



Effect of Foliar Application of Biofertilizer and Nano-fertilizers on Morpho-Physiological Characteristics of Peppermint (*Mentha piperita* L.)

Majid_Rostami*, Zahra Movahedi, Mohammad Reza Davari, Samira Siahpoosh

* Department of Agronomy, Malayer University, Iran, M.rostami@malayeru.ac.ir



Introduction:

Peppermint is one of the medicinal and aromatic plants that its extract is used in pharmaceuticals, food and cosmetic industry. In recent years, due to the harmful effects of chemical fertilizers on the environment, their use has been criticized. Using bio and nano-fertilizers as an alternative source for conventional fertilizers can lead to increased nutrient use efficiency and improved plant nutrition.

Material and methods:

In order to evaluate the effect of foliar application of nano-fertilizers and organic compounds on morpho-physiological characteristics of peppermint an experiment was conducted based on completely randomized design with 7 treatments and 3 replications at research greenhouse of Malayer University. Experimental treatments were control, foliar application of different nano-fertilizers (aqueous solution of nitrogen, iron and potassium at the rate of 2 g/L) and foliar application of normal vermiwash, enriched vermiwash (normal vermiwash+aqueous extract of *Urtica dioica*) and tea compost. Foliar application was done by evenly spraying the solution until the whole plant was wet. In order to increase the efficiency of experimental treatments, spraying was replicated 4 times at weekly intervals.

Results:

Based on the results effect of nano-fertilizers and bio-fertilizers on plant height, leaf area, leaf dry weight, total dry weight, relative water content, photosynthesis pigments and the concentration of mineral nutrients were significant. The lowest amount of leaf dry weight (1.73 gr. pot⁻¹) observed in control and by application of nitrogen nano fertilizer leaf dry weight increased by 165%. The lowest plant height (12 cm) was recorded in control, whereas the highest plant height (28.8 cm) was in nitrogen nano fertilizer followed by enriched vermiwash (20.4 cm). In all the treatments chlorophyll a was higher than control but application of enriched vermiwash resulted in the highest amount of chlorophyll a (2.4 mg/g FW). The highest amount of soluble protein (1.53 mg/g FW) was related to enriched vermiwash but the lowest soluble protein (1.05 mg/g FW) observed in tea compost treatment. In general nitrogen nano-fertilizer and enriched vermiwash had the highest positive effects on studied traits and were the best fertilizers among nano-fertilizers and biofertilizers, respectively.

Conclusion:

considering the economic yield best treatments were nitrogen nano-fertilizer and enriched vermiwash.

