甜瓜 *CmPOD* 家族基因鉴定及叶组织响应低温胁迫的表达分析

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Identification of the *CmPOD* Family Genes in the Melon and Expression Analysis of Leaf Tissues under Low-temperature Stress

附表 1 RT-qPCR 引物

Supplementary table1 RT-qPCR primer

基因名	基因 ID	序列 Sequences (5′–3′)	大　小 (bp)
CmPOD11-13	*MELO3C021297.1*	F1:TACTACATCGAGCTAACGAACCAC; R1:ATGACAACAACAAAATTCCAACAA	400
CmPOD1-3	*MELO3C018656.1*	F1:TGCCCACAGGACGAAGAGAT; R1:TCCACCCACGAGAGTGACAAG	146
CmPOD12-6	*MELO3C002391.1*	F3:GAAGGGCAACATGTGGAGTGA; R3:GGTGGCGGAAAATGGAGG	291
CmPOD4-3	*MELO3C009924.1*	F1:GGCTCCGTCCTCATCTCCTC; R1:AGCACCACATAACGCTACCATTT	357
CmPOD1-8	*MELO3C012610.1*	F3:AGACGAGACAGCACGAGGG; R3:TGGTAGGTTGGTTCCAGAAAAG	210
CmPOD8-4	*MELO3C007935.1*	F1:CCTCCTTTGCTGTGCTATTCTC; R1:TCTTTCTCTGCTATGTTGTTCCCTA	262
CmPOD11-14	*MELO3C021259.1*	F1:AGTCAATGGTGAAGATGGGAAG; R1:AAAAGTTGGGAGTTAAAAAGAGGA	247
CmPOD7-3	*MELO3C017603.1*	F1:ATTGGATAGTGCGACTGGGG; R1:CGGAGAGGTTGTATTTGCTGAA	129
CmPOD3-8	*MELO3C011261.1*	F1:CATTGTGCTTTCATCACCATCA; R1:TTCTATTCCCAACCACCGTCTA	394
CmPOD1-7	*MELO3C013362.1*	F1:GCCCCACCATTGACTTTGTT; R1:TTTAATAATCCCTCTGTTTCTCCTTT	280
EFla	*EFla*	F:ACTGTGCTGTCCTCATTATTG; R:AGGGTGAAAGCAAGAAGAGC	98

