

长期不同施肥处理对苹果产量、品质及土壤肥力的影响

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Effects of different long-term fertilization patterns on Fuji apple yield, quality, and soil fertility on Weibei Dryland, Shaanxi Province of Northwest China.

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摘要

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摘要

通过连续7年(2003—2010年)的田间定位试验,研究了不同施肥处理〔不施肥对照,CK;不施N肥只施PK肥,PK;不施P肥只施NK肥,NK;不施K肥只施NP肥,NP;单施NPK化肥,NPK;单施有机肥(猪粪),M;化肥有机肥配施(化肥有机肥氮各占一半),NPKM〕对渭北旱塬富士苹果产量、品质及果园土壤养分含量变化的影响.结果表明:施肥可以提高苹果产量,连续7年不同施肥处理苹果平均产量较对照提高14.4%~63.8%,各处理苹果年平均产量顺序为:NPKM>NPK>M>NP>NK>PK>CK.NPKM、M、NPK处理随着试验时间的推移,果实可溶性糖、维生素C、可溶性固形物含量呈上升趋势,NPKM、M处理不同年际间波动相对较小;NPKM处理糖酸比5年较对照提高了30.9%,维生素C含量提高了17.5%.长期合理施肥有利于提高土壤有机质,NPKM、M处理0~20 cm土层有机质含量提高幅度最大,分别提高了28.8%和29.3%.NPK、NPKM、M处理土壤各层速效氮、有效磷、速效钾含量较试验前均有显著提高,NPK处理0~20 cm、20~40 cm和40~60 cm土层速效氮含量分别提高了22.7%、37.3%和53.4%.与NPK处理相比,NPKM处理的土壤速效磷含量提高了18.7%,且不同处理土壤速效磷含量上层显著大于下层.

关键词: 苹果 长期施肥 产量 品质 土壤肥力

Abstract:

A 7-year (2003-2010) located field experiment was conducted to evaluate the effects of different long term fertilization patterns on the Fuji apple yield, quality, and soil fertility on the Weibei Dryland, Shaanxi Province of Northwest China. Seven treatments were installed, *i.e.*, no fertilization (CK), inorganic P and K fertilization (PK), inorganic N and K fertilization (NK), inorganic N and P fertilization (NP), inorganic N, P, and K fertilization (NPK), swine manure (M), and half inorganic N, P, and K combined with half swine manure (NPKM). Each treatment had three replications. Fertilization increased the apple yield. The average yield in the 7 years under fertilization was increased by 14.4%-63.8%, as compared to the CK. The average yield decreased in the order of NPKM>NPK>M>NP>NK>PK>CK. In treatments NPKM, M, and NPK, the fruit sugar/acid (S:A) ratio, vitamin C, soluble solid, and hardness tended to be increased with time, with a smaller yearly fluctuation in treatments NPKM and M. In treatment NPKM, the S:A ratio and vitamin C increased by 30.9% and 17.5%, respectively after five years, as compared to the CK. Long-term rational fertilization increased the soil organic matter (SOC) content in 0-20 cm layer, with the largest increment in treatments NPKM and M (28.8% and 29.3%, respectively). The soil available N, P, and K contents in all layers in treatments NPK, NPKM, and M increased significantly, and the soil available N content in 0-20, 20-40, and 40-60 cm layers in treatment NPK was increased by 22.7%, 37.3%, and 53.4%, respectively. As compared to treatment NPK, the soil available P content in treatment NPKM was increased by 18.7%. In all fertilization treatments, the soil available P content was significantly higher in upper layer than in lower layer.

Key words: apple long-term fertilization yield quality soil fertility.

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