Filamentous fungi isolated from the rhizosphere of melon plants (*Cucumis melo* L. cv. Gold Mine) cultivated in soil with organic amendments

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RESUMO - (Fungos filamentosos isolados da rizosfera de meloeiros (*Cucumis melo* L. cv. Gold Mine) cultivados em solo com compostos orgânicos). Foram coletadas amostras de solo rizosférico em uma área semiárida, na região do Vale do São Francisco, Petrolina, Pernambuco, Brasil, com o objetivo de conhecer a diversidade dos fungos filamentosos presentes em solo cultivado com melão (*Cucumis melo* cv. Gold Mine) e adubado com diferentes compostos orgânicos: Tratamento 1 (controle, sem adição de compostos orgânicos); T2 (77% de bagaço de côco, 20% de esterco de caprino e 3% de K_2SO_4); T3 (10% de torta de mamona, 50% de capim elefante e 40% de esterco de caprino); T4 (77% de bagaço de côco, 20% de esterco de caprino e 3% de termofosfato); T5 (47% de capim elefante, 50% de esterco de caprino e 3% K_2SO_4); e T6 (57% de capim elefante, 40% de esterco de caprino e 3% de termofosfato). O isolamento dos fungos foi realizado por meio da técnica de diluição em série até 1:1000. Foi aplicado o índice de similaridade de Sorensen, e avaliadas a freqüência e a distribuição dos fungos no solo. Setenta e oito espécies foram isoladas e identificadas, além de representantes de Basidiomycota (04) e *Mycelia sterilia* (02). Os gêneros predominantes foram *Aspergillus* e *Penicillium*, com 15 e 13 espécies, respectivamente. Maior número de espécies foi constatado no período de fundação (49), e em relação à adubação orgânica, o tratamento 6 apresentou a maior diversidade (43 espécies). A maioria das espécies encontradas é sapróbia e somente algumas são consideradas potenciais patógenos à cultura do meloeiro, como *Fusarium oxysporum, F. solani* e *Myrothecium roridum*.
Palavras-chave: microorganismos, semiárido, Vale do São Francisco, adubação orgânica

ABSTRACT - (Filamentous fungi isolated from the rhizosphere of melon plants (*Cucumis melo* L. cv. Gold Mine) cultivated in soil with organic amendments). Rhizosphere soil samples were collected in a semiarid area, in the region of the São Francisco River valley, Petrolina, Pernambuco state, Brazil, to study the diversity of filamentous fungi in a soil cultivated with melon (*Cucumis melo* L. cv. Gold Mine) and receiving different organic amendments: Treatment 1 (control, without organic compost); T2 (77% coconut fiber, 20% goat manure and 3% K_2SO_4); T3 (10% *Ricinus communis* leaves and stems, 50% *Pennisetum purpureum* leaves and 40% goat manure); T4 (77% coconut fiber, 20% goat manure and 3% termophosphate); T5 (47% *Pennisetum purpureum* leaves, 50% goat manure and 3% K_2SO_4); and T6 (57% *Pennisetum purpureum* leaves, 40% goat manure and 3% termophosphate). Fungal isolation was carried out by the serial dilution technique to 1:1000. The Sorensen index of similarity, frequency and distribution of the fungi were evaluated. Seventy-eight species of filamentous fungi were isolated and identified, plus several Basidiomycota (04) and *Mycelia sterilia* (02). The predominant genera were *Aspergillus* and *Penicillium*, with 15 and 13 species, respectively. A greater number of species was found in the sowing period (49), and in relation to the organic fertilization, treatment 6 provided the greatest species diversity (43 species). Most of the species are saprobes and only a few are considered to be potential pathogens on melon plants, such as *Fusarium oxysporum, F. solani* and *Myrothecium roridum*.
Key words: semiarid, São Francisco River valley, soil amendments, microorganism

Introduction

In Brazil, the culture of melon presented great evolution in the period from 1987 to 2006, with production of fruits going from 37,980 to 500,021 tons. Melon is largely cultivated and one of the most important products of the Brazilian agribusiness that is conquering greater shares in the national and international markets. The Northeast Region is responsible for about 93% of the national melon fruits production, with 465,623 tons; the States of Rio Grande do Norte, Ceará, Bahia and Pernambuco are the main producers and exporters (Araújo & Vilela 2003; IBGE 2006).

