This study aimed to investigate the effect of Zinc (Zn) and Nitrogen (N) fertilizations on grain zinc (Zn) phosphorus (P) and phytic acid (PA) concentrations, PA/Zn molar ratio, yield, phytase activity and protein content of lentil varieties. Zinc fertilization led to decrease in grain P concentrations and related parameters. Phytic acid/Zn molar ratios decreased with the increment of Zn and protein concentrations in grains, but increased with the increase of grain P levels. While there were positive relations amongst the grain P concentrations and P-related parameters, there was a close negative relation with Zn generally. Although, protein concentrations negatively affected by grain P and PA concentrations, there was a significant positive relation with N fertilization. Increase of both Zn and P concentrations in grains negatively affected phytase activity, but a positive correlation was seen between the protein and phytase. Grain yield increased with both Zn and N fertilization.