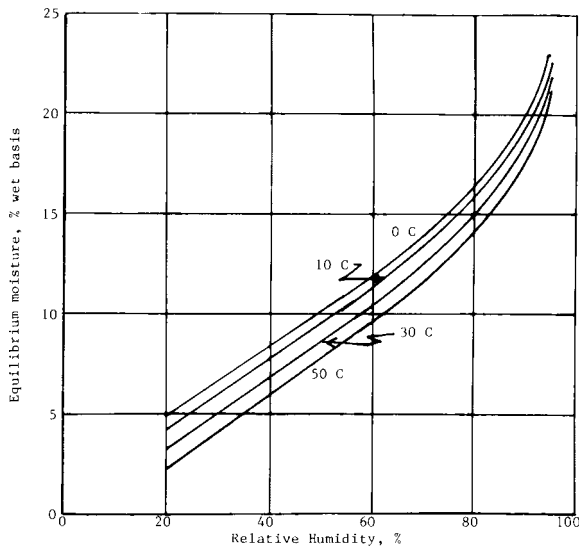


Figure 8 - Equilibrium moisture content, soybean

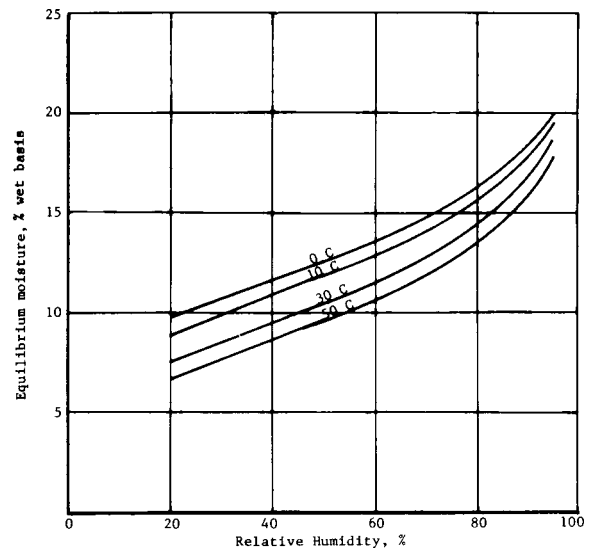


Figure 11 - Equilibrium moisture content, soft wheat

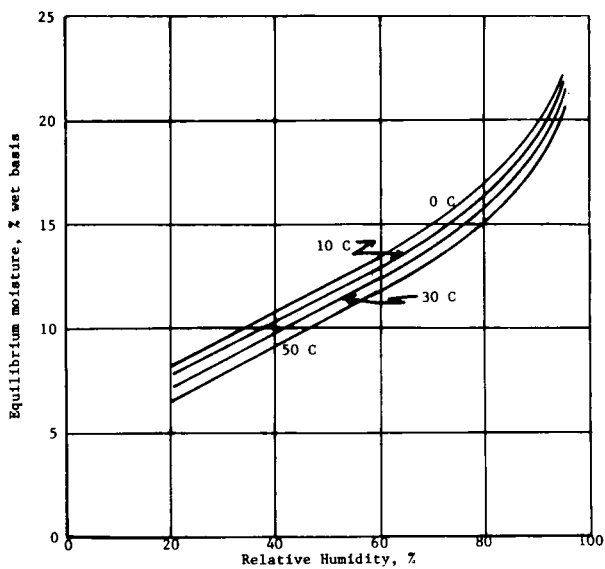


Figure 9 - Equilibrium moisture content, durum wheat

Table 2 – Isotherm equation constants for agricultural products

Product	Eq. No. ¹⁾	Isotherm Equation Constants				S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	Variable Format ⁵⁾			Model ⁶⁾	Source ⁷⁾	Reference
		A	B	C	EMC				ERH	Temp				
A. Starchy Materials														
1. Barley	b	475.12	0.14843	71.996	0.91	1.35	RH:18–95%,T:5–25C,Des	%db	dec	°C	ERH	17	–	
2. Buckwheat	a	8.2648E–08	2.4306	1.37E+04	0.25	–	Table 1a	%db	dec	°K	ERH	78	–	
	b	1.04E+08	0.1646	1.59E+07	0.22	–	Table 1a	%db	dec	°K	ERH	78	–	
3. Corn														
a. Shelled corn	a	6.6612E–05	1.9677	42.143	1.88	2.87	Table 1a	%db	dec	°C	ERH	16	17	
(a2. Dekalb 484)	b	374.34	0.18662	31.696	4.96	4.26	Table 1a	%db	dec	°C	ERH	16	17	
	d	15.303	–0.10184	3.0358	2.69	4.78	Table 1a	%db	dec	°C	ERH	16	17	
b. Popcorn	a	1.5593E–4	1.5978	60.754	2.99	–	Table 1a	%db	dec	°C	ERH	30	17	
	b	285.67	0.14845	44.184	2.55	–	Table 1a	%db	dec	°C	ERH	30	17	
	d	13.814	–0.082312	2.6189	1.09	1.49	Table 1a	%db	dec	°C	ERH	17	–	
e. Ear corn	a	0.000064424	2.0855	22.15	4.16	9.75	Table 1a	%db	dec	°C	ERH	17	56	
	b	447.05	0.1872	30.445	4.72	11.89	Table 1a	%db	dec	°C	ERH	17	56	
	d	15.306	–0.084674	2.9764	4.56	11.63	Table 1a	%db	dec	°C	ERH	17	56	
c. Cracked Corn	a-Des.	0.000056	2.1438	33.1421	0.03	7.57	Table 1a	%db	dec	20–65 °C	ERH	11(d)		
	b-Des.	455.4	0.2077	28.4067	0.02	5.19	Table 1a	%db	dec	20–65 °C	ERH			
	c-Des.	5.2653	–0.0148	2.1389	0.05	13.10	Table 1a	%db	dec	20–65 °C	ERH			
	d-Des.	13.6092	–0.068	3.1206	0.03	8.84	Table 1a	%db	dec	20–65 °C	ERH			
d. Dehulled Corn	c-Des.	2.662	–0.00469	1.3139	0.03	10.15	Table 1a	%db	dec	50–60 °C	ERH	82(d)		
(cv. Dekalb 3F21)	d-Des.	9.1313	–0.0127	2.1317	0.02	6.59	Table 1a	%db	dec	50–60 °C	ERH			
f. Hybrid 647	a. Ads.	0.7974	2.06	44.994	1.224	8.3	Table 1a	%db	dec	5–55 °C	ERH	107		
	a. Des.	0.8475	2.164	43.1112	1.046	7	Table 1a	%db	dec	5–55 °C	ERH			
	b. Ads.	493.18	19.056	51.269	1.112	6.9	Table 1a	%db	dec	5–55 °C	ERH			
	b. Des.	522.73	18.305	48.387	0.996	5.6	Table 1a	%db	dec	5–55 °C	ERH			
	d. Ads.	0.1357	–0.00075	3.067	0.531	3.9	Table 1a	%db	dec	5–55 °C	ERH			
	d. Des.	0.1483	–0.00083	3.207	1.186	5.6	Table 1a	%db	dec	5–55 °C	ERH			
g. Hybrid 704	a. Ads.	0.7173	2.075	51.412	1.156	5.2	Table 1a	%db	dec	5–55 °C	ERH	107		
	a. Des.	0.7175	2.146	50.918	1.055	6.8	Table 1a	%db	dec	5–55 °C	ERH			
	b. Ads.	542.95	18.782	57.985	1.064	6.2	Table 1a	%db	dec	5–55 °C	ERH			
	b. Des.	560.73	18.011	54.991	0.982	5.6	Table 1a	%db	dec	5–55 °C	ERH			
	d. Ads.	0.1367	–0.00071	3.079	0.533	3.8	Table 1a	%db	dec	5–55 °C	ERH			
	d. Des.	0.1478	–0.00078	3.186	0.705	4.3	Table 1a	%db	dec	5–55 °C	ERH			
h. Kernels	a. Ads. (25 °C)	7.12E–05	1.852	81.262	2.778	4.73	Table 1a	%db	dec	25 °C	ERH	102		
	b. Ads. (25 °C)	544.478	0.1689	90.08	2.37	4.1	Table 1a	%db	dec	25 °C	ERH			
	c. Ads. (25 °C)	4.437	–8.88E–02	1.9331	3.85	8.19	Table 1a	%db	dec	25 °C	ERH			
	d. Ads. (25 °C)	12.411	–4.80E–02	2.6597	2.54	3.76	Table 1a	%db	dec	25 °C	ERH			
	a. Ads. (50 °C)	1.27E–05	1.58E+00	87.51	2.75	4.33	Table 1a	%db	dec	50 °C	ERH			
	b. Ads. (50 °C)	438.12	1.43E–01	95.59	2.77	4.44	Table 1a	%db	dec	50 °C	ERH			
	c. Ads. (50 °C)	3.978	–8.57E–03	1.729	3.826	7.17	Table 1a	%db	dec	50 °C	ERH			
	d. Ads. (50 °C)	14.146	–7.92E–02	2.606	4.46	9.35	Table 1a	%db	dec	50 °C	ERH			
	a. Des. (25 °C)	3.70E–05	2.08	66.624	2.13	3.44	Table 1a	%db	dec	25 °C	ERH			
	b. Des. (25 °C)	532.5	0.17075	61.58	1.7	2.52	Table 1a	%db	dec	25 °C	ERH			
	c. Des. (25 °C)	5.717	–0.017	2.299	3.646	6.27	Table 1a	%db	dec	25 °C	ERH			
	d. Des. (25 °C)	14.3784	–6.10E–02	3.232	2.165	3.11	Table 1a	%db	dec	25 °C	ERH			
	a. Des. (50 °C)	7.98E–05	1.7872	82.265	3.39	4.87	Table 1a	%db	dec	50 °C	ERH			
	b. Des. (50 °C)	480.85	0.1582	85.03	2.94	4.46	Table 1a	%db	dec	50 °C	ERH			
	c. Des. (50 °C)	5.1788	–8.81E–02	2.1847	5.05	7.1	Table 1a	%db	dec	50 °C	ERH			
	d. Des. (50 °C)	12.861	–5.09E–02	2.7513	3.54	5.3	Table 1a	%db	dec	50 °C	ERH			
4. Millet	a-Ads.	0.000011	52.7007	2.4264	0.03	6.50	Table 1a	%db	dec	20–40 °C	ERH	3(d)		
(cv. Bx-Borno)	b-Ads.	628.6	0.1643	47.3885	0.01	1.81	Table 1a	%db	dec	20–40 °C	ERH			
	c-Ads.	6.5414	–0.0138	2.4283	0.03	9.15	Table 1a	%db	dec	20–40 °C	ERH			
	d-Ads.	17.2672	–0.0790	3.5194	0.01	3.29	Table 1a	%db	dec	20–40 °C	ERH			
	a-Des.	0.000004086	2.4823	103.9000	0.02	4.47	Table 1a	%db	dec	20–40 °C	ERH			
	b-Des.	1012.4000	0.1423	92.1836	0.02	2.77	Table 1a	%db	dec	20–40 °C	ERH			
	c-Des.	6.8733	–0.0083	2.4781	0.05	12.91	Table 1a	%db	dec	20–40 °C	ERH			
	d-Des.	18.9711	–0.0551	3.5849	0.03	4.97	Table 1a	%db	dec	20–40 °C	ERH			