The melon (*Cucumis melo* L.) started to be cultivated in the region of the submedium São Francisco in 1965, in the city of Santa Maria da Boa Vista, Pernambuco State. With the implement of several public projects for irrigation, this agriculture cluster became one of the main zones of production and exportation of fruits in the country. The culture of melon has been intensified in the region, mainly in the cities of Petrolina and Juazeiro, which have better infrastructure for commercialization (Oliveira 1991).

The melon culture in the Vale do São Francisco can be carried out throughout the year, due to the favorable soil and climate conditions, with increased solar radiation, high temperatures and low relative humidity. These factors favor the concentration of total soluble solids in the fruits and diminish the incidence of diseases, increasing the quality of the fruits (Dias *et al.* 1998).

With the advance of organic agriculture for fruit production in the Submedium São Francisco, many types of residues have been applied; however little is known about the effect of these residues in the soil mycobiota. The type of soil amendment can have a significant effect on the soil mycobiota mainly to favor the saprophytic activity in detriment of potential plant pathogens. Thus, organic residues that favor the increase of natural fungal population are important for improving the nutritional condition of

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the cultures of interest in the region and to ensure the sustainability of the organic production.

This work aimed to isolate and identify filamentous fungi from the rhizosphere of melon plants fertilized with distinct organic composts, and to evaluate the influence of these composts in three periods (sowing, flowering and post-harvest) of plant development, relating them to the presence of fungi.

Materials and methods

Soil sampling – Rhizosphere soil samples were collected using an auger, to a depth of 20 cm, in a semiarid area cultivated with melon (*C. melo* cv. Gold Mine), in the Vale do São Francisco, Petrolina, Pernambuco State, Brazil (09º32´09´´S, 40º55´28´´W), during the periods of sowing, flowering (37 days after sowing) and post-harvest (31 days after flowering), in the months of October, November and December/2005, respectively.

The area was fertilized with the following organic composts (O.C.): Treatment 1 (control, without organic composts); T2 19,7 m^3 ha^{-1} O.C. (77% coconut fiber, 20% goat manure and 3% K_2SO_4); T3 13,75 m^3 ha^{-1} O.C. (10% *Ricinus communis* leaves and stems, 50% *Pennisetum purpureum* leaves and 40% goat manure); T4 13,75 m^3 ha^{-1} O.C. (77% coconut fiber, 20% goat manure and 3% termophosphate); T5 9,69 m^3 ha^{-1} O.C. (47% *Pennisetum purpureum* leaves, 50% goat manure and 3% K_2SO_4); and T6 6,875 m^3 ha^{-1} O.C. (57% *Pennisetum purpureum* leaves, 40% goat manure and 3% termophosphate). Termophosphate (80 kg ha^{-1} P_2O_5) and potassium sulphate (60 kg ha^{-1} K_2O) were added to treatments 2 to 6. Organic composts and termophosphate were applied at planting with 50% potassium sulphate. Potassium sulphate remains were distributed manually with watering cans in 4 applications, at 6, 13, 21 and 27 days after transplanting.

For each treatment, three samples were taken, in a total of 18 samples at each sampling period (sowing, flowering and post-harvest). Considering all treatments, a total of 54 soil samples were investigated for the presence of fungi. The soil (Gray Argisol) samples were chemically analyzed at the Soil Laboratory of the Embrapa Semi-Árido (Tab. 1) (Embrapa 1997).

Isolation and identification of the filamentous fungi – The fungi were isolated using the serial dilution technique (Mehan *et al.* 1991): 25 g of each soil sample were suspended in 225 ml of sterilized distilled water (SDW) (1:10); 10 ml of this suspension were added to 990 ml of SDW (1:1000). Then, 1 ml of this suspension was cultured, in triplicate, in Petri dishes containing Sabouraud Agar added of chloranphenicol (500 mg l^{-1}). The plates were kept at room temperature (28ºC) and the development of colonies was observed until 120 h, when the CFU were estimated. After the first 72 h the colonies were transferred to Petri dishes with agar medium (potato dextrose agar, czapeck agar and/or malt extract agar) and kept for 20 days, allowing the formation of reproductive structures. The identification of the species was carried out through macroscopic and microscopic observation of the isolates, consulting the specialized literature (Raper *et al.* 1949; Ames 1961; Corlett 1966; Rifai 1969; Booth 1971; Ellis 1971; Nicoli & Russo 1974; Samson 1974; Arx 1975; Ellis 1976; Sigler & Carmichael 1976; Carmichael *et al.* 1980; Domsch *et al.* 1980; Sutton 1980; Schipper 1984; Arx *et al.* 1986; Pitt 1988; Udagawa *et al.* 1989; Klich & Pitt 1994; Hanlin & Menezes 1996).