附表 2 CmPOD 家族理化性质分析

Table 2 Analysis of physicochemical properties of CmPOD family

名称 Gene name	基因 ID Gene ID	氨基酸长度 Amino acids lengh (aa)	分子质量 Molecular (Da)	等电点 pI	不稳定指数 Instability index	脂溶指数 Aliphatic index	平均亲水指数 GRAVY	跨膜结构域 TMD	亚细胞定位 Subcellular localization
CmPOD1-1	*MELO3C028585.1*	152	16631.29	6.89	44.55	100.53	0.209	PredHel=1	chlo
CmPOD1-2	*MELO3C028619.1*	191	21433.26	6.59	48.83	86.75	-0.267	PredHel=0	vacu
CmPOD1-3	*MELO3C018656.1*	328	35400.43	8.66	36.77	80.79	-0.005	PredHel=1	vacu
CmPOD1-4	*MELO3C018672.1*	324	34971.92	6.11	45.08	91.23	-0.003	PredHel=0	chlo
CmPOD1-5	*MELO3C018719.1*	314	34044.51	8.63	32.52	77.07	-0.168	PredHel=0	chlo
CmPOD1-6	*MELO3C018804.1*	328	35830.42	9.19	38.28	88.60	-0.019	PredHel=1	cyto
CmPOD1-7	*MELO3C013362.1*	286	31505.94	6.1	31.42	88.01	-0.330	PredHel=1	cyto
CmPOD1-8	*MELO3C012610.1*	398	44493.38	5.72	44.45	86.73	-0.194	PredHel=0	chlo
CmPOD1-9	*MELO3C023617.1*	328	35511.49	8.06	33.27	80.03	-0.110	PredHel=0	extr
CmPOD1-10	*MELO3C023615.1*	338	36768.98	5.84	34.14	84.29	-0.128	PredHel=0	cyto
CmPOD1-11	*MELO3C023613.1*	340	36897.11	9.44	41.88	78.38	-0.165	PredHel=1	mito
CmPOD1-12	*MELO3C029239.1*	121	13301.21	6.89	40.25	81.49	0.120	PredHel=1	chlo
CmPOD1-13	*MELO3C000772.1*	146	16654.83	6.03	47.52	73.49	-0.499	PredHel=0	E.R.
CmPOD1-14	*MELO3C029240.1*	133	14532.59	7.72	37.22	86.62	0.192	PredHel=1	mito
CmPOD1-15	*MELO3C023612.1*	338	37149.01	8.33	43.99	72.25	-0.258	PredHel=1	chlo
CmPOD2-1	*MELO3C015445.1*	315	34274.90	8.40	34.93	84.32	-0.103	PredHel=1	chlo
CmPOD2-2	*MELO3C010344.1*	322	35601.67	5.81	32.79	85.03	-0.142	PredHel=0	extr
CmPOD2-3	*MELO3C010348.1*	170	18717.80	5.53	40.08	114.71	0.324	PredHel=1	chlo
CmPOD2-4	*MELO3C017120.1*	327	35637.04	8.47	26.05	82.29	-0.084	PredHel=0	extr
CmPOD3-1	*MELO3C008185.1*	363	39533.20	7.98	37.99	84.13	-0.068	PredHel=1	chlo
CmPOD3-2	*MELO3C008186.1*	335	36088.96	6.15	38.69	81.82	-0.124	PredHel=0	chlo
CmPOD3-3	*MELO3C008187.1*	325	35096.26	8.03	29.48	88.80	0.062	PredHel=1	chlo
CmPOD3-4	*MELO3C008188.1*	325	35096.26	8.03	29.48	88.80	0.062	PredHel=1	chlo
CmPOD3-5	*MELO3C010627.1*	416	45038.76	8.45	55.49	73.05	-0.411	PredHel=0	chlo
CmPOD3-6	*MELO3C019994.1*	323	34237.32	8.82	50.22	83.07	-0.119	PredHel=1	chlo
CmPOD3-7	*MELO3C011348.1*	318	34688.66	9.09	48.08	87.14	-0.088	PredHel=0	extr
CmPOD3-8	*MELO3C011261.1*	335	36650.08	7.61	37.81	89.94	-0.079	PredHel=0	chlo
CmPOD4-1	*MELO3C003377.1*	336	37853.28	5.69	48.90	97.14	-0.128	PredHel=1	cyto
CmPOD4-2	*MELO3C003628.1*	256	28155.94	9.12	27.05	73.16	-0.361	PredHel=0	nucl
CmPOD4-3	*MELO3C009924.1*	368	41485.67	8.74	34.93	86.44	-0.077	PredHel=2	plas
CmPOD4-4	*MELO3C009329.1*	325	36562.15	8.03	34.91	94.46	-0.196	PredHel=1	chlo
CmPOD5-1	*MELO3C031049.1*	321	34162.13	4.89	43.79	79.31	-0.098	PredHel=0	vacu
CmPOD5-2	*MELO3C014658.1*	318	34673.20	6.43	53.67	85.53	-0.125	PredHel=0	vacu
CmPOD5-3	*MELO3C014657.1*	345	37113.72	6.01	31.16	77.54	-0.182	PredHel=0	chlo
CmPOD5-4	*MELO3C014656.1*	345	37187.67	5.69	34.05	77.51	-0.234	PredHel=1	extr
CmPOD5-5	*MELO3C014655.1*	329	36666.44	5.92	50.42	74.95	-0.336	PredHel=0	extr
CmPOD5-6	*MELO3C014654.1*	333	36355.79	8.09	39.11	88.14	-0.060	PredHel=0	extr
CmPOD5-7	*MELO3C014653.1*	269	28839.71	5.33	44.37	88.85	-0.023	PredHel=0	plas
CmPOD5-8	*MELO3C014652.1*	338	36753.83	8.96	39.04	81.72	-0.213	PredHel=1	chlo