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				P ³⁾	Data Specification ⁴⁾	Variable Format ⁵⁾			Model ⁶⁾	Source ⁷⁾	Reference
		A	B	C	S.E. ²⁾			EMC	ERH	Temp			
5. Oats													
a. cv. Dumont	b	433.157	21.581	41.439	0.89	5.90	Table 1a	dec, db	dec	°C	ERH	49	–
b. Newman	a	0.000085511	2.0087	37.811	2.55	5.12	RH:15–92%, T:25–65C,Ads	%db	dec	°C	ERH	17	11
	b	442.85	0.21228	35.803	2.02	3.78	RH:15–92%, T:25–65C,Ads	%db	dec	°C	ERH	17	11
	d	12.412	–0.060707	2.9397	2.34	4.83	RH:15–92%, T:25–65C,Ads	%db	dec	°C	ERH	17	11
6. Rice													
a. Rough Rice													
a1. Long grain (cv. Inga, Australia)	a	0.000041276	2.1191	49.828	2.39	4.91	RH:19–97%, T:10–38C,Des	%db	dec	°C	ERH	17	71
	b	412.02	0.17528	39.016	1.90	3.58	RH:19–97%, T:10–38C,Des	%db	dec	°C	ERH	17	71
	d	14.431	–0.07886	3.137	2.96	5.78	RH:19–97%, T:10–38C,Des	%db	dec	°C	ERH	17	71
a2. Medium grain (cv. CSM5, California)	a	0.000035502	2.31	27.396	1.96	5.19	Table 1a	%db	dec	°C	ERH	17	95
	b	363.06	0.1804	26.674	1.78	4.04	Table 1a	%db	dec	°C	ERH	17	95
a3. Short grain (Nipponbare, Japan)	a	0.000048524	2.0794	45.646	1.85	3.42	Table 1a	%db	dec	°C	ERH	17	50
	b	433.88	0.1686	48.282	1.92	3.78	Table 1a	%db	dec	°C	ERH	17	50
	d	14.816	–0.087027	2.8368	2.83	5.30	Table 1a	%db	dec	°C	ERH	17	50
a4. Rough Rice	a. Ads. (25 °C)	8.77E–05	1.8125	61.43	3.45	6.08	Table 1a	%db	dec	25 °C	ERH	102	
	b. Ads. (25 °C)	445.17	0.1575	71.386	3.09	4.58	Table 1a	%db	dec	25 °C	ERH		
	c. Ads. (25 °C)	4.443	–1.09E–02	1.8611	3.08	6.68	Table 1a	%db	dec	25 °C	ERH		
	d. Ads. (25 °C)	13.117	6.77E–02	2.6074	2.67	5.72	Table 1a	%db	dec	25 °C	ERH		
	a. Ads. (50 °C)	9.32E–05	1.81E+00	72.36	3.665	7.346	Table 1a	%db	dec	50 °C	ERH		
	b. Ads. (50 °C)	507.7	1.17E+00	85.85	3.155	7.39	Table 1a	%db	dec	50 °C	ERH		
	c. Ads. (50 °C)	11.946	–4.76E–02	2.787	4.129	14.11	Table 1a	%db	dec	50 °C	ERH		
	d. Ads. (50 °C)	5.423	–1.04E–02	2.346	6.11	22.89	Table 1a	%db	dec	50 °C	ERH		
	a. Des. (25 °C)	6.26E–05	1.9467	57.038	2.04	3.93	Table 1a	%db	dec	25 °C	ERH		
	b. Des. (25 °C)	431.78	0.1678	54.07	2.34	4.23	Table 1a	%db	dec	25 °C	ERH		
	c. Des. (25 °C)	4.84	2.9219	1.9868	4.23	10	Table 1a	%db	dec	25 °C	ERH		
	d. Des. (25 °C)	14.086	–6.80E–02	2.9219	2.48	5.28	Table 1a	%db	dec	25 °C	ERH		
	a. Des. (50 °C)	6.63E–05	1.97148	72.205	3.772	12.42	Table 1a	%db	dec	50 °C	ERH		
	b. Des. (50 °C)	557.85	0.194	78.32	3.316	10.49	Table 1a	%db	dec	50 °C	ERH		
c. Des. (50 °C)	4.667	–1.01E–02	2.064	3.622	16.97	Table 1a	%db	dec	50 °C	ERH			
d. Des. (50 °C)	11.565	–4.86E–02	2.882	2.96	13.29	Table 1a	%db	dec	50 °C	ERH			
b. Brown Rice													
(Nipponbare)	a	0.000032301	2.2482	34.267	0.90	1.91	Table 1a	%db	dec	°C	ERH	17	50
b3. Raw Brown Rice	a-Mix.	1.07E–05	2.4831	99.067	0.63	2.1	Table 1a	%db	dec	13–40 °C	EMC	110	
	b-Mix.	1967	21.4233	190.85	0.81	3.11	Table 1a	%db	dec		EMC		
b4. Parboiled Brown rice	a-Mix.	9.59E–05	2.5821	112.33	0.4	1.54	Table 1a	%db	dec	13–40 °C	EMC	110	
	b-Mix.	3684.5	23.95	340.96	0.58	2.51	Table 1a	%db	dec		EMC		
b5. Brown Rice	a. Des. (25 °C)	3.33E–05	2.2512	34.25	2.89	4.08	Table 1a	%db	dec	25 °C	ERH	102	
	b. Des. (25 °C)	432.23	0.1752	37.25	2.92	4.29	Table 1a	%db	dec	25 °C	ERH		
	c. Des. (25 °C)	5.8459	–1.51E–02	2.135	7.48	12.26	Table 1a	%db	dec	25 °C	ERH		
	d. Des. (25 °C)	15.789	–9.25E–02	3.152	3.26	5.05	Table 1a	%db	dec	25 °C	ERH		
	a. Des. (50 °C)	3.75E–05	2.047	87.08	2.527	5.157	Table 1a	%db	dec	50 °C	ERH		
	b. Des. (50 °C)	546.265	0.1729	74.481	2.391	6.073	Table 1a	%db	dec	50 °C	ERH		
	c. Des. (50 °C)	4.485	–8.63E–02	1.898	4.22	12.735	Table 1a	%db	dec	50 °C	ERH		
	d. Des. (50 °C)	12.8924	–4.87E–02	2.8841	2.64	6.54	Table 1a	%db	dec	50 °C	ERH		
c. Parboiled Rice	a-Mix.	0.000015	2.7134	30.2352	0.03	4.99	Table 1a	%db	dec	25–38 °C	ERH	44(d)	
	b-Mix.	557.2	0.2363	25.3119	0.03	7.92	Table 1a	%db	dec	25–38 °C	ERH		
	c-Mix.	6.4673	–0.0179	2.6184	0.05	17.73	Table 1a	%db	dec	25–38 °C	ERH		
	d-Mix.	13.4893	–0.0723	3.8411	0.03	9.71	Table 1a	%db	dec	25–38 °C	ERH		

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	Variable Format ⁵⁾			Model ⁶⁾	Source ⁷⁾	Reference
		A	B	C	EMC				ERH	Temp				
d. Instant Rice	a-Mix.	0.000079	2.3983	3.9304	0.03	8.20	Table 1a	%db	dec	25–38 °C	ERH	44(d)		
	b-Mix.	263.2	0.2449	2.6236	0.02	5.92	Table 1a	%db	dec	25–38 °C	ERH			
	c-Mix.	5.9181	–0.0301	2.3556	0.04	15.74	Table 1a	%db	dec	25–38 °C	ERH			
e. Milled Rice	b-Mix.	212.8	0.2143	0.1	0.02	7.02	Table 1a	%db	dec	25 °C	ERH	44(d)		
	c-Mix.	4.9711	0.031	2.5154	0.05	17.45	Table 1a	%db	dec	25 °C	ERH			
	d-Mix.	9.1289	0.1	3.6169	0.03	9.04	Table 1a	%db	dec	25 °C	ERH			
f. Raw Paddy	a-Mix.	3.38E–05	2.2464	77.922	0.7	2.69	Table 1a	%db	dec	13–40 °C	EMC	110		
	b-Mix.	1152.1	22.2533	140.23	0.36	1.49	Table 1a	%db	dec	13–40 °C	EMC			
g. Parboiled Paddy	a-Mix.	2.07E–05	2.3936	117.39	0.7	2.85	Table 1a	%db	dec	13–40 °C	EMC	110		
	b-Mix.	3914.7	25.2366	479.72	0.57	2.86	Table 1a	%db	dec	13–40 °C	EMC			
7. Rye	a-Mix.	0.00006343	2.2060	13.1810	0.05	7.75	Table 1a	%db	dec	26.5 °C	ERH	20(d)		
	b-Mix.	461.0230	0.1840	38.7410	0.03	3.79	Table 1a	%db	dec	26.5 °C	ERH			
	c-Mix.	4.2970	0.0380	2.2710	0.02	4.51	Table 1a	%db	dec	26.5 °C	ERH			
	d-Mix.	11.8870	0.0210	3.2620	0.01	1.81	Table 1a	%db	dec	26.5 °C	ERH			
8. Sorghum (Kalir)	b	797.33	0.18159	52.238	1.37	2.49	Table 1a	%db	dec	°C	ERH	17	29	
9. Wheat														
a. Durum (Wakooma)	d	13.101	–0.052626	2.9987	0.83	1.27	Table 1a	%db	dec	°C	ERH	17	65	
b. Hard Red Spr. (Sinton)	b	610.34	0.15526	93.213	0.93	0.99	Table 1a	%db	dec	°C	ERH	17	65	
c. Hard Red Winter (Waldron)	a	0.000043295	2.1119	41.565	3.80	8.53	RH:11–93%,T:5–45C,Des	%db	dec	°C	ERH	17	86	
	b	377.52	0.16456	35.59	2.46	5.59	RH:11–93%,T:5–45C,Des	%db	dec	°C	ERH	17	86	
	d	15.868	–0.10378	3.0842	2.15	4.31	RH:11–93%,T:5–45C,Des	%db	dec	°C	ERH	17	86	
(Napayo)	d	14.736	–0.05459	3.3357	1.75	3.52	RH:8–92%,T:5–25C,Des	%db	dec	°C	ERH	17	65	
d. Softwinter (cv. Hobbit)	a-Ads.	0.000084	2.2854	0.01	0.02	3.84	Table 1a	%db	dec	25 °C	ERH	38(d)		
	b-Ads.	201.6	0.1965	0.09	0.01	1.48	Table 1a	%db	dec	25 °C	ERH			
	c-Ads.	5.2734	0.031	2.5787	0.03	5.93	Table 1a	%db	dec	25 °C	ERH			
	d-Ads.	–2.8931	0.61	3.566	0.01	2.14	Table 1a	%db	dec	25 °C	ERH			
	a-Des.	0.000061	2.37	0.001	0.02	3.47	Table 1a	%db	dec	25 °C	ERH			
	b-Des.	218.6	0.1956	0.09	0.01	2.75	Table 1a	%db	dec	25 °C	ERH			
	c-Des.	5.5187	0.031	2.6385	0.04	8.66	Table 1a	%db	dec	25 °C	ERH			
	d-Des.	–2.4189	0.61	3.7008	0.02	3.66	Table 1a	%db	dec	25 °C	ERH			
	e. White	a-Mix.	0.000111	2.1013	5	0.04	10.87	Table 1a	%db	dec	26.5 °C		ERH	20(d)
b-Mix.	178.1	0.1861	0.09	0.03	6.97	Table 1a	%db	dec	26.5 °C	ERH				
c-Mix.	4.4263	0.031	2.282	0.02	3.96	Table 1a	%db	dec	26.5 °C	ERH				
d-Mix.	–4.1451	0.61	3.2066	0.02	4.65	Table 1a	%db	dec	26.5 °C	ERH				
B. Fibrous Materials & Selected Feedstuffs														
1. Pellets														
a1. 1/4" alfalfa dehy	a	9.171	6.894	2.609	0.41	–	Table 1b	dec, db	dec	°C	ERH	28	–	
	b	276.774	19.115	35.856	0.21	–	Table 1b	dec, db	dec	°C	ERH	28	–	
	c	–4.586	–0.02	1.987	0.12	–	Table 1b	dec, db	dec	°C	ERH	28	–	
	d	0.121	–0.000965	2.673	0.13	–	Table 1b	dec, db	dec	°C	ERH	28	–	
a2. 5/16" alfalfa suncure	a	6.796	14.999	2.678	0.42	–	Table 1b	dec, db	dec	°C	ERH	28	–	
	b	312.576	17.684	49.336	0.18	–	Table 1b	dec, db	dec	°C	ERH	28	–	
	c	–4.175	–0.016	1.791	0.16	–	Table 1b	dec, db	dec	°C	ERH	28	–	
	d	0.119	–0.00077	2.557	0.15	–	Table 1b	dec, db	dec	°C	ERH	28	–	
b. Laying Mash Pellet	a-Ads.	0.00017	1.6198	52.7753	0.05	11.81	Table 1b	%db	dec	25–65 °C	ERH	11(d)		
	b-Ads.	416.4000	0.1781	56.3734	0.05	9.80	Table 1b	%db	dec	25–65 °C	ERH			
	c-Ads.	3.9064	–0.0120	1.6659	0.02	7.03	Table 1b	%db	dec	25–65 °C	ERH			
	d-Ads.	12.7075	–0.0648	2.3812	0.03	5.90	Table 1b	%db	dec	25–65 °C	ERH			