Statistical analyses – The experimental design was of random blocks in a factorial arrangement 3x6, with three periods of evaluation (sowing, flowering and post-harvest) and six fertilization treatments (T1, T2, T3, T4, T5 and T6), with three replicates. The values of the CFU were square root (x + 1) transformed before the analysis of variance (ANOVA). The averages were compared by the LSD (least square deviation), 5% of probability, using the program Statistica 5.0 (Statsoft 1997).

The Sorensen index of similarity (Müller-Dombois & Ellemberg 1974) was applied to verify the similarity between the fungal populations isolated in the different sampling periods. Frequency and distribution of each fungal species were calculated for each sampling period according to Brower *et. al* (1990) and Schnitter & Stephenson (2000).

Table 1. Soil chemical characteristics with and without organic composts fertilization in three periods of the melon plants (*C. melo* cv. Gold Mine) growing season.

Treatment	OS	pH	EC	P	K	Ca	Mg	Na	CEC
	g Kg^{-1}		d Sm^{-1}	mg/dm^3			cmolc/dm^3		
T1									
Sowing	6.72	6.00	0.21	3.00	0.10	1.10	0.50	0.02	3.04
Flowering	5.48	6.43	0.12	5.75	0.09	1.30	0.43	0.02	3.70
Post-harvest	6.16	5.73	0.11	2.50	3.33	0.95	0.45	0.03	6.75
T2									
Sowing	8.58	6.20	0.53	57.0	0.39	1.70	0.60	0.03	4.20
Flowering	6.73	6.98	0.20	120.75	0.21	1.50	0.65	0.04	3.26
Post-harvest	4.72	6.55	0.18	33.75	3.64	1.00	0.65	0.03	6.55
T3									
Sowing	7.86	6.50	0.32	56.00	0.18	1.60	0.80	0.02	3.59
Flowering	7.89	7.20	0.19	50.75	0.16	1.90	0.73	0.03	2.82
Post-harvest	4.10	6.13	0.18	08.75	2.95	0.85	0.58	0.03	6.18
T4									
Sowing	7.55	6.30	0.27	05.00	0.21	1.10	0.60	0.01	2.91
Flowering	7.99	6.68	0.14	17.00	0.20	1.58	0.63	0.02	3.08
Post-harvest	6.88	6.70	0.17	16.50	3.61	1.23	0.63	0.04	6.85
T5									
Sowing	09.31	6.80	0.39	138.00	0.13	1.90	1.00	0.03	3.88
Flowering	14.95	6.93	0.18	47.00	0.18	2.18	0.80	0.03	3.51
Post-harvest	04.11	6.73	0.14	19.75	2.84	1.10	0.73	0.03	5.69
T6									
Sowing	6.52	7.20	0.66	203.00	0.25	1.90	1.2	0.04	3.39
Flowering	8.25	7.08	0.21	104.25	0.20	2.00	0.8	0.04	3.44
Post-harvest	3.96	6.55	0.20	18.00	2.32	0.98	0.6	0.03	5.69

pH (water) (1:2.5); OS = organic substance; EC = electrical conductivity; CEC = cation exchange capacity. T1 = control, without organic composts; T2 = 77% coconut fiber, 20% goat manure and 3% K_2SO_4; T3 = 10% *Ricinus communis* leaves and stems, 50% *Pennisetum purpureum* leaves and 40% goat manure; T4 = 77% coconut fiber, 20% goat manure and 3% termophosphate; T5 = 47% *Pennisetum purpureum* leaves, 50% goat manure and 3% K_2SO_4; T6 = 57% *Pennisetum purpureum* leaves, 40% goat manure and 3% termophosphate.

