Water stable soil aggregates under the different fertilizer treatments

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RATIONALE

The difference in aggregate stability in different forms of soil exploitation is mainly due to the intensity of disturbance of soil and its cultivation. The questioning of farmers in Lithuania have indicated that in agricultural practice short crop rotation of three-course (45 %) and 4-year crop rotation (36%) with more nutrient exhausting crops are the most dominant. Under such conditions, when organic matter inputs are very low, along with humus decline soils also tend to have a less stable structure.

MATERIALS AND METHODS

Analysis of water stability of soil aggregates (at a depth of 0-20 cm) was examined according to the method of N. Savinov. In addition, Retsch wet sieving apparatus was used however water stable soil aggregates in this case were determined only from dry sieved 1 to 2 mm fraction (whereas fractions in diameter of 7; 5; 3; 2; 1; 0.5 and 0, 25 mm are used in N. Savinov's method).

RESULTS (I)

(analysis by N. Savinov method)

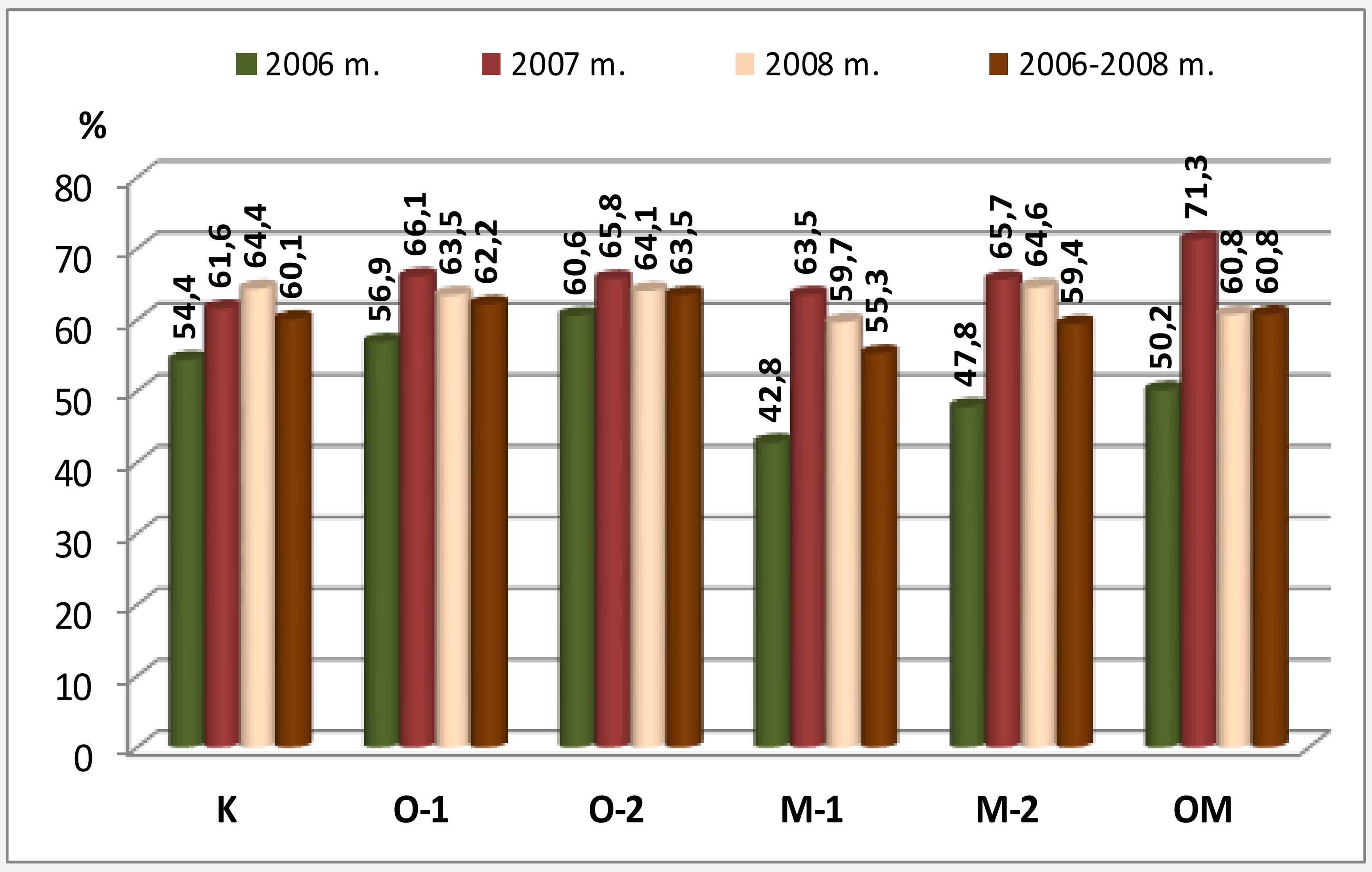

Fig. 1. Water-stable soil aggregates under the different fertilization systems
(in the Experimental Station of former Aleksandras Stulginskis University, 2006–2008)
K – Control (no fertilization applied); O – organic (1–50 t ha^{-1}, 2–100 t ha^{-1} manure once per rotation); OM – organic-mineral; M – mineral (1 – $N_{31}P_{38}K_{75}$, 2 – $N_{79}P_{65}K_{90}$) fertilization systems