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	Variable Format ⁵⁾			Model ⁶⁾	Source ⁷⁾	Reference
		A	B	C	EMC				ERH	Temp				
2. Grass & Hay														
a. Alfalfa Hay														
a1. Fresh, undried	a-Mix.	0.000108	1.8804	43.0000	0.05	8.77	Table 1b	%db	dec	22 °C	ERH	23(d)		
	b-Mix.	361.8000	0.1734	50.0000	0.05	7.60	Table 1b	%db	dec	22 °C	ERH			
	c-Mix.	3.7677	0.0310	2.0051	0.02	3.45	Table 1b	%db	dec	22 °C	ERH			
	d-Mix.	11.1254	0.0061	2.7224	0.04	6.00	Table 1b	%db	dec	22 °C	ERH			
a2. Fresh, barn-dried	a-Mix.	0.000128	1.7279	57.2000	0.02	3.61	Table 1b	%db	dec	22 °C	ERH	23(d)		
	b-Mix.	337.5000	0.1579	58.0000	0.01	2.73	Table 1b	%db	dec	22 °C	ERH			
	c-Mix.	3.6488	0.0170	1.8585	0.03	6.41	Table 1b	%db	dec	22 °C	ERH			
	d-Mix.	11.0866	-0.00081	2.6096	0.02	2.13	Table 1b	%db	dec	22 °C	ERH			
a3. Stem, barn-dried	a-Mix.	0.000122	1.8852	54.2000	0.04	21.59	Table 1b	%db	dec	22 °C	ERH	23(d)		
	b-Mix.	366.3000	0.2126	44.0000	0.03	14.70	Table 1b	%db	dec	22 °C	ERH			
	c-Mix.	3.8404	0.0200	2.0995	0.01	4.50	Table 1b	%db	dec	22 °C	ERH			
	d-Mix.	10.3003	-0.0350	2.9205	0.02	9.37	Table 1b	%db	dec	22 °C	ERH			
a4. Leaves, barn-dried	a-Mix.	0.000102	1.9700	38.0000	0.06	26.60	Table 1b	%db	dec	22 °C	ERH	23(d)		
	b-Mix.	403.1000	0.1997	43.0000	0.04	18.19	Table 1b	%db	dec	22 °C	ERH			
	c-Mix.	4.1002	0.0300	2.1948	0.01	2.14	Table 1b	%db	dec	22 °C	ERH			
	d-Mix.	10.9084	-0.008	3.0448	0.03	14.23	Table 1b	%db	dec	22 °C	ERH			
a5. Finely divided	a-Mix.	0.000167	1.5365	83.0200	0.04	11.54	Table 1b	%db	dec	25 °C	ERH	94(d)		
	b-Mix.	304.4000	0.1515	61.0000	0.01	2.73	Table 1b	%db	dec	25 °C	ERH			
	c-Mix.	3.1588	-0.0038	1.4906	0.02	7.92	Table 1b	%db	dec	25 °C	ERH			
	d-Mix.	10.7880	-0.0180	2.1764	0.02	6.09	Table 1b	%db	dec	25 °C	ERH			
b. Prairie Hay (Finely divided)	a-Mix.	0.000052	2.5959	6.0500	0.04	12.90	Table 1b	%db	dec	29 °C	ERH	94(d)		
	b-Mix.	539.8000	0.2725	26.5300	0.03	9.43	Table 1b	%db	dec	29 °C	ERH			
	c-Mix.	4.2486	0.0330	2.4832	0.02	5.57	Table 1b	%db	dec	29 °C	ERH			
	d-Mix.	10.5117	-0.0300	3.6671	0.02	8.98	Table 1b	%db	dec	29 °C	ERH			
c. Red Clover (Extra green) (Finely divided)	a-Mix.	0.000095	1.9418	36.3231	0.07	13.57	Table 1b	%db	dec	27 °C	ERH	94(d)		
	b-Mix.	412.2000	0.1849	46.3000	0.05	15.05	Table 1b	%db	dec	27 °C	ERH			
	c-Mix.	3.8949	0.0200	2.0146	0.02	4.27	Table 1b	%db	dec	27 °C	ERH			
	d-Mix.	11.2390	-0.004	2.8663	0.04	12.15	Table 1b	%db	dec	27 °C	ERH			
d. Red Clover (Brown) (Finely divided)	a-Mix.	0.000102	1.8815	40.2000	0.06	21.67	Table 1b	%db	dec	29 °C	ERH	94(d)		
	b-Mix.	407.8000	0.1821	46.9000	0.06	18.76	Table 1b	%db	dec	29 °C	ERH			
	c-Mix.	4.0939	0.0100	2.0029	0.03	8.74	Table 1b	%db	dec	29 °C	ERH			
	d-Mix.	11.2367	-0.007	2.8037	0.05	15.96	Table 1b	%db	dec	29 °C	ERH			
3. Straw														
a. Oat Straw (Threshed) (Finely divided)	a-Mix.	0.000104	1.9723	42.7000	0.04	13.47	Table 1b	%db	dec	29 °C	ERH	94(d)		
	b-Mix.	412.2000	0.2135	44.6000	0.03	9.37	Table 1b	%db	dec	29 °C	ERH			
	c-Mix.	3.6602	0.0110	1.9407	0.01	2.27	Table 1b	%db	dec	29 °C	ERH			
	d-Mix.	10.5022	-0.0300	2.8482	0.02	6.50	Table 1b	%db	dec	29 °C	ERH			
b. Wheat Straw	a	0.000238	1.212	139	4.80	-	Table 1b	%db	dec	°C	ERH	26		
	b	3.6041e5	0.122	111.3	5.00	-	Table 1b	%db	dec	°C	ERH	26		
4. Cotton lint														
a-Ads. b-Ads. c-Ads. d-Ads. a-Des. b-Des. c-Des. d-Des.	a-Ads.	0.000333	1.6645	66.2154	0.03	7.44	Table 1b	%db	dec	7.5–36 °C	ERH	6(d)		
	b-Ads.	369.6000	0.2739	62.6458	0.03	9.53	Table 1b	%db	dec	7.5–36 °C	ERH			
	c-Ads.	3.2377	-0.0139	1.7815	0.05	19.59	Table 1b, ERH: 0.23–0.98	%db	dec	7.5–36 °C	ERH			
	d-Ads.	7.5980	-0.0459	2.4837	0.03	12.32	Table 1b, ERH: 0.23–0.98	%db	dec	7.5–36 °C	ERH			
	a-Des.	0.000011	1.4616	3968.8000	0.03	7.78	Table 1b	%db	dec	36–50 °C	ERH			
	b-Des.	309192	0.2444	92471.8	0.03	8.43	Table 1b	%db	dec	36–50 °C	ERH			
	c-Des.	2.1377	-0.00087	1.3923	0.04	12.97	Table 1b	%db	dec	36–50 °C	ERH			
	d-Des.	5.9048	0.0054	2.0715	0.02	6.60	Table 1b	%db	dec	36–50 °C	ERH			