CmPOD5-9	*MELO3C014651.1*	335	35736.96	4.58	44.33	81.58	-0.074	PredHel=0	extr
CmPOD5-10	*MELO3C014650.1*	334	36437.67	6.12	42.93	89.88	-0.033	PredHel=1	chlo
CmPOD6-1	*MELO3C006862.1*	316	34690.60	7.56	39.71	88.26	-0.101	PredHel=0	extr
CmPOD7-1	*MELO3C016943.1*	327	34924.36	5.32	38.06	83.24	0.040	PredHel=1	E.R.
CmPOD7-2	*MELO3C016405.1*	343	37370.28	9.12	50.23	79.97	-0.296	PredHel=1	extr
CmPOD7-3	*MELO3C017603.1*	252	28143.97	5.36	38.63	85.08	-0.261	PredHel=0	chlo
CmPOD8-1	*MELO3C007545.1*	327	36672.85	6.94	29.44	87.03	-0.155	PredHel=1	extr
CmPOD8-2	*MELO3C007618.1*	329	36078.22	9.30	37.28	85.44	-0.078	PredHel=0	chlo
CmPOD8-3	*MELO3C007923.1*	329	36591.98	8.75	28.56	86.32	-0.242	PredHel=1	cyto
CmPOD8-4	*MELO3C007935.1*	318	34555.49	9.06	40.92	84.72	-0.072	PredHel=0	E.R.
CmPOD8-5	*MELO3C014252.1*	326	36797.37	6.66	42.88	98.96	-0.200	PredHel=0	plas
CmPOD8-6	*MELO3C003275.1*	299	33200.91	8.68	44.03	83.81	-0.184	PredHel=0	vacu
CmPOD9-1	*MELO3C021513.1*	319	35056.09	8.35	40.31	83.20	-0.033	PredHel=0	chlo
CmPOD9-2	*MELO3C005456.1*	337	35933.34	4.53	44.35	82.49	-0.046	PredHel=1	extr
CmPOD10-1	*MELO3C012183.1*	358	39793.79	5.92	31.25	94.75	0.019	PredHel=1	cyto
CmPOD10-2	*MELO3C022604.1*	316	34266.02	8.07	40.91	84.94	-0.079	PredHel=0	extr
CmPOD11-1	*MELO3C020841.1*	336	36640.95	8.85	30.07	79.49	-0.072	PredHel=1	vacu
CmPOD11-2	*MELO3C021914.1*	335	37197.44	5.04	32.39	86.48	-0.140	PredHel=0	extr
CmPOD11-3	*MELO3C019239.1*	329	36119.25	7.03	38.46	89.54	-0.138	PredHel=1	chlo
CmPOD11-4	*MELO3C034836.1*	324	35429.45	8.03	37.69	87.90	-0.170	PredHel=1	chlo
CmPOD11-5	*MELO3C026870.1*	326	35191.34	9.43	39.56	92.70	-0.098	PredHel=0	vacu
CmPOD11-6	*MELO3C019612.1*	345	38518.64	9.49	36.62	88.84	-0.081	PredHel=0	vacu
CmPOD11-7	*MELO3C034835.1*	314	34197.26	9.07	43.88	87.93	-0.156	PredHel=0	chlo
CmPOD11-8	*MELO3C025681.1*	325	35429.63	9.15	45.82	85.26	-0.169	PredHel=1	chlo
CmPOD11-9	*MELO3C025683.1*	322	34925.45	6.78	28.58	86.65	-0.166	PredHel=0	chlo
CmPOD11-10	*MELO3C025684.1*	320	35013.74	8.81	26.13	84.72	-0.200	PredHel=0	chlo
CmPOD11-11	*MELO3C025724.1*	249	27626.44	5.86	36.43	81.93	-0.374	PredHel=0	chlo
CmPOD11-12	*MELO3C021373.1*	327	35987.16	9.50	45.56	89.14	-0.108	PredHel=1	chlo
CmPOD11-13	*MELO3C021297.1*	268	29186.88	6.88	42.74	73.21	-0.297	PredHel=0	cyto
CmPOD11-14	*MELO3C021259.1*	330	35385.99	4.92	36.98	83.39	0.011	PredHel=1	extr
CmPOD11-15	*MELO3C022435.1*	340	38243.13	9.36	47.43	83.71	-0.398	PredHel=1	vacu
CmPOD12-1	*MELO3C020501.1*	319	34413.88	5.51	35.30	84.42	-0.048	PredHel=0	chlo
CmPOD12-2	*MELO3C020719.1*	245	26988.51	5.32	39.67	76.49	-0.383	PredHel=0	cyto
CmPOD12-3	*MELO3C004687.1*	198	22022.82	5.16	36.01	81.67	-0.269	PredHel=0	cyto
CmPOD12-4	*MELO3C035723.1*	190	20953.55	9.24	42.35	90.89	-0.105	PredHel=0	chlo
CmPOD12-5	*MELO3C002457.1*	331	37781.40	8.74	40.42	85.68	-0.359	PredHel=0	extr
CmPOD12-6	*MELO3C002391.1*	343	38185.66	5.84	39.86	90.44	-0.158	PredHel=0	extr
CmPOD12-7	*MELO3C002242.1*	334	37070.62	7.59	28.16	82.60	-0.052	PredHel=0	extr

