

不同氮效率油菜品种产量和品质对供氮水平的反应

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Responses of yield and quality to nitrogen fertilization for oilseed rape cultivars with different nitrogen efficiencies

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摘要

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摘要 为探明不同氮效率油菜产量和品质对供氮水平的反应动态, 揭示油菜氮效率与品质的关系, 本文采用砂培试验, 研究了两种氮效率油菜品种在0、6、3、6、12、15 mmol/L 5种不同氮水平下(用N1N5表示)的氮效率、子粒产量和品质的变化。结果表明, 随着供氮水平的提高, 油菜子粒产量、油分产量和蛋白质含量增加, 氮效率和油分含量下降; 而子粒脂肪酸组成变化较小, 所测定的7种脂肪酸中, 芥酸和花生烯酸含量随着氮水平的增加略有下降, 棕榈酸、硬脂酸、油酸、亚油酸和亚麻酸含量则没有明显的变化; 与氮低效品种相比, 氮高效品种的子粒产量、芥酸和花生烯酸含量随供氮水平的变化幅度更大, 油分含量下降幅度更小。所有氮水平下, 氮高效品种的子粒产量、油分含量和油分产量均高于氮低效品种, 亚油酸含量略高于而亚麻酸含量略低于氮低效品种, 子粒蛋白质、棕榈酸、硬脂酸、油酸含量两品种没有差异。总之, 提高氮水平有利于增加油分产量, 氮高效品种的增加幅度大于氮低效品种, 但对脂肪酸组成的影响较小。因此, 氮高效品种不会因高效吸收利用氮素而降低油分含量或使油菜品质变劣。

关键词: 油菜 氮效率 产量 品质 供氮水平

Abstract: To investigate responses of seed yield and quality of oilseed rape to nitrogen (N) application levels, and inspect relationship between N use efficiency and seed quality, the sand culture was conducted to study on changes of N efficiencies, seed yields and qualities of two oilseed rape cultivars with different N efficiencies under five N application levels, 0, 6, 3, 6, 12 and 15 mmol/L (expressed with N1-N5 respectively). The results show that the seed yields, oil yields and protein contents are increased with the increasing of N application levels, while the N efficiencies and oil contents are decreased. The changes of fatty acids in seeds are small, the contents of erucic acid and arachidonic acid are slightly decreased with the increasing of the N application levels, and the contents of palmitic acid, stearic acid, oleic acid, linoleic acid and linolenic acid are not obviously changed. Compared with the low N efficiency cultivar, the changes of seed yield, contents of erucic acid and arachidonic acid of the high N efficiency cultivar are bigger with the increasing of the N application levels, while the changes of oil content are smaller. The seed yield, oil content and oil yield of the high N efficiency cultivar are higher than those of the low N efficiency cultivar under the 5 N application levels. The linoleic acid content of the high N efficiency cultivar is higher than that of the low N efficiency cultivar, while the linolenic acid content of the high N efficiency cultivar is lower than that of the low N efficiency cultivar. There are no significant differences of seed protein, palmitic acid, stearic acid and oleic acid contents between the two cultivars. It can be concluded that increasing N application level is advantage for increasing oil yield, especially for the high N efficiency cultivar, but composition of fatty acids is less influenced. Therefore, the oil content and seed quality of the high N efficiency cultivar are not be decreased by high N absorption and use efficiency

Keywords: oilseed rape nitrogen efficiency yield quality N application level

Received 2010-11-22; published 2011-10-24

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引用本文:

陈历儒 宋海星 谌亚忠 张振华 刘强 荣湘民 官春云 李安乡. 不同氮效率油菜品种产量和品质对供氮水平的反应[J] 植物营养与肥料学报, 2011, V17(6): 1424-1429

CHEN Li-ru SONG Hai-xing SHEN Ya-zhong ZHANG Zhen-hua LIU Qiang RONG Xiang-min GUAN Chun-yun LI An-xiang. Responses of yield and quality to nitrogen fertilization for oilseed rape cultivars with different nitrogen efficiencies[J] Acta Metallurgica Sinica, 2011, V17(6): 1424-1429

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