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				Variable Format ⁵⁾									
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾	Source ⁷⁾	Reference		
5. Corn Cobs															
a. Reduced	c	3.8877	-0.014623	1.6887	1.08	1.04	Table 1b	%db	dec	°C	ERH	90	17		
	d	12.628	-0.088889	2.131	1.05	1.22	Table 1b	%db	dec	°C	ERH	90	17		
b. Whole cob	d	12.417	-0.08268	2.839	3.46	9.82	Table 1b	%db	dec	°C	ERH	56	17		
c. Corn cobs	a. Ads. (25 °C)	2.50E-05	1.3683	122.21	2.848	3.83	Table 1b	%db	dec	25 °C	ERH	102			
	b. Ads. (25 °C)	375.42	0.1574	115.74	2.68	3.55	Table 1b	%db	dec	25 °C	ERH				
	c. Ads. (25 °C)	2.9764	-6.89E-02	1.5066	4.4	6.22	Table 1b	%db	dec	25 °C	ERH				
	d. Ads. (25 °C)	9.444	-3.25E-02	2.2124	3.51	5.36	Table 1b	%db	dec	25 °C	ERH				
	a. Ads. (50 °C)	8.02E-04	1.0336	93.878	2.915	5	Table 1b	%db	dec	50 °C	ERH				
	b. Ads. (50 °C)	235.14	0.1497	89.6	3.496	5.91	Table 1b	%db	dec	50 °C	ERH				
	c. Ads. (50 °C)	1.8494	-8.97E-02	1.108	4.62	7.85	Table 1b	%db	dec	50 °C	ERH				
	d. Ads. (50 °C)	7.969	-4.36E-03	1.6384	4.03	6.42	Table 1b	%db	dec	50 °C	ERH				
	a. Des. (25 °C)	1.35E-05	1.667	79.97	2.84	6.1	Table 1b	%db	dec	25 °C	ERH				
	b. Des. (25 °C)	427.01	0.1673	84.184	2.63	5.98	Table 1b	%db	dec	25 °C	ERH				
	c. Des. (25 °C)	3.2402	-1.05E-02	1.4809	6.62	20.4	Table 1b	%db	dec	25 °C	ERH				
	d. Des. (25 °C)	11.453	-0.563	2.4163	4.05	12.47	Table 1b	%db	dec	25 °C	ERH				
	a. Des. (50 °C)	6.57E-05	1.037	123.04	2.73	2.87	Table 1b	%db	dec	50 °C	ERH				
	b. Des. (50 °C)	240.85	0.14175	106.04	3.1	3.48	Table 1b	%db	dec	50 °C	ERH				
	c. Des. (50 °C)	2.226	-7.31E-02	1.3137	3.789	5.26	Table 1b	%db	dec	50 °C	ERH				
	d. Des. (50 °C)	7.4306	-3.60E-02	1.6966	3.05	3.86	Table 1b	%db	dec	50 °C	ERH				
6. Bran															
a. Rice Bran															
a1. Burmese (Unextracted)	a-Ads.	0.000091	1.6334	160.2000	0.02	2.85	Table 1b	%db	dec	15-35 °C	ERH	68(d)			
	b-Ads.	534.2000	0.1806	103.8000	0.02	2.31	Table 1b	%db	dec	15-35 °C	ERH				
	c-Ads.	5.5461	-0.00777	2.4703	0.01	0.67	Table 1b	%db	dec	15-35 °C	ERH				
	d-Ads.	10.8747	-0.0324	2.9655	0.01	1.17	Table 1b	%db	dec	15-35 °C	ERH				
	a-Des.	0.00003	2.0968	108.2000	0.01	1.73	Table 1b	%db	dec	15-35 °C	ERH				
	b-Des.	734.6000	0.1971	81.3100	0.01	0.86	Table 1b	%db	dec	15-35 °C	ERH				
	c-Des.	6.4496	-0.00953	2.6915	0.02	3.06	Table 1b	%db	dec	15-35 °C	ERH				
	d-Des.	12.7127	-0.0423	3.4572	0.01	1.52	Table 1b	%db	dec	15-35 °C	ERH				
	a2. Flour	a-Mix.	0.000167	1.6448	81.5000	0.03	8.89	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C		ERH	18(d)	
	b-Mix.	304.0000	0.1894	52.0000	0.03	7.46	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
c-Mix.	3.2328	-0.00008	1.6567	0.02	7.26	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH					
d-Mix.	9.9690	-0.0400	2.4192	0.02	3.04	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH					
a3. Raw Bran	a-Mix.	5.13E-05	2.0001	131.09	0.52	2.23	Table 1b	%db	dec	13-40 °C	EMC	110			
	b-Mix.	1227.9	22.26	204.87	0.43	2.01	Table 1b	%db	dec	13-40 °C	EMC				
a4. Parboiled Bran	a-Mix.	2.00E-05	2.0387	317.8	0.41	1.78	Table 1b	%db	dec	13-40 °C	EMC	110			
	b-Mix.	2839.3	22.4166	462.23	0.51	2.58	Table 1b	%db	dec	13-40 °C	EMC				
	a-Mix.	0.00162	1.6393	79.0000	0.03	5.92	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
	b-Mix.	312.0000	0.1789	56.0000	0.03	5.26	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
b. Corn Bran (Flour)	c-Mix.	3.3694	0.0007	1.6930	0.03	10.93	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH	18(d)			
	d-Mix.	10.1308	-0.0300	2.3956	0.02	5.18	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
	a-Mix.	0.000144	1.8293	66.0000	0.02	4.45	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
	b-Mix.	332.6101	0.2168	48.6574	0.02	3.75	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
c. Oat Bran (Flour)	c-Mix.	3.3538	0.0020	1.7795	0.03	9.75	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH	18(d)			
	d-Mix.	9.7247	-0.0500	2.6153	0.01	3.04	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
	a-Mix.	0.000172	1.5908	83.0000	0.03	4.57	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
	b-Mix.	304.6000	0.1727	57.5000	0.03	4.01	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
d. Wheat Bran (Flour)	c-Mix.	3.1579	-0.004	1.5440	0.04	11.41	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH	18(d)			
	d-Mix.	10.2198	-0.0300	2.2913	0.02	5.01	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				
	a-Mix.	0.000172	1.5908	83.0000	0.03	4.57	Table 1b, ERH: 0.11-0.85	%db	dec	23 °C	ERH				

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	Variable Format ⁵⁾			Model ⁶⁾	Source ⁷⁾	Reference
		A	B	C	EMC				ERH	Temp				
e. Soy Bran (Flour)	a-Mix.	0.000176	1.6370	86.0000	0.03	8.19	Table 1b, ERH: 0.11–0.85	%db	dec	23 °C	ERH	18(d)		
	b-Mix.	293.9000	0.1974	50.3000	0.03	7.01	Table 1b, ERH: 0.11–0.85	%db	dec	23 °C	ERH			
	c-Mix.	3.1929	–0.002	1.6531	0.03	8.36	Table 1b, ERH: 0.11–0.85	%db	dec	23 °C	ERH			
	d-Mix.	9.3256	–0.0300	2.3968	0.02	3.42	Table 1b, ERH: 0.11–0.85	%db	dec	23 °C	ERH			
f. Semi Defatted Pumpkin Seed Flour														
a. Ads.	0.000128	2.071307	2.433004	2.08	13.7	Table 1b	%db	dec	10–40 °C	ERH	112			
b. Ads.	460.1132	27.74161	0.28063	1.27	7.76	Table 1b	%db	dec	10–40 °C	ERH				
c. Ads.	4.789093	–0.01911	2.144373	1.13	8.13	Table 1b	%db	dec	10–40 °C	ERH				
d. Ads.	10.30609	–0.04126	0.325429	0.87	8.7	Table 1b	%db	dec	10–40 °C	EMC				
a. Des.	0.000221	1.737435	2.05947	3.09	18.25	Table 1b	%db	dec	10–40 °C	ERH				
b. Des.	541.2193	37.09307	0.255578	0.81	4.64	Table 1b	%db	dec	10–40 °C	ERH				
c. Des.	5.204184	–0.01465	2.292932	0.99	5.94	Table 1b	%db	dec	10–40 °C	ERH				
d. Des.	11.11582	–0.04543	0.29566	0.67	5.24	Table 1b	%db	dec	10–40 °C	EMC				
7. Hull/Shell														
a. Cotton seed Hull	a-Mix.	0.000097	1.9544	37.3000	0.03	3.53	Table 1b	%db	dec	25 °C	ERH	51(d)		
	b-Mix.	399.0000	0.1817	49.0000	0.02	2.70	Table 1b	%db	dec	25 °C	ERH			
	c-Mix.	5.7556	–0.0330	2.2128	0.03	5.13	Table 1b	%db	dec	25 °C	ERH			
	d-Mix.	11.2103	–0.0013	2.9842	0.02	3.55	Table 1b	%db	dec	25 °C	ERH			
b. Sunflower seed Hull	a-Mix.	0.000445	1.585	24.4258	2.21	15.46	Table 1b	%db	dec	10–55 °C	ERH	59	–	
	b-Mix.	208.591	21.386	19.69	2.83	13.56	Table 1b	%db	dec	10–55 °C	ERH	59	–	
	c-Mix.	3.9113	–0.0255	1.6923	4.64	13.29	Table 1b	%db	dec	10–55 °C	ERH	59	–	
c. Pumpkin seed Hull	a-Ads	0.000040993	2.7295	1366.799	0.01	–	Table 1b	%db	dec	10–60 °C	ERH	4	–	
	a-Des	0.000039334	2.61889	1311.143	0.01	–	Table 1b	%db	dec	10–60 °C	ERH	4	–	
	b-Ads	1326.68	18.032	238.819	0.02	–	Table 1b	dec, db	dec	10–60 °C	ERH	4	–	
	b-Des	1468.11	16.765	260.96	0.02	–	Table 1b	dec, db	dec	10–60 °C	ERH	4	–	
d. Peanut Hull	a. Des	0.00011321	1.8075	42.154	2.79	4.04	Table 1b	%db	dec	10–32 °C	ERH	17	7	
	b. Des	254.72	0.14307	39.836	2.78	4.08	Table 1b	%db	dec	10–32 °C	ERH	17	7	
e. Pistachio nut Hull	a-Ads.	0.00052	0.7328	291.4000	0.02	1.94	Table 1b	%db	dec	20 °C	ERH	10 (d)		
	b-Ads.	79.9943	0.067	52.0000	0.03	3.98	Table 1b	%db	dec	20 °C	ERH			
	c-Ads.	2.4146	–0.03	1.0898	0.01	1.05	Table 1b	%db	dec	20 °C	ERH			
	d-Ads.	9.0396	–0.08	1.3056	0.01	1.19	Table 1b	%db	dec	20 °C	ERH			
	a-Des.	0.000328	0.9121	175.0000	0.01	1.48	Table 1b	%db	dec	20 °C	ERH			
	b-Des.	167.1000	0.0501	111.0000	0.02	2.06	Table 1b	%db	dec	20 °C	ERH			
	c-Des.	3.6277	0.0100	1.5296	0.01	0.84	Table 1b	%db	dec	20 °C	ERH			
	d-Des.	13.0081	0.1000	1.7614	0.01	0.94	Table 1b	%db	dec	20 °C	ERH			
f. Pistachio nut Shell	a-Ads.	0.000334	1.2707	158.0000	0.03	3.15	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH	10 (d)		
	b-Ads.	128.0000	0.1831	30.7000	0.03	3.00	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			
	c-Ads.	3.2176	0.004	1.8789	0.01	0.95	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			
	d-Ads.	8.8830	–0.09	2.2911	0.01	1.00	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			
	a-Des.	0.000203	1.4780	100.0000	0.01	1.62	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			
	b-Des.	271.4000	0.1568	65.5000	0.01	1.56	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			
	c-Des.	3.6275	0.0100	1.8805	0.03	4.37	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			
	d-Des.	10.1580	–0.03	2.4503	0.02	2.76	Table 1b, EMC:fatfree basis	%db	dec	20 °C	ERH			