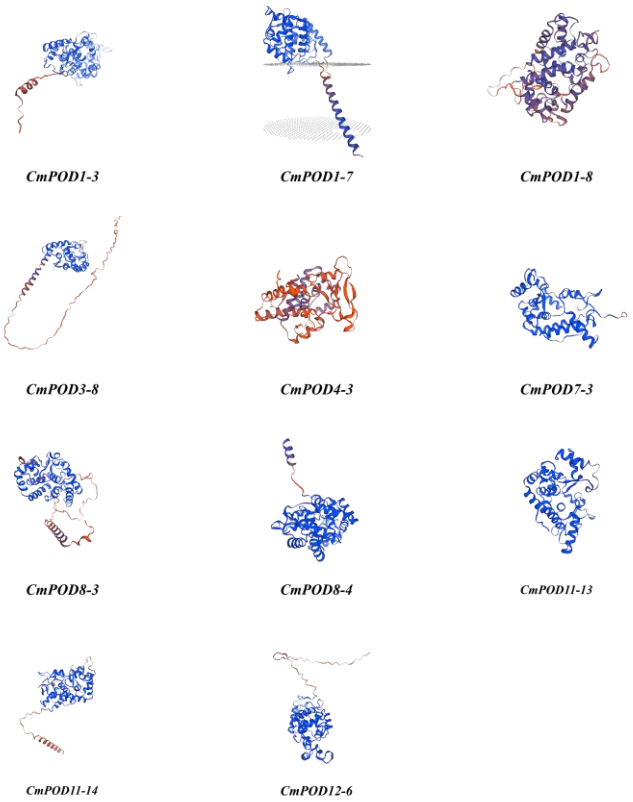
注: Chlo: 叶绿体; Cyto: 细胞质; E.R.: 内质网; Extr: 细胞外基质; Mito: 线粒体; Nucl: 细胞核; Plas: 质膜; Vacu: 液泡膜;

Note: Chlo: Chloroplast; Cyto: Cytoplasm; E.R.: Endoplasmic reticulum; extr: Extracellular matrix; Mito: Mitochondria; Nucl: Nucleus; Plas: Plasma membrane; Vacu: Vacuole membrane;

附表 3 二级结构预测

Table 3 Secondary structure prediction

基因名称 Gene name	α-螺旋 α-helix	β-折叠 β-bridge	延伸链 Extended strand	β-转角 β-turn	无规则卷曲 Random coil
CmPOD1-3	40.55%	0%	14.02%	0%	45.43%
CmPOD1-7	43.36%	0%	9.44%	0%	47.20%
CmPOD1-8	36.43%	0%	13.32%	0%	50.25%
CmPOD3-8	34.63%	0%	8.96%	0%	56.42%
CmPOD4-3	38.32%	0%	13.59%	0%	48.10%
CmPOD7-3	35.32%	0%	13.89%	0%	50.79%
CmPOD8-4	39.62%	0%	13.84%	0%	46.54%
CmPOD11-13	32.84%	0%	17.91%	0%	49.25%
CmPOD11-14	37.88%	0%	13.94%	0%	48.18%
CmPOD12-6	39.07%	0%	14.58%	0%	46.36%



附图 1 三级结构预测

Figure 1 Tertiary structure prediction