



**SURXONDARYO VILOYATI TUPROQ-IQLIM SHAROITIDA
YETISHTIRILGAN NOYOB ZANJABIL ILDIZPOYASINING MAKRO -
MIKROELEMENTLAR MIQDORIGA MINERAL O'G'ITLARNING TA'SIRI**

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Annotatsiya Ushbu tadqiqotda Surxondaryo viloyatining tuproq-iqlim sharoitida zanjabil (*Zingiber officinale* Roscoe) ildizpoyalari tarkibidagi mineral elementlarning miqdoriga mineral o'g'itlarning ta'siri o'rganildi. Mazkur tadqiqot O'zbekistonda birinchi bo'lib Surxondaryo viloyati Termiz tumanida etishtirilgan zanjabil ildizpoyasining mineral elementlarini o'rganishga qaratilgan. Tajribada to'rtta variant qo'llangan (O'g'itsiz nazorat (T-1), N75P50K50 kg/gektar (T-2), N125P100K100 kg/gektar (T-3) va N100P75K75 + B3Zn6Fe6 kg/gektar (T-4). Natijalarga ko'ra, nazoratga nisbatan T-4 variant zanjabil ildizpoyasidagi K, Ca, P, Mg, Fe Na, Mn, Zn va Si miqdorini sezilarli darajada oshirdi.

Kalit so'zlar: Zanjabil, mineral o'g'itlar, makroelementlar, mikroelementlar

Аннотация В данном исследовании, в почвенно-климатических условиях Сурхандарьинской области, изучено влияние минеральных удобрений на содержание минеральных элементов в корневищах лекарственного имбиря (*Zingiber officinale* Roscoe). Данное исследование направлено на изучение минеральных элементов корневища имбиря, впервые выращенного в Узбекистане в Термезском районе Сурхандарьинской области. В эксперименте использовались четыре варианта (контроль без удобрений (Т-1), N75P50K50 кг/га (Т-2), N125P100K100 кг/га (Т-3) и N100P75K75 + B3Zn6Fe6 кг/га (Т-4). Согласно результатам, вариант Т-4 по сравнению с контрольной группой значительно увеличивал количество К, Са, Р, Mg, Fe Na, Mn, Zn и Si в корневище имбиря.

Ключевые слова: Имбирь, минеральное удобрения, макроэлементы, микроэлементы

Abstract The present study investigated the effect of mineral fertilizers on content of mineral elements in rhizomes of ginger (*Zingiber officinale* Roscoe) in soil and climatic conditions of Surkhandarya region. The present study is the first in Uzbekistan to investigate the mineral elements of ginger rhizome inhabiting Termez district, Surkhandarya region. Four treatments have been used in the experiment (Control with no fertilizers (T-1), N75P50K50

kg/hectare (T-2), N125P100K100 kg/ha (T-3) and N100P75K75 + B3Zn6Fe6 kg/ hectare (T-4). Results showed that T-4 treatment significantly increased ginger rhizome K, Ca, P, Mg, Fe, Na, Mn, Zn and content as compared to all other treatments and control.

Keywords: Zingiber, mineral fertilizers, content of macronutrients, content of micronutrients

KIRISH

Zanjabil tibbiyot va oziq-ovqat sanoatida keng qo‘llaniladi [5]. Barcha ziravorlar orasida zanjabil ko‘plab fermerlar va manfaatdor tomonlarning, jumladan Hindiston, Indoneziya, Nigeriya va Bangladesh kabi bir qancha mamlakatlardagi zanjabil yetishtiruvchilarning iqtisodiy va turmush darajasini yaxshilashda yordam beradigan muhim mahsulotidir [8].