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				Variable Format ⁵⁾								
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾	Source ⁷⁾	Reference	
g. Corn Hull	a-Des.	1.724E-09	0.0000	7095444	0.03	7.26	Table 1b	%db	dec	50-60 °C	ERH	82 (d)		
	b-Des.	689210	0.1857	157680	0.03	6.43	Table 1b	%db	dec	50-60 °C	ERH			
	c-Des.	3.2464	-0.0011	1.6002	0.04	13.39	Table 1b	%db	dec	50-60 °C	ERH			
	d-Des.	8.6165	0.0176	2.4411	0.03	8.10	Table 1b	%db	dec	50-60 °C	ERH			
h. Rice hull	a. Des	0.000014449	1.9467	24.264	0.88	1.75	Table 1b	%db	dec	20 °C	ERH	17	50	
	b. Des	285.44	0.19738	27.733	1.69	4.2	Table 1b	%db	dec	20 °C	ERH	17	50	
8. DDGS														
a. 10% Solubles	c-Ads	3.35	0.01	1.64	4.64	21.18	Table 1b	%db	dec	10-40 °C	ERH	114		
	d-Ads	9.3	0.09	1.84	4.59	20.68	Table 1b	%db	dec	10-40 °C	ERH			
b. 15% Solubles	c-Ads	2.59	0.03	1.41	7.72	20.85	Table 1b	%db	dec	10-40 °C	ERH	114		
	d-Ads	6.83	0.28	1.6	7.92	20.73	Table 1b	%db	dec	10-40 °C	ERH			
c. 20% Solubles	c-Ads	2.76	0.02	1.33	8.41	18.62	Table 1b	%db	dec	10-40 °C	ERH	114		
	d-Ads	9.5	0.22	1.49	8.45	18.02	Table 1b	%db	dec	10-40 °C	ERH			
d. 25% Solubles	c-Ads	2.47	0.02	1.22	15.79	29.01	Table 1b	%db	dec	10-40 °C	ERH	114		
	d-Ads	9.67	0.29	1.39	16.15	27.24	Table 1b	%db	dec	10-40 °C	ERH			
9. Corn Leaf	a ads	0.000919	36.9385	1.1451	2.18	19.32	Table 1b	%db	dec	10-40 °C	ERH	100		
	b ads	104.6	13.3332	0.1296	3.1	21.35	Table 1b	%db	dec	10-40 °C	ERH			
	c ads	5.5105	-0.0255	2.2923	0.83	6.49	Table 1b	%db	dec	10-40 °C	ERH			
	d ads	12.8146	-0.1167	2.5634	0.78	6.03	Table 1b	%db	dec	10-40 °C	ERH			
10. Corn Stalk Skin	a ads	0.000472	73.5802	1.2425	1.3	11.17	Table 1b	%db	dec	10-40 °C	ERH	100		
	b ads	166.5	34.783	0.1434	1.66	13.23	Table 1b	%db	dec	10-40 °C	ERH			
	c ads	5.3053	-0.0126	2.4065	1.54	17.23	Table 1b	%db	dec	10-40 °C	ERH			
	d ads	10.8041	-0.058	2.7102	0.99	9	Table 1b	%db	dec	10-40 °C	ERH			
11. Corn Stalk Pith	a ads	0.0019	68.7153	0.7616	2.8	29.09	Table 1b	%db	dec	10-40 °C	ERH	100		
	b ads	65.6488	14.5591	0.0912	5.89	54.94	Table 1b	%db	dec	10-40 °C	ERH			
	c ads	3.7938	-0.0174	1.7461	2.31	16.49	Table 1b	%db	dec	10-40 °C	ERH			
	d ads	10.6099	-0.0946	1.9136	2.13	14.95	Table 1b	%db	dec	10-40 °C	ERH			
12. Corn Stalk	a ads	0.00085	65.2487	1.0587	1.74	17.33	Table 1b	%db	dec	10-40 °C	ERH	100		
	b ads	115.7	25.1278	0.1244	2.74	23.59	Table 1b	%db	dec	10-40 °C	ERH			
	c ads	4.7669	-0.0153	2.1592	1.45	14.29	Table 1b	%db	dec	10-40 °C	ERH			
	d ads	10.9137	-0.0746	2.4116	0.99	6.65	Table 1b	%db	dec	10-40 °C	ERH			
13. Citrus Leaves	a. ads	0.0018	-19.1442	1.391	3.2153	15.56	Table 1b	%db	dec	30-50 °C	EMC	104		
	b. ads	92.5579	-6.0337	0.1209	3.5268	19	Table 1b	%db	dec	30-50 °C	EMC			
	c. ads	3.9736	0.0024	1.8386	1.5254	5.345	Table 1b	%db	dec	30-50 °C	EMC			
	d. ads	11.1348	0.0134	2.319	2.0217	9.9931	Table 1b	%db	dec	30-50 °C	EMC			
	a. Des	0.001	-18.5039	1.3076	4.443	19.942	Table 1b	%db	dec	30-50 °C	EMC			
	b. Des	116.621	-10.422	0.1069	4.8965	21.1257	Table 1b	%db	dec	30-50 °C	EMC			
	c. Des	3.9825	0.0031	1.7312	1.5766	6.6272	Table 1b	%db	dec	30-50 °C	EMC			
	d. Des	12.1876	0.0412	2.1756	2.8343	12.5916	Table 1b	%db	dec	30-50 °C	EMC			
14. Switchgrass pellets	a. ads	3.70E-05	3.74E+04	1.76	0.0744	0.0484	Table 1b	%db	dec	6-50 °C	ERH	101		
	b. ads	1089.5	218.6	0.2	0.0553	0.0266	Table 1b	%db	dec	6-50 °C	ERH			
	c. ads	3.64	-0.004	1.82	0.174	0.128	Table 1b	%db	dec	6-50 °C	ERH			
	d. ads	9.38	-0.017	2.63	0.0599	0.0387	Table 1b	%db	dec	6-50 °C	ERH			
C. High Oil & Protein Materials														
1. High Oil Products														
a. Canola/Rapeseed														
a1. Candle (Rapeseed)	c	3.0026	-0.0048967	1.7607	0.35	0.35	Table 1c	%db	dec	°C	ERH	17	65	
a5. Tower (Rapeseed)	c	2.8748	-0.0074848	1.7007	0.79	1.1	Table 1c	%db	dec	°C	ERH	17	70	
a6. Tobin (Canola)	c	3.489	-0.010553	1.86	2.39	3.58	Table 1c	%db	dec	°C	ERH	17	77	
	d	8.1234	-0.04539	2.397	2.76	4.31	Table 1c	%db	dec	°C	ERH	17	77	

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants					Variable Format ⁵⁾						
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾	Source ⁷⁾	Reference
a2. Global	a-Mix	0.000225	1.7466	54.8825	0.05	14.66	Table 1c	%db	dec	25–50 °C	ERH	63(d)	
	d-Mix	9.0685	–0.0513	2.5892	0.03	6.63	Table 1c	%db	dec	25–50 °C	ERH	63(d)	
a3. Gulle	a-Ads	0.000324	1.349	173.1	0.03	4.84	Table 1c	%db	dec	5–35 °C	ERH	70(d)	
	d-Ads	6.3305	–0.0225	2.2081	0.01	1.86	Table 1c	%db	dec	5–35 °C	ERH	70(d)	
	a-Des	0.000261	1.5016	146.6	0.03	7.03	Table 1c	%db	dec	5–35 °C	ERH	70(d)	
	d-Des	6.6722	–0.0261	2.3157	0.01	2.37	Table 1c	%db	dec	5–35 °C	ERH	70(d)	
a4. Hektor	a-Ads.	0.000308	1.2267	256.7	0.02	2.997680952	Table 1c	%db	dec	5–35 °C	ERH	70(d)	
	b-Ads.	578.5	0.2181	227.5	0.02	3.245518221	Table 1c	%db	dec	5–35 °C	ERH		
	c-Ads.	2.5599	–0.00482	1.6571	0.01	0.744566601	Table 1c	%db	dec	5–35 °C	ERH		
	d-Ads.	–1.77E+09	3.55E+08	–0.0161	0.19	24.38841617	Table 1c	%db	dec	5–35 °C	ERH		
	a-Des.	0.000351	1.4236	124	0.02	4.041116964	Table 1c	%db	dec	5–35 °C	ERH		
	b-Des.	359.2	0.2316	100	0.02	3.031432029	Table 1c	%db	dec	5–35 °C	ERH		
	c-Des.	2.7637	–0.00794	1.655	0.02	3.178412316	Table 1c	%db	dec	5–35 °C	ERH		
	d-Des.	6.7956	–0.0306	2.2234	0.01	1.919173016	Table 1c	%db	dec	5–35 °C	ERH		
	a7. Wester	a-Ads.	0.000147	1.8125	95.2358	0.06	14.03611988	Table 1c	%db	dec	3.5–40 °C	ERH	91(d)
	b-Ads.	573.2	0.2514	100.2	0.05	12.08275516	Table 1c	%db	dec	3.5–40 °C	ERH		
	c-Ads.	3.6446	–0.00745	1.933	0.03	8.780376874	Table 1c	%db	dec	3.5–40 °C	ERH		
	d-Ads.	8.254	–0.0337	2.6764	0.04	10.58569536	Table 1c	%db	dec	3.5–40 °C	ERH		
	a-Des.	0.000185	1.8144	64.3719	0.06	14.4920836	Table 1c	%db	dec	3.5–40 °C	ERH		
	b-Des.	406.1	0.2403	65.063	0.05	12.54973961	Table 1c	%db	dec	3.5–40 °C	ERH		
	c-Des.	3.8491	–0.0117	1.9458	0.03	9.28977305	Table 1c	%db	dec	3.5–40 °C	ERH		
	d-Des.	8.9782	–0.0506	2.6952	0.04	10.81748082	Table 1c	%db	dec	3.5–40 °C	ERH		
b. Canola Meal	a. Mix	0.000103	1.6129	89.99	0.03	–	Table 1c	%db	dec	10–30 °C	ERH	17	45
	b. Mix	519.2	13.9	107.6	0.04	–	Table 1c	dec, db	dec	10–30 °C	ERH	17	45
c. Cotton seed													96
c1. Whole seed	a-Mix.	0.00015582	1.7569	75.0839	0.05	4.83	Table 1c	%db	dec	25 °C	ERH	51	96
	d-Ads.	8.0972	–0.1461	1.7259	0.05	3.51	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH		96
	a-Des.	0.00032594	1.0690	175.3211	0.01	1.40	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH		96
	b-Des.	179.8712	0.0980	87.0055	0.02	1.62	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH		96
	c-Des.	3.3015	0.004996	1.6366	0.02	1.68	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH		96
	b-Mix.	315.2937	0.2143	46.0603	0.04	3.77	Table 1c	%db	dec	25 °C	ERH		96
	c-Mix.	3.5964	0.0139	2.0258	0.02	2.15	Table 1c	%db	dec	25 °C	ERH		96
	d-Mix.	9.8891	–0.0540	2.6747	0.03	2.29	Table 1c	%db	dec	25 °C	ERH		96
	c2. Meats	a-Mix.	0.00020977	1.6464	102.6945	0.06	5.82	Table 1c	%db	dec	25 °C	ERH	
	b-Mix.	192.1220	0.2418	23.3334	0.05	5.26	Table 1c	%db	dec	25 °C	ERH		96
	c-Mix.	3.3210	0.003214	1.9377	0.02	1.56	Table 1c	%db	dec	25 °C	ERH		96
	d-Mix.	9.1709	–0.0828	2.5238	0.03	3.40	Table 1c	%db	dec	25 °C	ERH		96
c3. Meats (Oil Free)	a-Mix.	0.000156	1.6498	50	0.04	7.03	Table 1c	%db	dec	25 °C	ERH	51(d)	
	b-Mix.	224.4	0.149	30	0.05	6.42	Table 1c	%db	dec	25 °C	ERH		
	c-Mix.	3.663	0.031	1.964	0.02	3.06	Table 1c	%db	dec	25 °C	ERH		
	d-Mix.	–3.5335	0.61	2.548	0.03	4.75	Table 1c	%db	dec	25 °C	ERH		
d. Flax Seed (Linnot)	a. Mix	0.000176	1.9054	56.228	1.47	7.85	Table 1c	%db	dec	10–55 °C	ERH	60	
	b-Mix.	396.133	28.0501	42.0214	1.38	7.21	Table 1c	dec, db	dec	10–55 °C	ERH	60	
	c-Mix.	3.9662	–0.016	1.9776	2.49	10.17	Table 1c	%db	dec	10–55 °C	ERH	60	
d2 cv. Dufferin	a-Mix.	0.00017	1.9615	50	0.04	8.99	Table 1c	%db	dec	25 °C	ERH	60(d)	
	b-Mix.	300.5	0.2723	30	0.03	5.78	Table 1c	%db	dec	25 °C	ERH		
	c-Mix.	2.8459	0.031	2.0255	0.02	8.22	Table 1c	%db	dec	25 °C	ERH		
	d-Mix.	276.5	0.61	–124.7	0.57	192.95	Table 1c	%db	dec	25 °C	ERH		
d3 cv. McGregor	a-Mix.	0.000165	1.9571	50	0.04	9.47	Table 1c	%db	dec	25 °C	ERH	60(d)	
	b-Mix.	301.2	0.2672	30	0.03	5.81	Table 1c	%db	dec	25 °C	ERH		
	c-Mix.	2.871	0.031	2.0169	0.02	7.47	Table 1c	%db	dec	25 °C	ERH		
	d-Mix.	199.6	0.61	–100.4	0.57	192.95	Table 1c	%db	dec	25 °C	ERH		

