Characterization of Normal and Waxy Corn Starch for Bioethanol Production

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Table 1. Pedigree Background, Country of Origin, and Race of GEM Normal and Waxy Corn Lines

	Inventory #	Pedigree	Code ^a	Country	Race
Waxy	08GEM05036	AR16035:S02-615-001-B wx	GEMS-0206	Arg	Cristalino Colorado
	08GEM05037	CUBA164:S2012-444-001-B wx	GEMS-0223	Cuba	Mixed Creole
	08GEM05038	CUBA164:S2012-966-001-B wx	GEMS-0185	Cuba	Mixed Creole
	08GEM05039	DKB844:S1601-003-002-B wx	N/A ^b	Mexico	Tropical hybrid
	08GEM05040	FS8A(S):S09-362-001-B wx	N/A	US	Mixed
	08GEM05042	DKXL370:N11a20-036-002-B wx	GEMN-0186	Brazil	Tropical hybrid
	08GEM05043	SCRO1:N1310-509-001-B wx	N/A	St. Croix	St. Croix
	08GEM05044	UR13085:N0215-014-001-B wx	N/A	Uruguay	Cateto Sulino
Normal	08GEM04701	DKB844:S1601-073-001-B-B-B-B-B-B	GEMS-0115	Mexico	Tropical hybrid
	08GEM04702	GEMS-0002	GEMS-0002	US	Mixed
	08GEM04703	BR52051(SE32):S17-B-023-001-B-B-Sib-B-B-B-B-B	GEMS-0003	Brazil	Dente Amarelo
	08GEM04704	BR51721:N2012-098-002-B-B-SIB-B	GEMN-0156	Brazil	Dente Amarelo

^a Codes of released GEM lines. ^b Not released or assigned.

Table 2. Percentages Starch-Hydrolysis (%) of the Dry-Grind Grain ^a

		Line	3h	10h	24h	72h	96h
2009 crop year	Waxy	5036	26.5±0.3	47.2±0.1	75.3±0.4	96.8±0.6	97.3±0.3
		5037	22.4±0.0	37.7±0.3	67.1±0.5	94.1±0.8	94.7±0.0
		5039	23.7±0.3	40.0±0.4	67.2±0.5	91.2±0.3	93.6±0.1
		5040	20.9±0.1	36.0±0.1	64.3±0.4	94.9±0.5	95.2±0.3
		5042	23.0±0.1	40.0±0.0	65.4±0.5	93.5±0.3	93.5±0.8
	Normal	4701	19.2±0.2	29.8±0.2	40.7±0.1	68.8±1.1	79.2±0.4
		4702	17.3±0.1	25.2±0.6	36.0±0.3	64.0±0.4	72.7±0.6
		4703	26.7±0.1	35.5±0.1	48.0±0.4	71.0±0.1	78.8±0.8
		4704	19.9±0.1	28.5±0.2	40.8±0.0	69.0±0.8	78.6±0.2
2010 crop year	Waxy	5036	24.3±0.5	48.7±0.7	76.6±1.7	93.5±1.6	97.3±1.3
		5037	23.6±0.2	44.4±0.1	71.9±0.7	93.3±0.6	96.0±0.1
		5039	26.2±0.1	48.1±0.6	75.2±1.0	94.8±1.0	95.8±1.4
		5040	24.7±0.4	43.6±0.3	71.5±0.4	92.3±0.0	94.5±0.7
		5042	24.8±0.1	47.2±1.0	72.2±0.1	92.0±0.4	94.1±0.7
	Normal	4701	19.2±0.1	28.9±0.1	40.2±0.1	68.4±0.5	77.7±0.3
		4702	21.4±0.3	29.7±0.5	40.5±0.4	68.6±0.6	75.0±0.4
		4703	27.0±0.1	35.9±0.1	48.7±0.7	71.2±0.5	78.6±0.9
		4704	20.9±0.1	29.3±0.1	40.4±0.6	69.2±0.6	78.4±0.4
<i>LSM</i> ± <i>SEM</i> ^b	Waxy		24.0a ±0.9	43.3a ±2.1	70.7a ±2.0	93.6a ±0.6	95.2a ±0.6
	Normal		21.5a ±1.0	30.4b ±2.2	41.9b ±2.1	68.8b ±0.7	77.4b ±0.7

^a Values are means ± standard deviations of two replicates. Different letters within the same columns indicate statistically different mean values (p<0.05). ^b Least squares means (*LSM*) ± standard errors (*SEM*). Different letters following the *LSM* values within the same columns indicate statistically different mean values (p<0.05).