Results

Twenty-five genera were isolated, including 78 taxa of filamentous fungi, with predominance of *Aspergillus* (15 species) and *Penicillium* (13 species), besides some Basidiomycota (04) and *Mycelia sterilia* (02), totaling 6,641 x 10^4 CFU g^{-1} (Tab. 2). Most of the species were anamorphic fungi (68.75%), and the remaining were Ascomycota (27.5%), Zygomycota (2.5%) and Basidiomycota (1.25%).

The variance analysis showed differences in the number of CFU between the sampling periods and between the organic fertilization treatments. A greater number of CFU was evidenced in the sowing period (183.5 x 10^4 CFU g^{-1}), differing significantly from the other periods: flowering (85.05 x 10^4 CFU g^{-1}) and post-harvest (100.38 x 10^4 CFU g^{-1}). In relation to the organic fertilization, treatment 5 yielded a greater number of CFU, followed by treatments 3, 4 and 1 which did not differ significantly. Significant differences were registered only between treatments 5, 2 and 6 (Fig. 1).

There was no difference on species diversity between the sampling periods. A greater number of species was found in the sowing period (49), without significant difference in comparison with the other periods: flowering (39 species) and post-harvest (41 species).

The soil from treatment 6 presented the highest species diversity (43), followed by treatments 2 and 5 (39 species), 1 (38 species) and 3 (35 species), which did not differ significantly. Significant difference was registered only between treatments 6 and 4 (24 species).

The fungal populations were more similar between the sowing and flowering periods (56.8% of similarity), followed by the flowering and post-harvest periods (50%), while the similarity between the sowing and post-harvest periods reached 42.2%. In relation to the organic fertilization, treatments 2 and 3 showed higher similarity in all periods: 59.46% (sowing), 68.96% (flowering) and 68.96% (post-harvest). ("Em relação aos tratamentos de adubação organica, maior similaridade foi observada entre os tratamentos 2 e 3, em todos os períodos fenológicos, 59,46 % (fundação), 68,96 % (floração) e 68,96 % (pós-colheita)" veja se ficou claro)

Sixteen taxa were found in the three sampling periods (Tab. 2). Most of the taxa identified in the melon rhizosphere are known as saprobes (96.25%) and only a few (3.75%)