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				Variable Format ⁵⁾								
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾	Source ⁷⁾	Reference	
d4 cv. Norlin	a-Mix.	0.000165	1.9573	50	0.57	192.95	Table 1c	%db	dec	25 °C	ERH	60(d)		
	b-Mix.	300.6	0.2678	30	0.03	7.23	Table 1c	%db	dec	25 °C	ERH			
	c-Mix.	2.8712	0.031	2.0223	0.02	6.92	Table 1c	%db	dec	25 °C	ERH			
	d-Mix.	199.3	0.61	-102.6	0.61	219.6	Table 1c	%db	dec	25 °C	ERH			
d5 cv. Norman	a-Mix.	0.000144	2.0319	50	0.04	10.09	Table 1c	%db	dec	25 °C	ERH	60(d)		
	b-Mix.	323.2	0.2797	30	0.03	6.83	Table 1c	%db	dec	25 °C	ERH			
	c-Mix.	3.0029	0.031	2.0951	0.02	5.36	Table 1c	%db	dec	25 °C	ERH			
	d-Mix.	277.1	0.61	-124.9	0.57	192.95	Table 1c	%db	dec	25 °C	ERH			
e. Mellon seed (Unshelled)	a-Des.	0.0012779	1.5026	15.6263	0.07	17.42	Table 1c	%db	dec	7-75 °C	ERH	27(d)		
	b-Des.	194.2842	0.3683	9.3336	0.07	17.44	Table 1c	%db	dec	7-75 °C	ERH			
	c-Des.	3.5979	-0.0287	1.8282	0.04	8.50	Table 1c	%db	dec	7-75 °C	ERH			
	d-Des.	7.8735	-0.0716	2.5799	0.03	6.75	Table 1c	%db	dec	7-75 °C	ERH			
f. Peanuts														
f1. Whole pods	d. Des	8.6588	-0.057904	2.6204	1.25	1.91	Table 1c	%db	dec	10-32 °C	ERH	17	7	
f2. Kernels	c. Des	3.9916	-0.017856	2.2375	2.55	4.28	Table 1c	%db	dec	10-32 °C	ERH	17	7	
	d. Des	6.9812	-0.04387	3.7021	2.79	4	Table 1c	%db	dec	10-32 °C	ERH	17	7	
g. Safflower Seed	a-Mix.	0.000203	1.8883	57.4013	1.11	7.71	Table 1c	%db	dec	10-55 °C	ERH	48	-	
	b-Mix.	408.823	29.23	48.281	0.96	5.94	Table 1c	dec, db	dec	10-55 °C	ERH	48	-	
	c-Mix.	3.7749	-0.0145	1.9808	2.77	7.85	Table 1c	%db	dec	10-55 °C	ERH	48	-	
	d-Mix.	8.206	-0.0465	2.794	1.40	6.09	Table 1c	%db	dec	10-55 °C	ERH	48	-	
h. Sunflower Seed														
h1. Seeds	a-Mix.	0.00031	1.7459	66.603	1.89	10.7	Table 1c	%db	dec	10-55 °C	ERH	59	17	
	b-Mix.	399.472	32.1403	53.4887	1.99	8.44	Table 1c	dec, db	dec	10-55 °C	ERH	59	17	
	c-Mix.	3.2945	-0.0143	1.8641	1.30	7.39	Table 1c	%db	dec	10-55 °C	ERH	59	17	
h2. Kernels	a-Mix.	0.000544	1.7566	59.3796	4.42	15.26	Table 1c	%db	dec	10-55 °C	ERH	59	17	
	b-Mix.	292.203	44.659	46.2161	4.63	13.13	Table 1c	dec, db	dec	10-55 °C	ERH	59	17	
	c-Mix.	2.7663	-0.0149	1.8375	2.18	9.37	Table 1c	%db	dec	10-55 °C	ERH	59	17	
i. Pistachio nut														
i1. Whole nut	a-Ads.	0.00042869	0.9984	236.8414	0.02	1.49	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH	10(d)		
	b-Ads.	89.0174	0.1286	38.9353	0.02	1.94	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
	c-Ads.	3.0177	-0.009246	1.6597	0.02	1.32	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
	d-Ads.	8.8855	-0.1059	1.9297	0.01	0.92	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
i2. Kernel	a-Ads.	0.00048993	0.9552	273.9845	0.03	2.20	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
	b-Ads.	176.8961	0.1447	101.8293	0.02	1.61	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
	c-Ads.	2.6135	-0.0295	1.4615	0.06	3.87	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
	d-Des.	10.4133	-0.0294	1.9387	0.02	1.43	Table 1c, EMC:fatfree basis	%db	dec	20 °C	ERH			
j. Pumpkin Seed														
j1. Seeds	a-Ads	0.000039718	3.1344	1671.698	0.01	-	Table 1c	%db	dec	10-60 °C	ERH	4	-	
	a-Des	0.000038345	3.026	1613.898	0.01	-	Table 1c	%db	dec	10-60 °C	ERH	4	-	
	b-Ads	926.82	22.121	218.655	0.01	-	Table 1c	dec, db	dec	10-60 °C	ERH	4	-	
	b-Des	926.85	21.116	229.761	0.02	-	Table 1c	dec, db	dec	10-60 °C	ERH	4	-	
j2. Kernels	a-Ads	0.000033725	3.4174	1728.729	0.01	-	Table 1c	%db	dec	10-60 °C	ERH	4	-	
	a-Des	0.000033045	3.3645	1697.76	0.00	-	Table 1c	%db	dec	10-60 °C	ERH	4	-	
	b-Ads	1079.25	32.013	130.898	0.01	-	Table 1c	dec, db	dec	10-60 °C	ERH	4	-	
	b-Des	1095.71	29.82	142.45	0.01	-	Table 1c	dec, db	dec	10-60 °C	ERH	4	-	

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants					Variable Format ⁵⁾						
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾	Source ⁷⁾	Reference
2. Legumes													
a. Dry Beans													
a1. Red	c-Mix	4.2669	-0.013382	1.6933	2.90	8.13	RH:11-90%, T:21-38C,Des	%db	dec	25 °C	ERH	17	33
a7. Pinto	c. Mix	4.4181	-0.011875	1.7571	1.78	4.88	RH:11-90%, T:21-38C,Des	%db	dec	25 °C	ERH	17	33
Baby lima	c-Mix	4.3867	-0.01208	1.727	3.26	8.27	RH:11-90%, T:21-38C,Des	%db	dec	25 °C	ERH	17	33
Black	c-Mix	5.2003	-0.022685	1.9856	2.36	2.95	RH:30-90%, T:10-38C,Des	%db	dec	25 °C	ERH	17	55
a8. Red beans	a. Ads. (25 °C)	5.05E-05	1.887	102.3	3.79	10.72	Table 1c	%db	dec	25 °C	ERH	102	
	b. Ads. (25 °C)	65.4	0.1699	103	2.99	8.1	Table 1c	%db	dec	25 °C	ERH		
	c. Ads. (25 °C)	4.7274	-4.78E-01	2.045	2.89	7.11	Table 1c	%db	dec	25 °C	ERH		
	d. Ads. (25 °C)	12.715	-4.63E-02	2.055	6.47	20	Table 1c	%db	dec	25 °C	ERH		
	a. Des. (25 °C)	7.30E-05	1.6088	135.6	3.07	4.88	Table 1c	%db	dec	25 °C	ERH		
	b. Des. (25 °C)	448.5	0.134	94.76	2.63	3.9	Table 1c	%db	dec	25 °C	ERH		
	c. Des. (25 °C)	4.509	-8.02E-02	1.879	2.2	2.8	Table 1c	%db	dec	25 °C	ERH		
	d. Des. (25 °C)	13.737	-4.65E-02	2.431	2.5	3.5	Table 1c	%db	dec	25 °C	ERH		
	a. Des. (50 °C)	1.03E-05	1.6142	88.04	3.15	5.95	Table 1c	%db	dec	50 °C	ERH		
	b. Des. (50 °C)	489.83	0.1353	104.02	2.53	4.22	Table 1c	%db	dec	50 °C	ERH		
	c. Des. (50 °C)	4.0717	-7.63E-02	1.7044	1.916	3.66	Table 1c	%db	dec	50 °C	ERH		
	d. Des. (50 °C)	12.665	-1.85E-02	2.4677	3.24	6.52	Table 1c	%db	dec	50 °C	ERH		
b. White Bean	a-Mix	0.1633	1.567	87.46	0.01	-	Table 1c	dec, db	dec	18-49 °C	EMC	45	17
	b-Mix	33.1	13.73	60.02	0.00	-	Table 1c	dec, db	dec	18-49 °C	EMC	45	17
	c-Mix	4.2277	-0.014751	1.7251	1.63	2.86	RH:18-90%, T:16-49C,Des	%db	dec	18-49 °C	ERH	17	-
c. Lentil	a-Des.	0.000147	1.5887	59.6923	0.05	12.02732178	Table 1c	%db	dec	5-30 °C	ERH	13(d)	
	b-Des.	323.7	0.129	65.6785	0.05	10.93780968	Table 1c	%db	dec	5-30 °C	ERH		
	c-Des.	4.3554	-0.0141	1.771	0.02	4.079541373	Table 1c	%db	dec	5-30 °C	ERH		
	d-Des.	14.8592	-0.1054	2.4432	0.03	6.674780736	Table 1c	%db	dec	5-30 °C	ERH		
c1. Lentil Seeds	a. Ads.	0.000155	16.55963	1.99265	1.88	10.33	Table 1c	%db	dec	5-60 °C	ERH	113	
	b. Ads.	351.622	57.39878	0.173882	1.05	8	Table 1c	%db	dec	5-60 °C	ERH		
	c. Ads.	3.8871	-0.01189	1.73036	1.42	6.74	Table 1c	%db	dec	5-60 °C	ERH		
	d. Ads.	11.77622	-0.0595	0.3951	0.69	5.28	Table 1c	%db	dec	5-60 °C	EMC		
	a. Des.	0.000207	21.63811	1.73806	2.07	10.59	Table 1c	%db	dec	5-60 °C	ERH		
	b. Des.	313.8682	36.83264	0.165797	0.93	5.92	Table 1c	%db	dec	5-60 °C	ERH		
	c. Des.	5.307779	-0.013708	2.182358	0.93	8.5	Table 1c	%db	dec	5-60 °C	ERH		
	d. Des.	13.89757	-0.076	0.35266	0.89	6.13	Table 1c	%db	dec	5-60 °C	EMC		
d. Soybeans													
d2. USA (cv. Essex)	c-Des.	2.87	-0.0054	1.38	0.00	-	Table 1c	%db	dec	5-35 °C	ERH	62	17
Britain	c-Des.	3.0446	-0.0054321	1.5245	0.59	0.87	Table 1c	%db	dec	5-35 °C	ERH	17	69
d3 var. Nigerian	a Ads	0.3002	-21.9192	50	0.50	100	Table 1c	%db	dec	30 °C	ERH	22(d)	
	b Ads	255.2	0.2378	30	0.05	0.64	Table 1c	%db	dec	30 °C	ERH		
	c Ads	1.9272	0.031	1.6196	0.02	0.349	Table 1c	%db	dec	30 °C	ERH		
	d Ads	-10.8066	0.61	2.3847	0.04	0.52	Table 1c	%db	dec	30 °C	ERH		
	a Des	0.000293	1.6058	50	0.04	11.68	Table 1c	%db	dec	30 °C	ERH		
	b Des	228.2	0.2072	30	0.04	11.43	Table 1c	%db	dec	30 °C	ERH		
	c Des	2.2258	0.031	1.7363	0.03	6.44	Table 1c	%db	dec	30 °C	ERH		
	d Des	984.6	0.61	-255	0.58	166.26	Table 1c	%db	dec	30 °C	ERH		
d4. TGX 1440-1E	a Des	6.00E-05	-292.3670	2.27	2.30	15.75	Table 1c	%db	dec	40-70 °C	EMC	99	
	b Des	188.854	-299.8020	0.1875	1.96	14.23	Table 1c	%db	dec	40-70 °C	EMC		
	c Des	19.204	-0.0365	0.30836	2.00	12.66	Table 1c	%db	dec	40-70 °C	EMC		
	d Des	61.831	-0.1510	3.72	1.91	10.15	Table 1c	%db	dec	40-70 °C	EMC		