Zanjabil (*Zingiber officinale* Roscoe) *Zingiberaceae* oilasiga mansub bo‘lib, shifobaxsh, ko‘p yillik ziravorlar bo‘lib, subtropik va nam iqlimda, ayniqsa Janubi-Sharqiy Osiyoda etishtiriladi. Hozirgi vaqtda zanjabil yetishtirish bo‘yicha birinchi o‘rinda Hindiston, undan keyin Xitoy, Yaponiya, Yamayka va Indoneziya mamlakatlari turadi [7]. Zanjabil barcha fermerlar, iste‘molchilar, manfaatdor tomonlar uchun iqtisodiy ahamiyatga ega bo‘lgan ekin bo‘lib, dietologlar dorivor va yuqori ozuqaviy ahamiyatga ega ayurveda tibbiyoti kabi ko‘p miqdorda qo‘llanilishi tufayli dietologlar va iste‘molchilar orasida tobora ortib borayotgan qiziqishni uyg‘otmoqda. Zanjabil ildizpoyalari orqali ko‘payadi va namlikni yaxshi ko‘radi [23]. Zanjabil Osiyoda qadim zamonlardan beri, qariyb 3000 yil davomida Ada, Adrak, Ingwer, Zingiber nomi bilan mashhur [12, 13, 21].

Zanjabil etishtirish uchun yomg‘irli va sug‘oriladigan sharoitlar, shuningdek, yaxshi qurigan tuproqlar, qumloq, loy, qizil yoki laterit qumloqlar eng mos keladi. Uning ildizpoyasi yangi va quritilgan shaklda iste‘mol qilinadi, u ham an‘anaviy, ham o‘simlik tibbiyotida ovqat hazm qilishda, bosh og‘rig‘i va ko‘ngil aynishini davolash uchun juda foydalidir [2]. Antioksidant xususiyatlari tufayli zanjabil bir qator foydali xususiyatlarga ega. U qon bosimi, ko‘ngil aynishi va uyqusizlik kabi turli kasalliklarni davolashda foydalidir [3, 25]. Zanjabil o‘zining shifobaxsh, ozuqaviy va davolovchi ahamiyatiga ega bo‘lganligi sababli, zanjabilga bo‘lgan talab kundan-kunga ortib bormoqda [19].

Zanjabil ildizpoyasi fosfor, kaliy va kaltsiy kabi ko‘p miqdordagi minerallardan iborat bo‘lib, ular ko‘plab fiziologik jarayonlarni nazorat qiladi va inson organizmi uchun foydalidir [27, 28]. Bozor ehtiyojlarini qondirish uchun ildizpoyalarning ozuqaviy moddalarini boyitgan va tuproq sifatini yaxshilaydigan o‘g‘itlarning eng yaxshi me‘yorini topish katta ahamiyatga ega. Bir qator tadqiqotlar shuni ko‘rsatdiki, NPK o‘g‘itlari ekinlar hosildorligi, ishlab chiqarish va butun qishloq xo‘jaligi ishlab chiqarishini yaxshilash uchun muhim o‘g‘itlar bo‘lib, o‘simliklarning o‘sishi va rivojlanishida asosiy rol o‘ynaydi [14, 20, 26,].

Surxondaryo viloyati tuproq-iqlim sharoitida noyob zanjabil o‘simligining makro va mikroelementlar miqdoriga mineral o‘g‘itlarning ta’siri o‘rganilmagan. Shu bois, Surxondaryo

viloyati tuproq-iqlim sharoitida noyob zanjabil ildizpoyasining makro va mikroelementlar miqdoriga mineral o‘g‘itlarning ta’siri o‘rganildi.