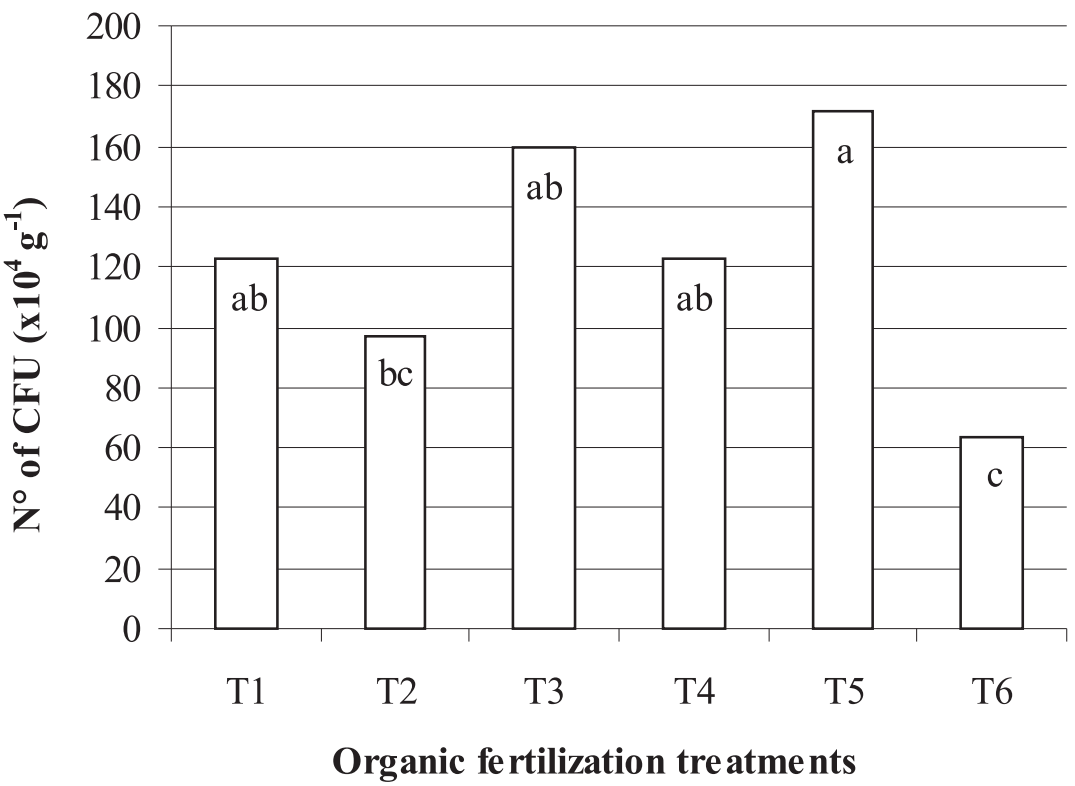

Figure 1. Number of filamentous fungi CFU in the rizhosphere of melon plants fertilized with six types of organic compost: T1 = control, without organic composts; T2 = 77% coconut fiber, 20% goat manure and 3% K_2SO_4; T3 = 10% *Ricinus communis* leaves and stems, 50% *Pennisetum purpureum* leaves and 40% goat manure; T4 = 77% coconut fiber, 20% goat manure and 3% termophosphate; T5 = 47% *Pennisetum purpureum* leaves, 50% goat manure and 3% K_2SO_4; T6 = 57% *Pennisetum purpureum* leaves, 40% goat manure and 3% termophosphate.

Table 2. Filamentous fungi colony forming units (CFU x 10^4 g^{-1}) isolated from the rizhosphere of melon plants (*C. melo* cv. Gold Mine), fertilized with organic composts, during the sowing, flowering and post-harvest periods.

Species	Sowing						Flowering						Post-harvest						Total
	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	
Alternaria tenuissima (Kunze) Wiltshire						05													05
Aspergillus flavipes (Bainier & R. Sartory) Thom & Church								03										03	06
A. flavus Link	03				02														05
A. fumigatus Fresen.	13	66	51	09	13	27	16	21	30	10	13	19	16	28	22	21	10	15	400
A. japonicus var. *aculeatus* (Iizuka) Al-Musallam		02			02				10										14
A. japonicus var. *japonicus* Saito			02	04			18	03	03		45				02			04	81
A. nidulans (Eidam) G. Winter	141					90					07								238
A. niger Tiegh.	03	09	61	18	24	02	09	07	01	05			09	09	05	09	06	02	179
A. niger var. *niger* Tiegh.	89					03													92
A. sydowii (Bainier & Sartory) Thom & Church			02																02
A. tamarii Kita		02			02			02											06
A. terreus Thom	13	175	18	02	22	18	02	02	03		19	04	09	22	13	09	03	06	339
A. terreus var. *aureus* Thom & Raper						03	05	15	03	02				34	03	97		06	168
A. ungüis (Emile-Weill & L. Gaudin) Thom & Raper	08	02	03			07						02							22
A. ustus (Bainier) Thom & Church					02	03													05
A. viridinutans Ducker & Thrower													02		22	13	10	13	60
Chaetomium convolutum Chivers													04			05	03		12
C. cupreum L.M. Ames		02																	02
C. leucophorum L.M. Ames	02																		02
C. nigricolor L.M. Ames														09		03			12
C. ochraceum Tschudy						02		10			10								22
C. trigonosporum (Marchal & É.J. Marchal) Chivers							06	02		06		06					03		23
Cladosporium sphaerospermum Penz.		03									02								05
C. tenuissimum Cooke		03	05																08
Curvularia eragrostidis (Henn.) J.A. Mey.			04																04
Emericella nidulans (Eidam) Vuill.	13	37	561	421	404	03	37	02	06	72	286		121	13	07			45	2028
E. nidulans var. *acristata* Subram.	300	60	157		31	09	85	22	105	163	145	37	03	21	169	120	34	66	1527
E. nidulans var. *echinulata* Godeas	07					21	09	06	04	06	02		30					06	91
E. rugulosa (Thom & Raper) C.R. Benj.							02												02
E. variecolor Berk. & Broome					02														02
Eupenicillium brefeldianum (B.O. Dodge) Stolk & D.B. Scott	06																		06
E. crustaceum F. Ludw.							02												02
Eurotium chevalieri L. Mangin								03	03			02	02						10
E. rubrum W. Bremer								02											02
Fusarium equiseti (Corda) Sacc.								02											02
F. merismoides Corda	18				02														20
F. oxysporum Schltdl.				02										02	03				07
F. redolens Wollenw.	02																		02
F. solani (Mart.) Sacc.	04					02		04	07	02			02		04		02	02	29
F. stilboides Wollenw.															02			02	04
Gliocladium virens J.H. Mill., Giddens & A.A. Foster		03																	03
Humicola fuscoatra Traaen	02	04	03			02							02	02			02		17
Monodictys castaneae (Wallr.) S. Hughes			02			02													04
Myrothecium. roridum Tode								07			03	03							13
M. verrucaria (Alb. & Schwein.) Ditmar					02	02			02										06
Neocosmospora vasinfecta var. *africana* (Arx) P.F. Cannon & D. Hawksw.	05	03	02	27	43	03	06	02	03	02				02					98
Neoscytalidium dimidiatum (Penz.) Crous & Slippers						02													02
Paecilomyces carneus (Duché & R. Heim) A.H.S. Br. & G. Sm.				07															07
P. lilacinus (Thom) Samson	07																21		28
P. variotii Bainier										03									03