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants					Variable Format ⁵⁾					Reference	
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾		Source ⁷⁾
e. Soybean Meal	a-Ads	0.000619	0.6766	204.2	0.04	6.78	Table 1c	%db	dec	15–35 °C	ERH	69(d)	
	d-Ads	11.7682	–0.0696	1.0832	0.04	6.09	Table 1c	%db	dec	15–35 °C	ERH	69(d)	
	a-Des.	0.00007629	2.6529	137.4	0.05	6.61	Table 1c	%db	dec	15–35 °C	ERH	69(d)	
	b-Des.	1453.8	0.2499	119.8	0.04	4.36	Table 1c	%db	dec	15–35 °C	ERH	69(d)	
	c-Des.	6.0849	–0.00717	2.6835	0.03	5.83	Table 1c	%db	dec	15–35 °C	ERH	69(d)	
	d-Des.	11.3343	–0.028	3.7524	0.03	3.92	Table 1c	%db	dec	15–35 °C	ERH	69(d)	
f. Winged Bean	a	8.19E–4	3.485	1.353	0.06	–	Table 1c	%db	dec	°C	ERH	2	17
	c	8.644	–0.0196	1.36	0.05	–	Table 1c	%db	dec	°K	ERH	2	17
g. Cowpea Nigerian	a-Ads.	0.000089	1.8888	36.8758	0.02	5.898109829	Table 1c	%db	dec	30–50 °C	ERH	22(d)	
	b-Ads.	373.4	0.1698	37.249	0.02	4.759653161	Table 1c	%db	dec	30–50 °C	ERH		
	c-Ads.	4.756	–0.015	1.9112	0.04	8.647314111	Table 1c	%db	dec	30–50 °C	ERH		
	d-Ads.	217.7	–2.7441	–53.6396	0.57	183.3792253	Table 1c	%db	dec	30–50 °C	ERH		
	a-Des.	0.000072	1.9487	35.4882	0.02	5.765874134	Table 1c	%db	dec	30–50 °C	ERH		
	b-Des.	389.6	0.1679	36.1462	0.02	4.767295936	Table 1c	%db	dec	30–50 °C	ERH		
	c-Des.	4.9815	–0.0151	1.9677	0.04	8.446424398	Table 1c	%db	dec	30–50 °C	ERH		
	d-Des.	195.6	–2.634	–47.3394	0.57	183.0569371	Table 1c	%db	dec	30–50 °C	ERH		
h. White Lupin	a-Ads.	0.00036764	1.1270	213.7552	0.04	5.80	Table 1c	%db	dec	25 °C	ERH	39(d)	
	b-Ads.	80.9871	0.1867	9.4018	0.07	9.85	Table 1c	%db	dec	25 °C	ERH		
	c-Ads.	2.3887	–0.03469	1.0975	0.03	4.22	Table 1c	%db	dec	25 °C	ERH		
	d-Ads.	8.5879	–0.1065	1.6042	0.01	1.39	Table 1c	%db	dec	25 °C	ERH		
	a-Des.	0.00038729	1.0632	226.5131	0.02	2.26	Table 1c	%db	dec	25 °C	ERH		
	b-Des.	108.5807	0.1681	26.1365	0.04	5.52	Table 1c	%db	dec	25 °C	ERH		
	c-Des.	2.4175	–0.03353	1.1231	0.05	5.56	Table 1c	%db	dec	25 °C	ERH		
	d-Des.	8.6546	–0.1039	1.5995	0.02	2.50	Table 1c	%db	dec	25 °C	ERH		
i. Pigeon Pea grain	a	0.000175	88.114	1.469	0.0372	3.905	Table 1c	%db	dec	10–50 °C	EMC	103	
	b	308.845	68.066	0.137	0.0365	3.583	Table 1c	%db	dec	10–50 °C	EMC		
	c	5.002	–0.011	2.083	0.0301	3.945	Table 1c	%db	dec	10–50 °C	EMC		
	d	13.155	–0.062	2.598	0.0285	3.243	Table 1c	%db	dec	10–50 °C	EMC		
J. Dehulled splits	a	0.00081	106.825	1.6613	0.0322	3.471	Table 1c	%db	dec	10–50 °C	EMC	103	
	b	433.224	76.95	0.1454	0.0297	3.223	Table 1c	%db	dec	10–50 °C	EMC		
	c	5.755	–0.0095	2.3255	0.0271	3.205	Table 1c	%db	dec	10–50 °C	EMC		
	d	13.8652	–0.51	2.8692	0.0269	3.205	Table 1c	%db	dec	10–50 °C	EMC		
K. Vetch Seeds	a. Ads	0.00025	56.4200	1.489	1.27	9.97	Table 1c	%db	dec	5–60 °C	ERH	98	
	b. Ads	418.9	68.2000	0.176	1.29	8.07	Table 1c	%db	dec	5–60 °C	ERH		
	c. Ads	4.302	–0.0100	1.916	0.69	5.65	Table 1c	%db	dec	5–60 °C	ERH		
	d. Ads	11.87	–0.0570	2.48	0.58	3.79	Table 1c	%db	dec	5–60 °C	ERH		
	a. Des	0.00017	43.0800	1.685	1.17	8.18	Table 1c	%db	dec	5–60 °C	ERH	98	
	b. Des	345.9	45.8000	0.165	0.97	6.42	Table 1c	%db	dec	5–60 °C	ERH		
	c. Des	4.498	–0.0150	1.859	1.54	6.46	Table 1c	%db	dec	5–60 °C	ERH		
	d. Des	13.77	–0.0830	2.65	0.85	4.32	Table 1c	%db	dec	5–60 °C	ERH		
D. Agricultural Byproducts													
1. Cocoa Beans (Nigerian)	a-Ads.	0.000127	2.0981	92.9957	0.05	7.484048312	Table 1d	%db	dec	15–35 °C	ERH	37 (d)	
	b-Ads.	813.4	0.3795	89.5502	0.04	5.632013459	Table 1d	%db	dec	15–35 °C	ERH		
	c-Ads.	4.28	–0.00904	2.498	0.02	1.842792603	Table 1d	%db	dec	15–35 °C	ERH		
	d-Ads.						Table 1d	%db	dec	15–35 °C	ERH		
	a-Des.	0.000096	1.9418	220.1	0.06	11.4860787	Table 1d	%db	dec	15–35 °C	ERH		
	b-Des.	1301.4	0.384	185.6	0.04	1.251653439	Table 1d	%db	dec	15–35 °C	ERH		
	c-Des.	36.0831	17.6826	–158	0.02	0.191468254	Table 1d	%db	dec	15–35 °C	ERH		
	d-Des.						Table 1d	%db	dec	15–35 °C	ERH		