RESULTS (II)

(analysis by N. Savinov method)

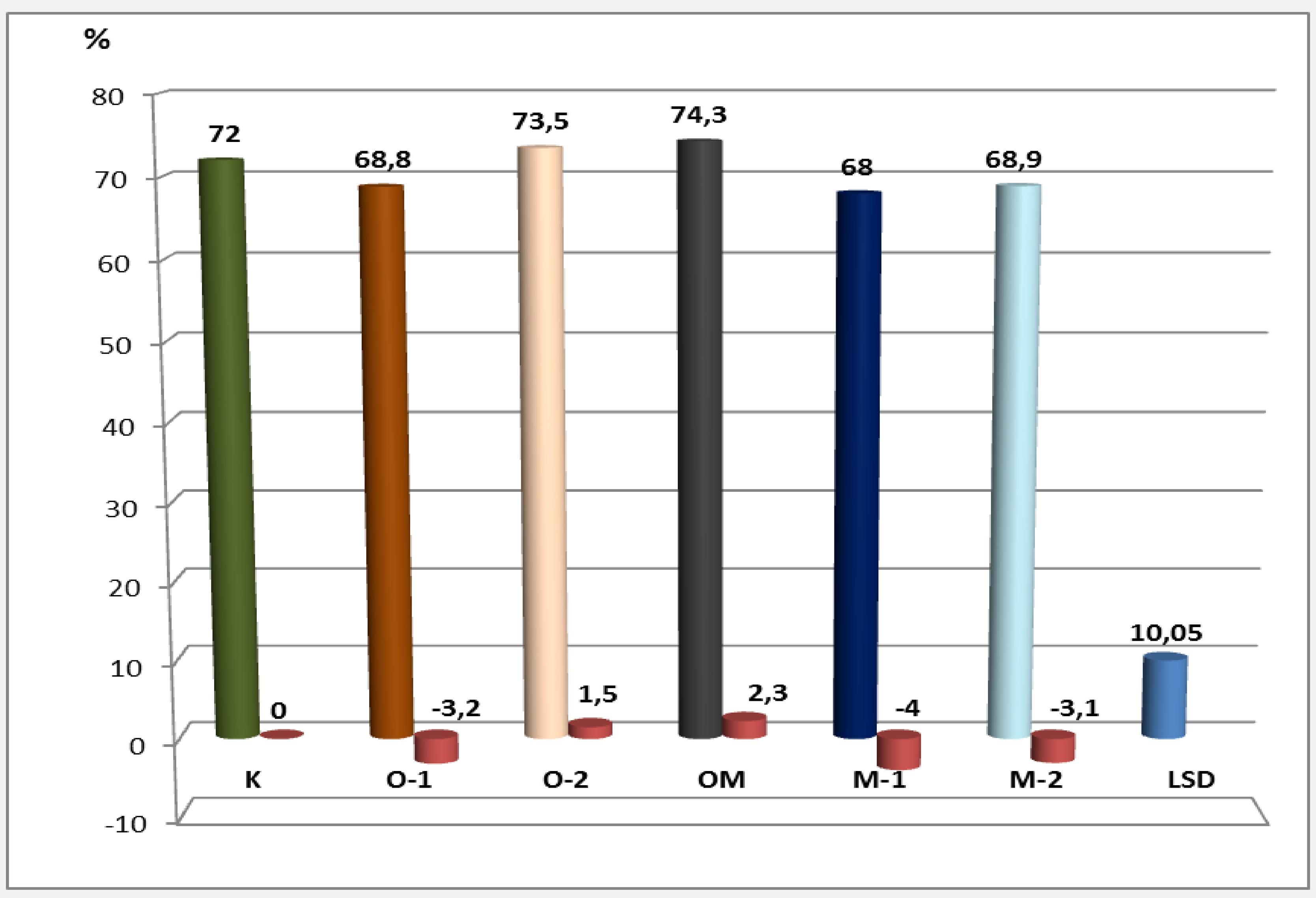

Fig. 2. Residual effect of fertilizer systems on water-stable of soil aggregates
(in the Experimental Station of former Aleksandras Stulginskis University, 2016)
K – Control (no fertilization applied); O – organic (1–50 t ha^{-1}, 2–100 t ha^{-1} manure once per rotation); OM – organic-mineral; M – mineral (1 – $N_{31}P_{38}K_{75}$, 2 – $N_{79}P_{65}K_{90}$) fertilization systems