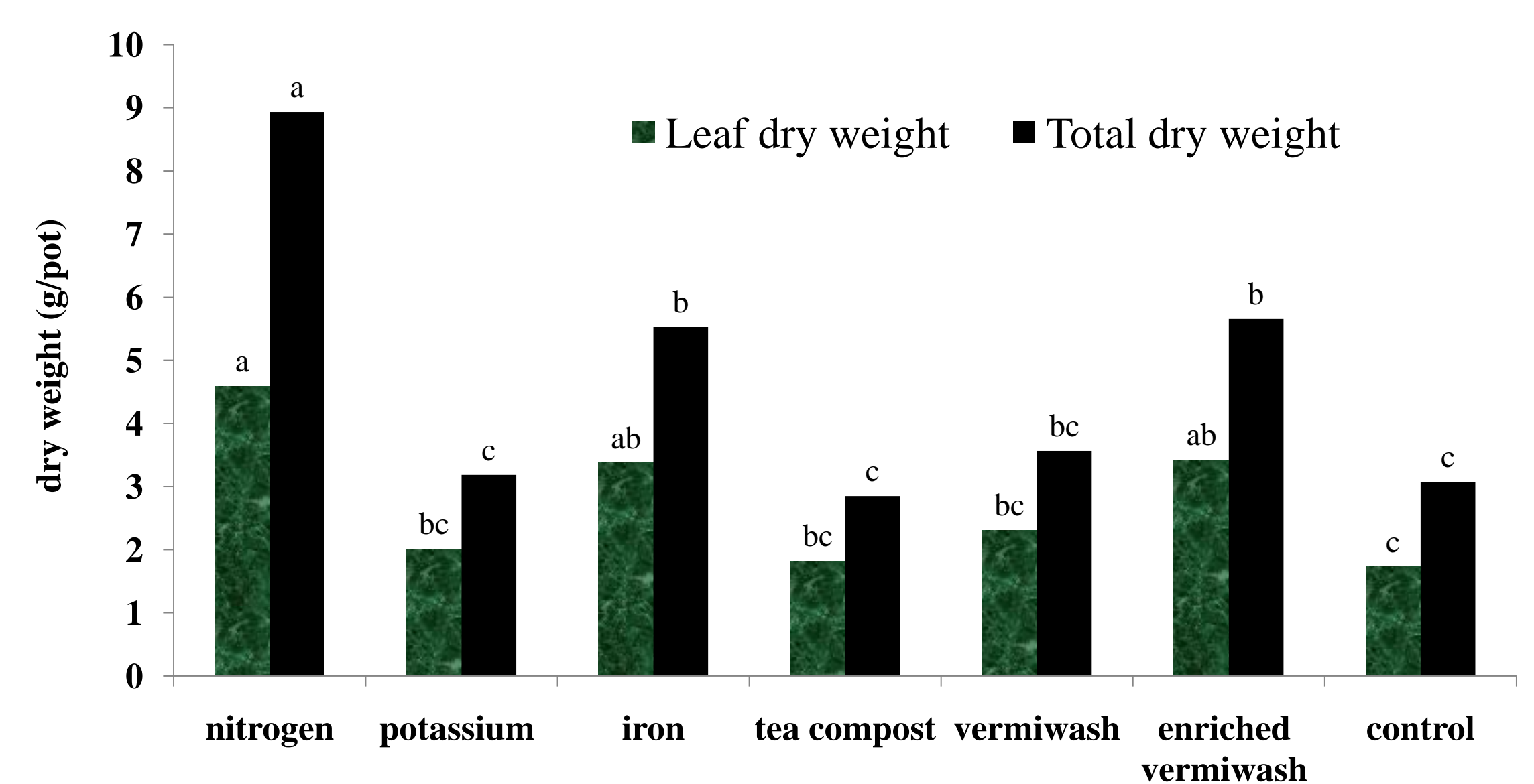


Fig.1. Effect of different treatments on leaf dry weight and total dry weight

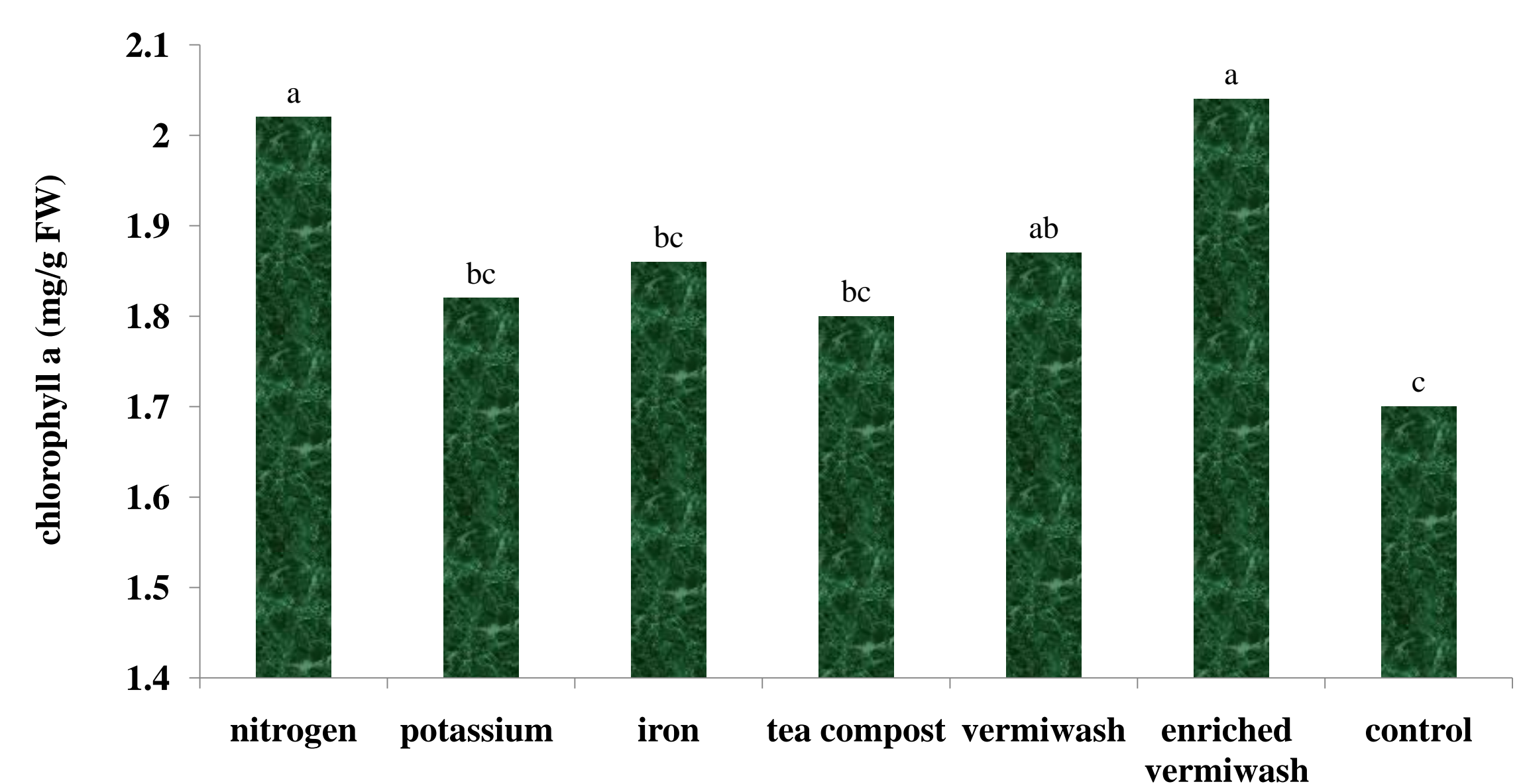