Continua.

Continuação.

Species	Sowing						Flowering						Post-harvest						Total
	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	
P. citrinum Thom													02	34	49		02		87
P. corylophilum Dierckx															04		07		11
P. decumbens Thom		03							03				04					02	12
P. dierckxii Biourge													02	03	03				08
P. griseofulvum Dierckx							02			02		02							06
P. janthinellum Biourge				02	03		03		02										10
P. pinophilum Thom													03					02	05
P. restrictum J.C. Gilman & E.V.Abbott													10	13	24		12	07	66
P. solitum var. *crustosum* (Thom) Bridge, D. Hawksw., Kozak., Onions, R.R.M. Paterson & Sackin																	03		03
P. spinulosum Thom																27			27
P. vinaceum J.C. Gilman & E.V. Abbott	04						02	06				04		51			264	04	335
P. waksmanii K.M. Zalessky																	16		16
Rhizopus microsporus var. *chinensis* (Saito) Schipper & Stalpers		06	02	03	02	02			03										18
R. microsporus var. *microsporus* Tiegh.		03		06	04	02								02		03		02	22
Scopulariopsis brumptii Salv.-Duval					03														03
S. croci J.F.H. Beyma												03							03
S. sphaerospora Zach			04					21						04				03	32
Sordaria fimicola (Roberge ex Desm.) Ces. & De Not.		02				03													05
Talaromyces trachyspermus (Shear) Stolk & Samson											02							02	04
Thielavia fragilis (Natarajan) Arx					02							06	02					02	12
T. microspora Mouch.													02	06	07				15
T. terrestris (Apinis) Malloch & Cain																		02	02
T. terricola (J.C. Gilman & E.V. Abbott) C.W. Emmons	15	42	03	02	07	29	09	12	19	21	06	07	09	21	02		07	07	218
Torula caligans (Bat. & H.P. Upadhyay) M.B. Ellis								04	04	02		12	02	02	02				28
Trichoderma pseudokoningii Rifai															02				02
T. viride Pers.									03										03
Xepicula leucotricha (Peck) Nag Raj		02				18		03											23
Basidiomycota		02				02													04
Black Mycelia sterilia																		02	02
CFU TOTAL	655	431	880	503	572	262	213	161	214	296	540	107	237	278	346	308	433	205	6641

T1 = control, without organic composts; T2 = 77% coconut fiber, 20% goat manure and 3% K_2SO_4; T3 = 10% *Ricinus communis* leaves and stems, 50% *Pennisetum purpureum* leaves and 40% goat manure; T4 = 77% coconut fiber, 20% goat manure and 3% termophosphate; T5 = 47% *Pennisetum purpureum* leaves, 50% goat manure and 3% K_2SO_4; T6 = 57% *Pennisetum purpureum* leaves, 40% goat manure and 3% termophosphate.

are referred to as potential plant pathogens: *Fusarium oxysporum*, *F. solani* and *Myrothecium roridum*.

Most of the fungi was classified as rare; however *Emericella nidulans* and *E. nidulans* var. *acristata* were abundant. All the species presented low frequencies of occurrence.

