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Supplement of

Macromolecular fungal ice nuclei in *Fusarium*: effects of physical and chemical processing

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Theoretical calculation of a potential freezing point depression (ΔT) for a 0.9 % NaCl solution.

$$\Delta T = i \cdot K_f \cdot m$$

where i is the van 't Hoff factor ($i = 2$ for NaCl), K_f is the cryoscopic constant ($K_f = 1.86 \text{ K kg mol}^{-1}$ for water), and m is the molality of the salt.

Table S1. List of *Fusarium* strains tested for ice nucleation activity. Ice nucleation-active (IN-active) strains are marked with a plus (+), ice nucleation-inactive strains are marked with a minus (-). The newly identified IN-active *Fusarium* species are marked with an asterisk (*).

Species	Strain	Ice nucleation activity	Sampling location	Material	Sampling date
<i>F. acuminatum</i>	1-1 ^a	-	Colorado, USA	<i>Beta vulgaris</i> , root	2001
<i>F. acuminatum</i>	1-3 ^a	+	Colorado, USA	<i>Beta vulgaris</i> , root	2001
<i>F. acuminatum</i>	1-4 ^a	+	Colorado, USA	<i>Beta vulgaris</i> , root	2001
<i>F. acuminatum</i>	1-5 ^a	+	Colorado, USA	<i>Beta vulgaris</i> , root	2001
<i>F. acuminatum</i>	1-24 ^a	+	Oregon, USA	<i>Beta vulgaris</i> , leaf	2001
<i>F. acuminatum</i>	2-38 ^a	+	Colorado, USA	<i>Beta vulgaris</i> , root	2002
<i>F. acuminatum</i>	2-48 ^a	+	Colorado, USA	<i>Beta vulgaris</i> , root	2002
<i>F. acuminatum</i>	2-82 ^a	-	Colorado, USA	<i>Beta vulgaris</i> , root	2002

<i>F. acuminatum</i>	2-103 ^a	-	Colorado, USA	<i>Beta vulgaris</i> , root	2002
<i>F. acuminatum</i>	2-109 ^a	+	Montana, USA	<i>Beta vulgaris</i> , root	2002
<i>F. acuminatum</i>	3-48 ^a	+	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. acuminatum</i>	3-68 ^a	+	Colorado, USA	<i>Phaseolus</i> <i>vulgaris</i> , root	2003
<i>F. acuminatum</i>	3-88 ^a	-	Montana, USA	<i>Beta vulgaris</i> , root	2003
<i>F. acuminatum</i>	3-119 ^a	-	Colorado, USA	<i>Beta vulgaris</i> , root	2003
<i>F. acuminatum</i>	3-123 ^a	-	Colorado, USA	<i>Beta vulgaris</i> , root	2003
<i>F. acuminatum</i>	3-132 ^a	-	Montana, USA	<i>Beta vulgaris</i> , root	2003
<i>F. acuminatum</i>	20964 ^b	+	N/A	N/A	N/A
<i>F. acutatum</i>	10769 ^b	-	N/A	N/A	N/A
<i>F. andiyazi</i>	4647 ^b	-	N/A	N/A	N/A
<i>F. anthophilum</i>	11560 ^b	-	N/A	N/A	N/A
<i>F. armeniacum</i> *	20970 ^b	+	N/A	N/A	N/A
<i>F. armeniacum</i>	F156N11 ^c	-	Virginia, USA	Flight samples	2010 (01.10.)
<i>F. avenaceum</i>	1-25 ^a	-	Oregon, USA	<i>Beta vulgaris</i> , crown	2001
<i>F. avenaceum</i>	1-26 ^a	-	Oregon, USA	<i>Beta vulgaris</i> , crown	2001
<i>F. avenaceum</i>	2-85 ^a	-	Minnesota, USA	<i>Beta vulgaris</i> , crown	2002
<i>F. avenaceum</i>	2-106 ^a	+	Montana, USA	<i>Beta vulgaris</i> , root	2002