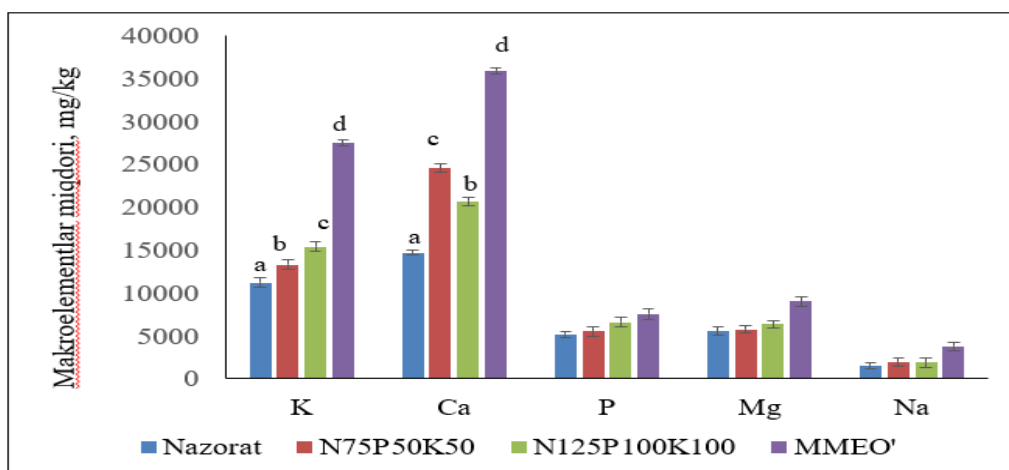
MATERIAL VA TADQIQOT USLUBLARI

Dala tajribalari Sabzavot, poliz ekinlari va kartoshkachilik ilmiy tadqiqot institutining Surxondaryo ilmiy tajriba stansiyasida o‘tkazilgan. Tadqiqotlarni olib borishda noyob zanjabil (*Zingiber officinale*) ildizpoyalaridan foydalanilgan. Dala tajribasi uchun to‘rtta variant tanlab olindi: 1- variant o‘g‘itsiz, nazorat varianti bo‘lib, qolgan variantlarni taqqoslash uchun olindi; 2- variant gektariga N75P50K50 kg mineral o‘g‘it; 3- variant gektariga N125 P100 K100 kg mineral o‘g‘it; 4- variant makro- va mikro elementli o‘g‘itlar (MMEO‘ gektariga N100P75K75 + B3Zn6Fe6 kg) qo‘llanilgan. Zanjabil ildizpoyasining makro va mikroelementlar miqdori aniqlangan. Mineralizatsiya qilingan eritmani Perkin Elmer firmasining ISP-MS (Nexion 2000) induktiv bog‘langan plazmali mass-spektrometrda (yoki shunga o‘xshash analogida), namunalarning tarkibidagi makro va mikro elementlari standart namunaga nisbatan mikdoriy jixatdan tahlil qilingan.

Olingan natijalar IBM SPSS 20 Statistics dasturining (ANOVA) dagi Duncanning ko‘p faktorli testi yordamida tahlil qilingan. Variatsiyalar analizi (ANOVA) Duncanning ko‘p faktorli testi yordamida tahlil qilingan.