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants					Variable Format ⁵⁾					
		A	B	C	S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	EMC	ERH	Temp	Model ⁶⁾	Source ⁷⁾
2. Hops (California Clusters)	a-Ads.	0.00020251	1.7891	103.7409	0.05	13.66	Table 1d	%db	dec	25 °C	ERH	42(d)
	b-Ads.	166.1239	0.3090	9.9230	0.04	11.91	Table 1d	%db	dec	25 °C	ERH	
	c-Ads.	3.1637	-0.003448	1.9336	0.02	2.06	Table 1d	%db	dec	25 °C	ERH	
	d-Ads.	8.6750	-0.1031	2.6968	0.03	8.13	Table 1d	%db	dec	25 °C	ERH	
	a-Des.	0.00020399	1.6962	103.9297	0.06	16.61	Table 1d	%db	dec	25 °C	ERH	
	b-Des.	153.0201	0.2682	10.3130	0.06	14.78	Table 1d	%db	dec	25 °C	ERH	
	c-Des.	3.0427	-0.008096	1.7119	0.02	4.99	Table 1d	%db	dec	25 °C	ERH	
	d-Des.	8.9666	-0.0914	2.4697	0.04	10.65	Table 1d	%db	dec	25 °C	ERH	
3. Potatoes (Desiree)	a-Ads.	0.000872	1.5444	-12.923	0.03	13.8754443	Table 1d	%db	dec	40–70 °C	ERH	87(d)
	b-Ads.	180.5	0.2392	-4.5084	0.04	17.0423309	Table 1d	%db	dec	40–70 °C	ERH	
	c-Ads.	3.5622	-0.0244	1.4162	0.04	14.7114557	Table 1d	%db	dec	40–70 °C	ERH	
	d-Ads.	12.84	-0.1128	2.1824	0.02	6.98344617	Table 1d	%db	dec	40–70 °C	ERH	
	a-Des.	0.00063	1.3847	18.3761	0.03	14.03733502	Table 1d	%db	dec	40–70 °C	ERH	
	b-Des.	280	0.2108	33.0307	0.03	18.53197445	Table 1d	%db	dec	40–70 °C	ERH	
	c-Des.	2.7938	-0.0159	1.2421	0.04	13.33029505	Table 1d	%db	dec	40–70 °C	ERH	
	d-Des.	10.9837	-0.0771	1.9208	0.03	10.08840802	Table 1d	%db	dec	40–70 °C	ERH	
4. Sugarbeet Root	a-Des.	0.000463	0.8874	132.4	0.05	69.48709042	Table 1d	%db	dec	20–65 °C	ERH	46(d)
	b-Des.	389.3	0.0996	132.3	0.07	90.55050108	Table 1d	%db	dec	20–65 °C	ERH	
	c-Des.	1.6147	-0.00733	0.7098	0.04	43.33738887	Table 1d	%db	dec	20–65 °C	ERH	
	d-Des.	14.6168	-0.0871	1.1421	0.05	59.10637801	Table 1d	%db	dec	20–65 °C	ERH	
5. Tobaccos												
a. Burley-21	a-Mix.	0.00026292	1.2040	137.2378	0.05	18.30	Table 1d	%db	dec	20 °C	ERH	73(d)
	b-Mix.	231.9514	0.1378	60.2597	0.07	24.24	Table 1d	%db	dec	20 °C	ERH	
	c-Mix.	2.6360	-0.02845	1.0805	0.02	12.82	Table 1d	%db	dec	20 °C	ERH	
	d-Mix.	10.4171	-0.02917	1.6712	0.03	7.34	Table 1d	%db	dec	20 °C	ERH	
a1. Burley 21	a-Mix.	0.0011	1.2820	46.58912	0.76	10.49	Table 1d	%db	dec	15–40 °C	ERH	97
	b-Mix.	184.5903	0.2897	31.85008	0.54	8.49	Table 1d	%db	dec	15–40 °C	ERH	
	c-Mix.	2.4049	-0.0195	1.438539	1.13	10.64	Table 1d	%db	dec	15–40 °C	ERH	
	d-Mix.	6.0836	-0.0396	0.463087	0.44	7.67	Table 1d	%db	dec	15–40 °C	ERH	
b. BY-4	a-Mix.	0.00039356	0.8137	215.7200	0.04	19.71	Table 1d	%db	dec	20 °C	ERH	73
	b-Mix.	222.9801	0.0832	89.6206	0.09	39.23	Table 1d	%db	dec	20 °C	ERH	
	c-Mix.	2.2418	-0.04805	0.7054	0.01	2.79	Table 1d	%db	dec	20 °C	ERH	
	d-Mix.	10.9872	-0.001083	1.0990	0.02	11.49	Table 1d	%db	dec	20 °C	ERH	
c. Matsukawa	a-Mix.	0.00022189	1.3556	112.8623	0.06	18.31	Table 1d	%db	dec	20 °C	ERH	
	b-Mix.	232.7083	0.1565	49.3807	0.07	18.77	Table 1d	%db	dec	20 °C	ERH	
	c-Mix.	2.8287	-0.01883	1.2534	0.03	15.38	Table 1d	%db	dec	20 °C	ERH	
	d-Mix.	10.3722	-0.03134	1.9178	0.04	6.81	Table 1d	%db	dec	20 °C	ERH	
d. Kroumougrad	a-Mix.	0.00040786	0.8559	224.3579	0.03	14.80	Table 1d	%db	dec	20 °C	ERH	
	b-Mix.	224.5520	0.1078	85.9011	0.08	32.71	Table 1d	%db	dec	20 °C	ERH	
	c-Mix.	2.2075	-0.05003	0.7344	0.01	6.52	Table 1d	%db	dec	20 °C	ERH	
	d-Mix.	10.0016	-0.0501156	1.1507	0.02	7.23	Table 1d	%db	dec	20 °C	ERH	
d1. Kroumougrad	a-Mix.	0.0001	1.5464	19.34265	0.53	7.91	Table 1d	%db	dec	15–40 °C	ERH	97
	b-Mix.	157.5002	0.3168	17.28218	0.63	6.92	Table 1d	%db	dec	15–40 °C	ERH	
	c-Mix.	2.8366	-0.0250	1.609356	0.72	8.91	Table 1d	%db	dec	15–40 °C	ERH	
	d-Mix.	6.7357	-0.0620	0.430652	0.40	7.87	Table 1d	%db	dec	15–40 °C	ERH	
e. Midrib	a-Mix.	0.00040117	0.7521	220.2976	0.04	20.17	Table 1d	%db	dec	20 °C	ERH	73
	b-Mix.	218.0852	0.0663	92.7863	0.09	41.74	Table 1d	%db	dec	20 °C	ERH	
	c-Mix.	2.2191	-0.04909	0.6462	0.01	2.06	Table 1d	%db	dec	20 °C	ERH	
	d-Mix.	11.8793	0.0426	1.0086	0.03	12.72	Table 1d	%db	dec	20 °C	ERH	
f. Plovdiv 187	a-Mix.	0.0012	1.5583	18.87026	0.47	7.33	Table 1d	%db	dec	15–40 °C	ERH	97
	b-Mix.	162.3446	0.3183	19.12322	0.55	8.99	Table 1d	%db	dec	15–40 °C	ERH	
	c-Mix.	2.7895	-0.0242	1.609689	0.75	8.19	Table 1d	%db	dec	15–40 °C	ERH	
	d-Mix.	6.7163	-0.0631	0.418364	0.35	6.41	Table 1d	%db	dec	15–40 °C	ERH	

Table 2 – Isotherm equation constants for agricultural products (continued)

Product	Eq. No. ¹⁾	Isotherm Equation Constants				S.E. ²⁾	P ³⁾	Data Specification ⁴⁾	Variable Format ⁵⁾			Model ⁶⁾	Source ⁷⁾	Reference
		A	B	C	EMC				ERH	Temp				
g. Virginia 454	a-Mix.	0.0001	1.6347	21.63707	0.44	6.54	Table 1d	%db	dec	15–40 °C	ERH	97		
	b-Mix.	180.8591	0.3459	19.27944	0.44	6.18	Table 1d	%db	dec	15–40 °C	ERH			
	c-Mix.	2.8725	–0.0235	1.687435	0.64	6.37	Table 1d	%db	dec	15–40 °C	ERH			
	d-Mix.	6.7356	–0.0620	0.430652	0.40	7.87	Table 1d	%db	dec	15–40 °C	ERH			
6. Yam	a. Des	0.619	2.055	18.464	n/a	6.2	Table 1d	%db	dec	20–62 °C	EMC	111		
	b. Des	0.389	0.069	10.712	n/a	5.9	Table 1d	%db	dec	20–62 °C	EMC			
	c. Des	–3.896	2.195	0.021	n/a	8	Table 1d	%db	dec	20–62 °C	EMC			
7. Sweet Potato	a	1.01	2.69	64.92	0.0612	0.989	Table 1d	%db	dec	5–50 °C	ERH	105		
	b	1085.5	17.87	62.9	0.0418	0.995	Table 1d	%db	dec	5–50 °C	ERH			
	c	–5.176	–0.0127	2.756	0.0241	0.998	Table 1d	%db	dec	5–50 °C	ERH			
	d	0.178	–0.00071	3.957	0.0409	0.995	Table 1d	%db	dec	5–50 °C	ERH			
8. Carrot	a	–0.01654	–567.385	0.62826	2.09E–02	26.3	Table 1d	%db	dec	10–50 °C	EMC	108		
	b	129.862	–3.19406	1660.55	1.60E–01	133.34	Table 1d	%db	dec	10–50 °C	EMC			
	c	–6.28581	–0.00815	1.38722	2.39E–02	18.35	Table 1d	%db	dec	10–50 °C	EMC			
	d	–0.06202	0.00046	1.5165	2.15E–02	19.69	Table 1d	%db	dec	10–50 °C	EMC			
E. Fruits and Vegetables														
1. Pitted cherries														
a. Freeze dried	d	13	–0.02	1.22	24.53	25.09	Table 1d	%db	dec	10–40 °C	ERH	106		
	c	1.9	–0.005	0.88	56.33	35.63	Table 1d	%db	dec	10–40 °C	ERH			
	a	0.001	0.81	950	13.89	27.44	Table 1d	%db	dec	10–40 °C	ERH			
b. Osmo-Freeze dried	b	81109	5.5	46034	12.76	52.16	Table 1d	%db	dec	10–40 °C	ERH			
	d	16	–0.08	1.22	30.02	30.31	Table 1d	%db	dec	10–40 °C	ERH			
	c	2.1	–0.008	0.88	70.16	43.15	Table 1d	%db	dec	10–40 °C	ERH			
c. Osmotic air dried	a	0.0002	0.82	389	10.73	22.87	Table 1d	%db	dec	10–40 °C	ERH			
	b	783	5.2	417	11.75	52.8	Table 1d	%db	dec	10–40 °C	ERH			
	d	20	–0.23	1.2	42.3	70.09	Table 1d	%db	dec	10–40 °C	ERH			
	c	2.5	–0.017	0.96	55.89	74.54	Table 1d	%db	dec	10–40 °C	ERH			
	a	0.0007	0.78	101	14.61	50.88	Table 1d	%db	dec	10–40 °C	ERH			
	b	2221	5.4	100	14.42	76.53	Table 1d	%db	dec	10–40 °C	ERH			
2. Blue berries														
a. Freeze dried	d	15.9	–0.07	1.33	21.29	15.43	Table 1d	%db	dec	10–40 °C	ERH	106		
	c	2.2	–0.007	0.93	55.51	30.76	Table 1d	%db	dec	10–40 °C	ERH			
	a	0.0002	0.91	261	4.98	11.36	Table 1d	%db	dec	10–40 °C	ERH			
b. Osmo-Freeze dried	b	475	6.1	213	7.77	31.88	Table 1d	%db	dec	10–40 °C	ERH			
	d	16	–0.07	1.36	19.87	15.2	Table 1d	%db	dec	10–40 °C	ERH			
	c	2.2	–0.007	0.96	43.32	25.87	Table 1d	%db	dec	10–40 °C	ERH			
c. Osmotic air dried	a	0.0002	0.93	293	8.75	19.14	Table 1d	%db	dec	10–40 °C	ERH			
	b	549	6.2	247	8.55	31.13	Table 1d	%db	dec	10–40 °C	ERH			
	d	15	–0.06	1.32	19.95	20.44	Table 1d	%db	dec	10–40 °C	ERH			
	c	2.1	–0.007	0.93	47.52	29.38	Table 1d	%db	dec	10–40 °C	ERH			
	a	0.0002	0.89	310	6.03	16.15	Table 1d	%db	dec	10–40 °C	ERH			
	b	762	6.3	369	9.27	36.67	Table 1d	%db	dec	10–40 °C	ERH			
3. Longan														
b	b	151.7605	0.0328	4.3457	16.6019	12.2386	Table 1d	%db	dec	30–50 °C	EMC	109		
	c	6.6225	–0.0274	1.5524	56.6602	19.5586	Table 1d	%db	dec	30–50 °C	EMC			
	d	79.9826	–0.8277	2.1867	18.4494	8.4974	Table 1d	%db	dec	30–50 °C	EMC			

¹⁾The equation series number in the section: Isotherm Equations

²⁾Standard Error of the residuals for dependent variable

³⁾p Value—mean relative percentage deviation for dependent variable

⁴⁾'RH'—relative humidity; 'T'—temperature; 'Ads'—adsorption; 'Des'—desorption

⁵⁾The format of variables when regression was done. 'dec'—decimal; 'C'—degree celsius; 'K'—Kelvin

⁶⁾The equation format when regression was done. 'ERH'—ERH as dependent variable; 'EMC'—EMC as dependent variable

⁷⁾(d)—obtained through non linear regression from the original source

Annex A
(informative)
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