Discussion

Most of the fungi found in the melon rhizosphere was registered in rhizosphere and non-rhizosphere soils in Brazil and other countries (Silva & Cavalcanti 1990, 1991; Cavalcanti & Maia 1994; Maia & Gibertoni 2002; Mandeel 2002; Souza-Motta *et al.* 2003; Ananda & Sridhar 2004; Cavalcanti *et al.* 2006; Costa *et al.* 2006; Grishkan *et al.* 2006).

Studying the microfungi of the rhizosphere of *Zygophyllum qatarense* Hadidi, in a semiarid environment of Bahrain, Mandeel (2002) reported the predominance of species of *Aspergillus* and *Penicillium*. Similarly, Grishkan *et al.* (2006) found species of *Penicillium* and *Aspergillus* to be the most abundant in the rhizosphere of native plants of Negev, Israel. These results are similar to the findings of this work, considering that *Aspergillus* and *Penicillium* are well represented in the studied area, with 15 (18.75%) and 13 (16.25%) species, respectively.

In the Brazilian semiarid region, Silva & Cavalcanti (1990; 1991) registered *Fusarium* and *Penicillium* as predominant in the rhizosphere of tomato (*Lycopersicon esculentum* Mill). Maia & Gibertoni (2002) reported a

great diversity of soil fungi in the Brazilian semiarid, with predominance of: *Aspergillus, Cladosporium, Fusarium, Humicola, Myrothecium, Paecilomyces, Penicillium, Rhizopus* and *Trichoderma*. Species of *Aspergillus* and *Penicillium* predominated in soil from a copper mining impacted area (Costa *et al.* 2006) in Bahia State. Likewise, Cavalcanti *et al.* (2006) registered several filamentous fungi in soils from the Xingó region (Sergipe and Alagoas States), with predominance of *Penicillium* and *Aspergillus* species. Several of the fungal species found here were reported in areas of the Brazilian semiarid region (Maia & Gibertoni 2002; Cavalcanti *et al,* 2006; Costa *et al.* 2006).

The prevalence of *Aspergillus* and *Penicillium* occurs probably because these genera have a high number of species and are capable of surviving in dry environments (Dix & Webster 1995).

Three of the species found in this study were previously regarded as pathogen to melon plants: *Fusarium oxysporum, F. solani* and *Myrothecium roridum* (Marinho *et al.* 2002; Muniz *et al.* 2004; Viana *et al.* 2001). However, it is not possible to say if they were in the rhizosphere as saprobe or pathogen. These species were also registered, respectively, in the rhizosphere of sugar-cane, tomato and sunflower (Santos & Cavalcanti 1989; Silva & Cavalcanti 1990, 1991; Souza-Motta *et al.* 2003). In the present work these species showed an occasional distribution.

The organic fertilization in the melon plants favored the presence of filamentous fungi and increased the number of CFU. It also allowed a wide distribution of saprophytic fungi, considering that 96.25% of the species isolated in this study have been described as organic matter decomposers. Therefore, the introduction of organic composts can improve the soil quality in the culture of melon by increasing the diversity and number of fungi.

The phenology of the melon plants did not affect the diversity of filamentous fungi; however, it significantly decreased the amount of CFU. The highest number of CFU was observed in the sowing period, probably due to the processes of incorporation and mineralization of the organic residues in the soil, resulting in an increase of the cation exchange capacity (CEC) in the subsequent periods (Tab. 1). Except for treatments 5 and 6, the quantity of organic matter in the soil was higher in the sowing period, increasing the offer of substrate for decomposition that was reflected in the highest number of CFU in this period.

The analysis of similarity showed a lower index between the fungi in the sowing and the post-harvest periods. According to Melnitchouk *et al.* (2005) and Wellbaum *et al.* (1999), this may be associated with the changes in the composition of root exudates over the phenological cycle of the plant, causing variation in the rhizodeposition, and with the hydrosoluble substances released by decomposition of organic matter, which represent an energy source promptly available for the microorganisms. In addition, Parkinson *et al.* (1963) apud Souza-Motta *et al.* (2003) mentioned that the young roots are initially colonized by a diversity of soil fungi which after some days are substituted by a more restricted mycobiota that remains until the senescence of the roots.

The results attained in this study suggest that anamorphic fungi dominate the soil mycobiota of cultivated melon fields in the Brazilian semiarid, and that species of *Aspergillus* and *Penicillum* are the most commonly found. Furthermore, the data indicate that the composition of the rhizosphere interfere in the fungal succession.

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