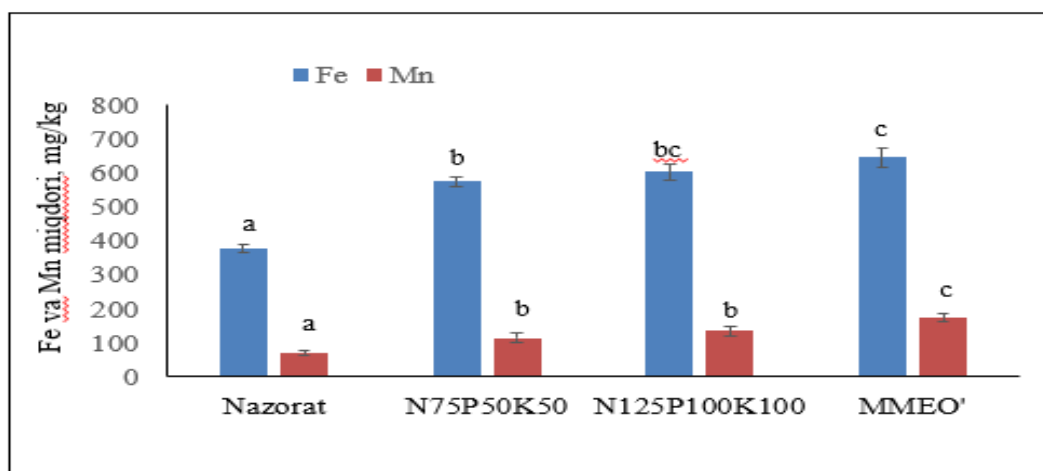
NATIJALAR VA MUHOKAMA

Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasining makro va mikroelementlar miqdoriga mineral o‘g‘itlarning ta’siri o‘rganildi. Surxondaryo tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi makroelementlar tahlil qilinganda, zanjabil ildizpoyasidagi makroelementlar miqdorini gektariga N125P100K100 kg miqdorda o‘g‘it qo‘llanilgan variant va MMEO‘ qo‘llanilgan variantlarda oshganligi kuzatildi (1-rasm). Zanjabil ildizpoyasidagi K miqdorini 37%, P miqdorini 26% va Na miqdorini 24% nazoratga nisbatan gektariga N125P100K100 kg miqdorda o‘g‘it qo‘llanilgan variant oshirganligi aniqlandi. Eng yuqori ko‘rsatkich MMEO‘ qo‘llanilgan variantda qayd etildi. Ayniqsa, zanjabil ildizpoyasidagi K, P, Na, Ca va Mg miqdorini barcha variantlarga nisbatan MMEO‘ qo‘llanilgan variant oshirganligi aniqlandi.



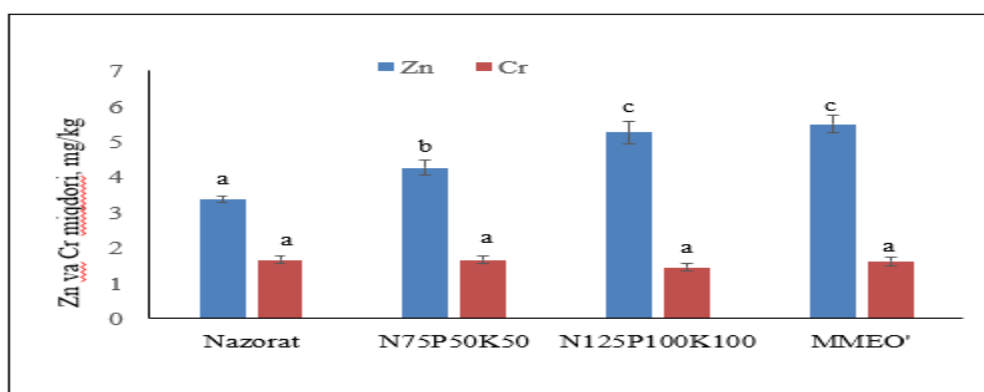
1-rasm. Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasining makroelementlar miqdoriga mineral o'g'itlarning ta'siri

Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi mikroelementlar tahlil qilinganda, zanjabil ildizpoyasidagi miqdorini gektariga N125P100K100 kg miqdorda o'g'it qo'llanilgan variant va MMEO' qo'llanilgan variantlarda oshganligi kuzatildi (2-rasm). Zanjabil ildizpoyasidagi Fe miqdorini 60% va Mn miqdorini 48% ga nazoratga nisbatan gektariga N125P100K100 kg miqdorda o'g'it qo'llanilgan variant oshirganligi aniqlandi. Zanjabil ildizpoyasidagi Fe va Mn miqdorini barcha variantlarga nisbatan MMEO' qo'llanilgan variant yuqori oshirganligi aniqlandi.