Fig.2. Effect of different treatments on leaf chl a content

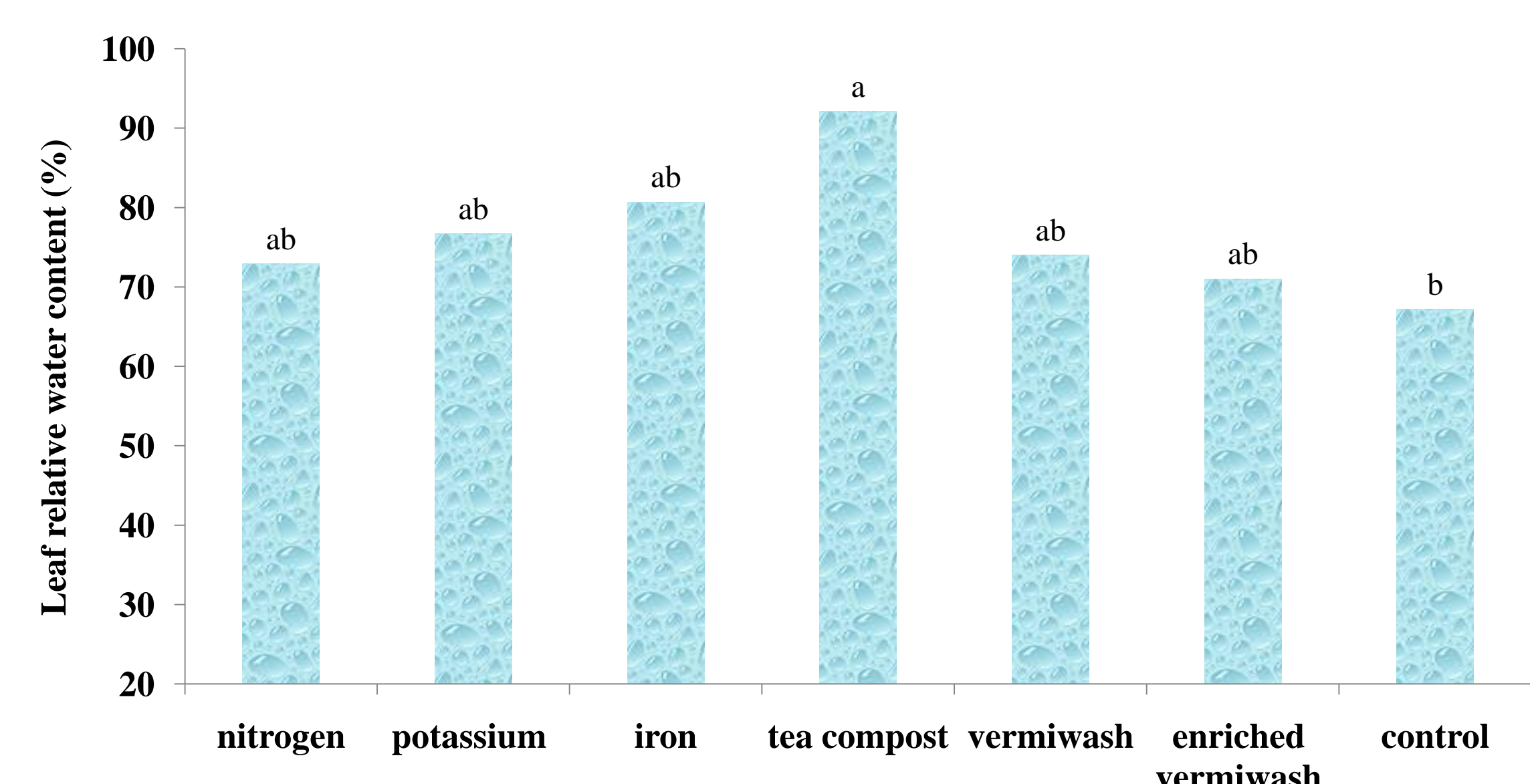


Fig. 3. Change in leaf relative water content in different treatments