<i>F. avenaceum</i>	3-126 ^a	-	Colorado, USA	<i>Phaseolus vulgaris</i> , root	2003
<i>F. avenaceum</i>	11440 ^b	+	N/A	N/A	N/A
<i>F. avenaceum</i>	F156N33 ^c	+	Virginia, USA	Flight samples	2010 (01.10.)
<i>F. babinda</i>	11478 ^b	-	N/A	N/A	N/A
<i>F. begoniae</i> *	10767 ^b	+	N/A	N/A	N/A
<i>F. beomiforme</i>	5013 ^b	-	N/A	N/A	N/A
<i>F. brevicatenulatum</i>	10756 ^b	-	N/A	N/A	N/A
<i>F. bulbicola</i>	10759 ^b	-	N/A	N/A	N/A
<i>F. chlamydosporum</i>	11397 ^b	-	N/A	N/A	N/A
<i>F. circinatum</i>	H-10847 ^b	-	N/A	N/A	N/A
<i>F. circinatum</i>	F149N7 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. compactum</i>	20974 ^b	-	N/A	N/A	N/A
<i>F. concentricum</i> *	20031076 5 ^b	+	N/A	N/A	N/A
<i>F. crookwellense</i>	3-52 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. crookwellense</i> (<i>cerealis</i>)	11451 ^b	-	N/A	N/A	N/A
<i>F. culmorum</i>	3-47 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. decemcellulare</i>	11411 ^b	-	N/A	N/A	N/A
<i>F. denticulatum</i>	10763 ^b	-	N/A	N/A	N/A
<i>F. dimerum</i>	14971 ^b	-	N/A	N/A	N/A
<i>F. dlamini</i>	5009 ^b	-	N/A	N/A	N/A
<i>F. equiseti</i>	3-94 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. equiseti</i>	4-24 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2004

<i>F. equiseti</i>	20978 ^b	-	N/A	N/A	N/A
<i>F. fujikuroi</i>	C-1993 ^b	-	N/A	N/A	N/A
<i>F. fujikuroi</i>	C-1994 ^b	-	N/A	N/A	N/A
<i>F. fujikuroi</i>	F148N2 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. globosum</i>	11554 ^b	-	N/A	N/A	N/A
<i>F. graminearum</i>	3-83 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. graminearum</i>	4-22 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2004
<i>F. graminearum</i>	Z-3639 ^b	-	N/A	N/A	N/A
<i>F. graminearum</i>	F149N19 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. guttiforme</i>	10764 ^b	-	N/A	N/A	N/A
<i>F. heterosporum</i> (<i>graminum</i>)	15050 ^b	-	N/A	N/A	N/A
<i>F. konzum</i>	I-11615 ^b	-	N/A	N/A	N/A
<i>F. lacertarum</i>	F147N5 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. lactis</i>	10757 ^b	-	N/A	N/A	N/A
<i>F. langsethiae</i> *	19084 ^b	+	N/A	N/A	N/A
<i>F. lateritium</i>	11404 ^b	-	N/A	N/A	N/A
<i>F. longipes</i>	20983 ^b	-	N/A	N/A	N/A
<i>F. manganiferae</i>	11781 ^b	-	N/A	N/A	N/A
<i>F. napiforme</i>	5015 ^b	-	N/A	N/A	N/A
<i>F. nelsonii</i>	11564 ^b	-	N/A	N/A	N/A
<i>F. nisikadoi</i>	10758 ^b	-	N/A	N/A	N/A
<i>F. nygamai</i>	G-5111 ^b	-	N/A	N/A	N/A
<i>F. nygamai</i>	G-5112 ^b	-	N/A	N/A	N/A
<i>F. nygamai</i>	F153N3 ^c	-	Virginia, USA	Flight samples	2010 (29.09.)