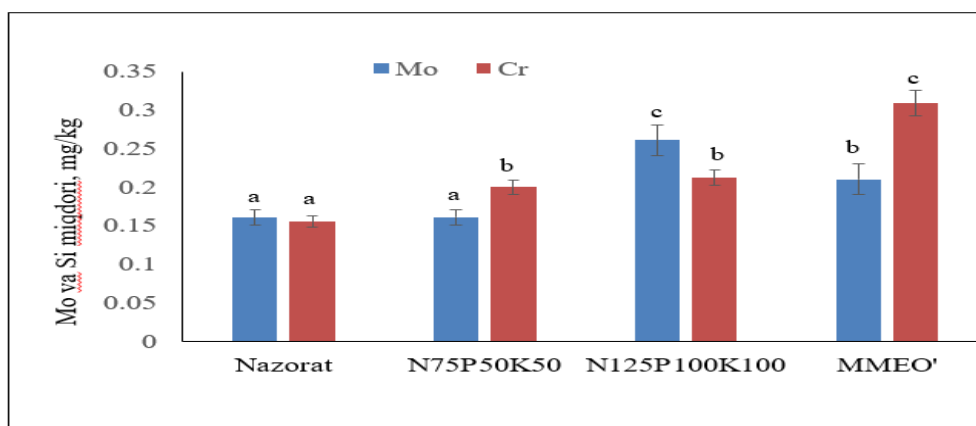
2-rasm. Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi Fe va Mn miqdoriga mineral o'g'itlarning ta'siri

Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi Zn qilinganda, zanjabil ildizpoyasidagi Zn miqdorini gektariga N125P100K100 kg miqdorda o'g'it qo'llanilgan variant va MMEO' qo'llanilgan variantlarda oshganligi kuzatildi (3-rasm). Zanjabil ildizpoyasidagi Zn miqdorini 57% ga nazoratga nisbatan gektariga N125P100K100 kg miqdorda o'g'it qo'llanilgan variant oshirganligi aniqlandi. Zanjabil ildizpoyasidagi Zn miqdorini barcha variantlarga nisbatan MMEO' qo'llanilgan variant oshirganligi aniqlandi.



3-rasm. Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi Zn va Cr miqdoriga mineral o'g'itlarning ta'siri

Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi Mo va Si tahlil qilinganda, zanjabil ildizpoyasidagi Mo va Si miqdorini gektariga N125P100K100 kg miqdorda o'g'it qo'llanilgan variant va MMEO' qo'llanilgan variantlarda oshganligi kuzatildi (4-rasm). Zanjabil ildizpoyasidagi Mo va Si miqdorini barcha variantlarga nisbatan MMEO' qo'llanilgan variant oshirganligi aniqlandi.



4-rasm. Surxondaryo viloyati tuproq-iqlim sharoitida yetishtirilgan noyob zanjabil ildizpoyasidagi Mo va Si miqdoriga mineral o'g'itlarning ta'siri

Bir qator olimlar tomonidan dorivor o'simliklardagi biologic faol moddalar, makro va mikroelementlar miqdori o'rganilgan [10, 11, 15, 16, 17, 18, 24]. Biz tadqiqotimizda ilk marotaba Surxondaryo viloyati tuproq-iqlim sharoitida etishtirilgan zanjabil ildizpoyasining makro va mikroelementlar miqdorini aniqladik. Bir qator xorijiy olimlar tomonidan Nigeriya, Hindiston va Xitoy mamlakatlarida etishtirilgan zanjabilning makro va mikroelementlar miqdori o'rganilgan [1, 6, 22, 27, 28,].

Xulosa

Surxondaryo viloyati tuproq-iqlim sharoitida noyob zanjabil o'simligining makro-mikroelementlar miqdoriga mineral o'g'itlarning ta'siri o'rganilganda, zanjabil ildizpoyasidagi makro va mikroelementlar miqdorini MMEO' qo'llanilgan variantda oshganligi aniqlangan. Zanjabil ildizpoyasi minerallarga boy va ozuqaviy qo'shimchalar va tuproqni boyitish uchun katta potentsial sifatida ishlatilishi mumkin. Xulosa qilib aytganda, makro va mikroelementli mineral o'itlar Surxondaryo viloyati tuproq-iqlim sharoitida zanjabil ildizpoyalarida mineral elementlarning miqdorini oshirish imkoniyatiga ega.

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