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Potassium and nitrogen applications for sugarbeet yield and quality in Southern Minnesota and Imperial Valley of California.

The use of K and N fertilizer for sugar beet growth and quality have been a concern in the sugar beet growing areas of Southern Minnesota and California for several years. Concerns include the need for optimum root yield and the effect of K and N on quality. Both nutrients are impurities for the extraction of sucrose from the beet root. The objective of these studies was to assess and compare the effects of K and N in high soil test K soils of the Imperial Valley (IV) and the Southern Minnesota Beet Sugar Cooperative (SMBSC) growing areas. Three studies were conducted. The first in the SMBSC growing area had six sites from 2010 to 2012. The treatments included a factorial arrangement of four N rates and six K rates. The second study was conducted in the IV growing area had three sites from 2013 to 2015 with four N rates and six K rates. The final study was conducted from 2021 to 2023 in the SMBSC growing area with three N rates and five K rates. Comparing the results of the two SMBSC studies, in the 2010 to 2012 study, K application increased root yield and quality at 50 % of the sites with no quality issues from the excessive K application rates. Nitrogen application increased root yield at 50% of the sites and decreased quality at 75 % of the sites. In the 2021 to 2023 SMBSC study, K application did not affect root yield or quality, and N application reduced quality at 67 % of the sites. In the IV study, there was little interaction between N and K for root yield and quality. Excess application of K did not reduce sugar beet quality. In general, the excess application of K did not affect the quality in any of the studies.