<i>F. oxysporum</i>	3-9 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. oxysporum</i>	3-76 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2003
<i>F. oxysporum</i>	4-30 ^a	-	Wyoming, USA	<i>Beta vulgaris</i> , root	2004
<i>F. oxysporum</i>	11390 ^b	-	N/A	N/A	N/A
<i>F. oxysporum</i>	F152N2 ^c	-	Virginia, USA	Flight samples	2010 (29.09.)
<i>F. phyllophilum</i>	10768 ^b	-	N/A	N/A	N/A
<i>F. poae</i>	11470 ^b	-	N/A	N/A	N/A
<i>F. polyphialidicum</i>	11413 ^b	-	N/A	N/A	N/A
<i>F. proliferatum</i>	D-4863 ^b	-	N/A	N/A	N/A
<i>F. proliferatum</i>	D-4854 ^b	-	N/A	N/A	N/A
<i>F. proliferatum</i>	F148N3 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. pseudo-anthophilum</i>	10755 ^b	-	N/A	N/A	N/A
<i>F. pseudo-circinatum</i>	10761 ^b	-	N/A	N/A	N/A
<i>F. pseudo-graminearum</i>	11435 ^b	-	N/A	N/A	N/A
<i>F. pseudonygamai</i>	10762 ^b	-	N/A	N/A	N/A
<i>F. ramigenum</i>	10760 ^b	-	N/A	N/A	N/A
<i>F. redolens</i>	18979 ^b	-	N/A	N/A	N/A
<i>F. sacchari</i>	B-3852 ^b	-	N/A	N/A	N/A
<i>F. sacchari</i>	B-3853 ^b	-	N/A	N/A	N/A
<i>F. sambucinum</i>	20481 ^b	-	N/A	N/A	N/A
<i>F. sambucinum</i>	F153N10 ^c	-	Virginia, USA	Flight samples	2010 (29.09.)
<i>F. scirpi</i>	20986 ^b	-	N/A	N/A	N/A

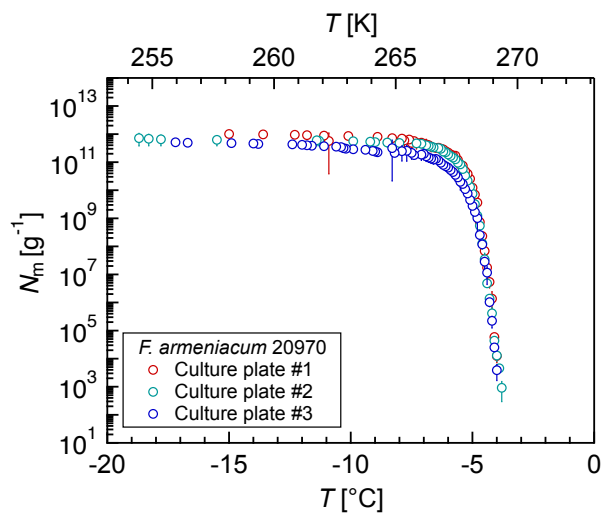
<i>F. solani</i>	11420 ^b	-	N/A	N/A	N/A
<i>F. sporotrichioides</i>	11552 ^b	-	N/A	N/A	N/A
<i>F. sporotrichioides</i>	F149N20 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. sterilihyphosum</i>	11783 ^b	-	N/A	N/A	N/A
<i>F. stilbioides</i>	F157N3 ^c	-	Virginia, USA	Flight samples	2010 (01.10.)
<i>F. subglutinans</i>	E-0990 ^b	-	N/A	N/A	N/A
<i>F. subglutinans</i>	E-2192 ^b	-	N/A	N/A	N/A
<i>F. succisae</i>	3832 ^b	-	N/A	N/A	N/A
<i>F. thapsinum</i>	F-4093 ^b	-	N/A	N/A	N/A
<i>F. thapsinum</i>	F-4094 ^b	-	N/A	N/A	N/A
<i>F. torulosum</i>	11419 ^b	-	N/A	N/A	N/A
<i>F. tricinctum</i>	20990 ^b	+	N/A	N/A	N/A
<i>F. venenatum</i>	18982 ^b	-	N/A	N/A	N/A
<i>F. verticillioides</i>	A-0149 ^b	-	N/A	N/A	N/A
<i>F. verticillioides</i>	A-0999 ^b	-	N/A	N/A	N/A
<i>F. verticillioides</i>	F149N8 ^c	-	Virginia, USA	Flight samples	2010 (28.09.)
<i>F. virguliforme</i>	20485 ^b	-	N/A	N/A	N/A
<i>F. xylarioides</i>	18977 ^b	-	N/A	N/A	N/A

13 ^a = USDA-ARS, Michigan State University, ^b = Kansas State University, ^c = Virginia Tech

14 N/A = not available

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16 **Figure S1.** Variation of IN activity within *Fusarium armeniacum* 20970: cumulative number of
17 IN (N_m) per gram of mycelium plotted against the temperature (T). Three independent
18 measurements with aqueous extracts from different fungal culture plates. The error bars were
19 calculated using the counting error and the Gaussian error propagation.
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