Nitrate and Ammonium Leaching in Open Field Tomato Cultivation under Different N Rates and Mulch Managements

Monika ZOVKO[1], Mario SRAKA[2], Serđo BILE[3], Igor KALUĐEROVIĆ[3], Dragan ŽNIDARČIČ[4]

[1]Institute of Agriculture and Tourism Poreč, Carla Huguesa 8, 52440 Poreč, Croatia
(e-mail: monika@iptpo.hr)
[2]University of Zagreb, Faculty of Agriculture, Svetošimunska cesta 25, 10000 Zagreb, Croatia
[3]Ministry of Justice RH, Valtura, Croatia
[4] University of Ljubljana, Biotechnical faculty, Jamnikarjeva 101, 1000 Ljubljana, Slovenia

Abstract

In this study the results of the field experiment conducted during 2007 on the deep red soil of the area of Valtura about the distribution of nitrate and ammonium nitrogen in soil and filtered water, on the occasion of tomato cultivation on bare soil, respectively on the soil covered by organic (straw) and synthetic (PE film) materials were showed. Fertilization was achieved with 60, 120 and 180 kg N/ha. The average concentrations of nitrate and ammonium nitrogen in the upper layer of soil have varied from 0,54-13,96 mg of soil, respectively from 0,34-2,84 mg of soil and mainly they have been more on the bare than on the soil covered with straw and PE - film. The concentrations of nitrate nitrogen in filtered water have varied in a wide range from 17,5 - 319,2 mg, depending on the quantity of filtered water, level of fertilization and consumption of nitrate from tomatoes, while the concentrations of ammonium nitrogen have varied in a narrow range from 0,3-12,4 mg. As a rule, the highest fertilized variables have also noted down the highest concentration of nitrate and ammonium nitrogen on soil and waters. In filtered waters the increased concentration of nitrate and ammonium nitrogen often exceeds the maximum degree of permitted concentration for potable water (According to Croatian rules). For this reason it is necessary to use rationally nitrogen fertilizers on the agricultural areas of this region, in order to protect its soil, and especially its water, as it is a question of delicate Karst landscape, whose subterranean waters are used as drinking water.

Key words: tomato, fertilizers, nitrate, ammonium

sa2008_a0114

Kretanje nitratnog i amonijačnog dušika pri uvjetima različite gnojidbe i malčiranja tla u proizvodnji rajčice

Monika ZOVKO[1], Mario SRAKA[2], Serđo BILE[3], Igor KALUĐEROVIĆ[3], Dragan ŽNIDARČIČ[4]

[1]Institut za poljoprivredu i turizam Poreč, Carla Huguesa 8, 52440 Poreč, Hrvatska,
(e-mail: monika@iptpo.hr)
[2]Sveučilište u Zagrebu, Agronomski fakultet, Svetošimunska cesta 25, 10000 Zagreb, Hrvatska
[3]Ministarstvo pravosuđa RH, Uprava za zatvorski sustav, Valtura, Hrvatska
[4]Sveučilište u Ljubljani, Biotehnički fakultet, Jamnikarjeva 101, 1000 Ljubljana, Slovenija

Sažetak

U radu su prikazani rezultati poljskog pokusa provedenog tijekom 2007. godine na dubokoj crvenici na području Valture o kretanju nitratnog i amonijačnog dušika u tlu i procjednim vodama, prilikom uzgoja rajčice na golom tlu, odnosno na tlu prekrivenim organskim (slama) i sintetskim (PE film) materijalima. U uvjetima navodnjavanja rajčice gnojidba je provedena sa 60, 120 i 180 N kg ha^{-1}. Prosječne koncentracije nitratnog i amonijskog dušika u oraničnom sloju tla varirale su od 0,54-13,96 mg NO_3^-/100 g tla, odnosno od 0,34 - 2,84 mg NH_4^+/100 g tla i uglavnom su bile više na golom tlu u odnosu na tlo prekriveno slamom i PE - filmom. Koncentracije nitratnog dušika u procjednoj vodi varirale su u širokom rasponu od 17,5-319,2 mg NO_3^-/l, ovisno o količini procjeđene vode, razini gnojidbe i potrošnji nitrata od strane rajčice, dok su. koncentracije amonijačnog dušika varirale u užem rasponu od 0,3-12,4 mg NH_4^+/l. U pravilu su na najviše gnojenim varijantama zabilježene i najveće koncentracije nitratnog i amonijačnog dušika u tlu i vodama. U procjednim vodama povećane koncentracije nitratnog i amonijačnog dušika često prelaze maksimalno dozvoljene koncentracije za pitke vode (Prema pravilniku o zdravstvenoj ispravnosti vode za piće N.N. 182/04). Stoga je nužno provoditi racionalnu upotrebu dušićnih gnojiva na poljoprivrednim površinama ovoga područja, u cilju zaštite tla, a posebice voda, budući da se radi o osjetljivom krškom krajobrazu, čije se podzemne vode koriste kao vode za piće.

Ključne riječi: rajčica, gnojidba, nitrati, amonijak

sa2008_a0114