RESULTS (III)

(analysis by Retsch sieving apparatus)

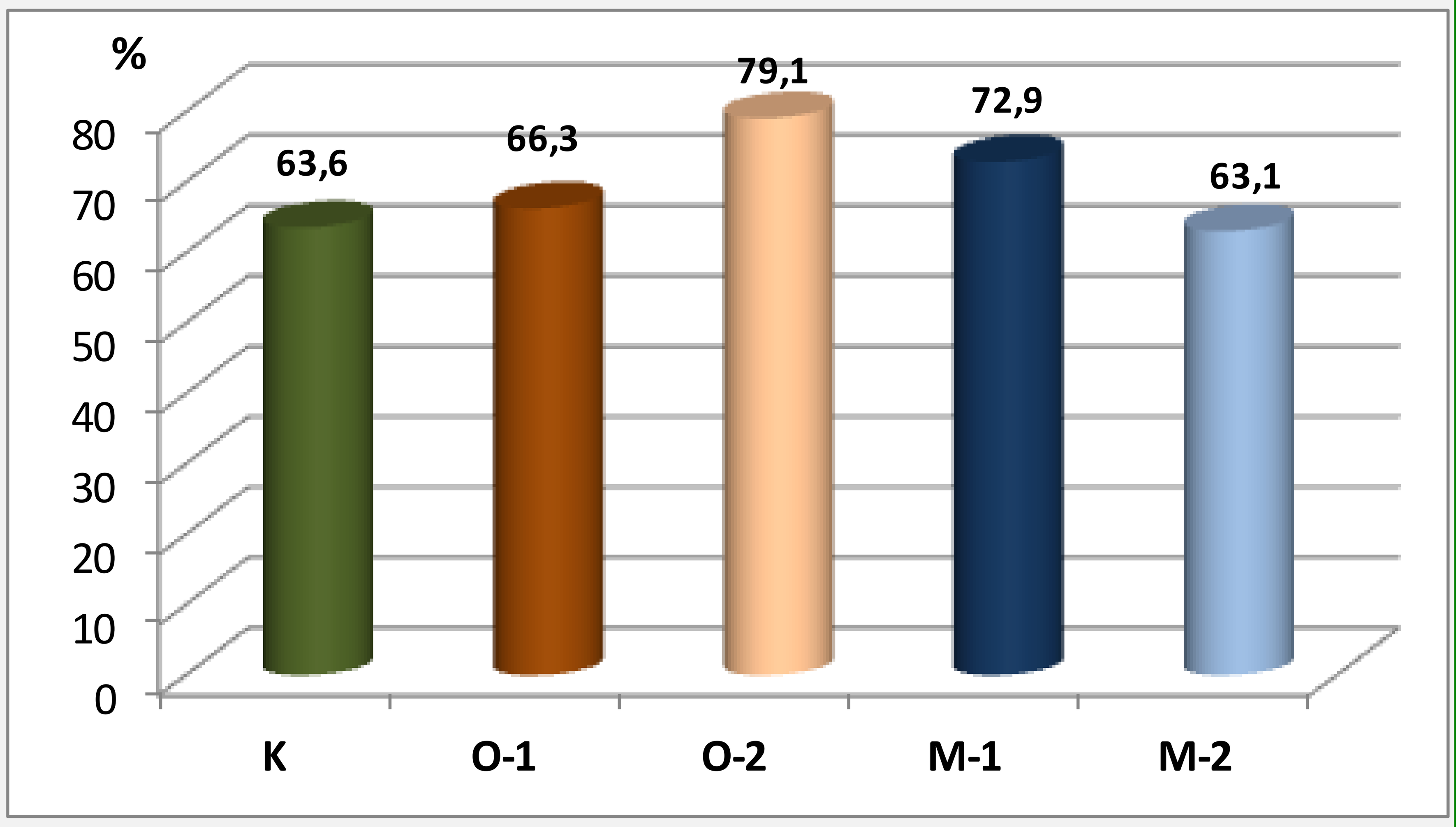

Fig. 3. Water-stable soil aggregates under the different fertilization systems
(in the Experimental Station of former Aleksandras Stulginskis University, 2016)
K – Control (no fertilization applied); O – organic (1–50 t ha^{-1}, 2–100 t ha^{-1} manure once per rotation); M – mineral (1 – $N_{31}P_{38}K_{75}$, 2 – $N_{79}P_{65}K_{90}$) fertilization systems

RESULTS (IV)

(analysis by Retsch sieving apparatus)

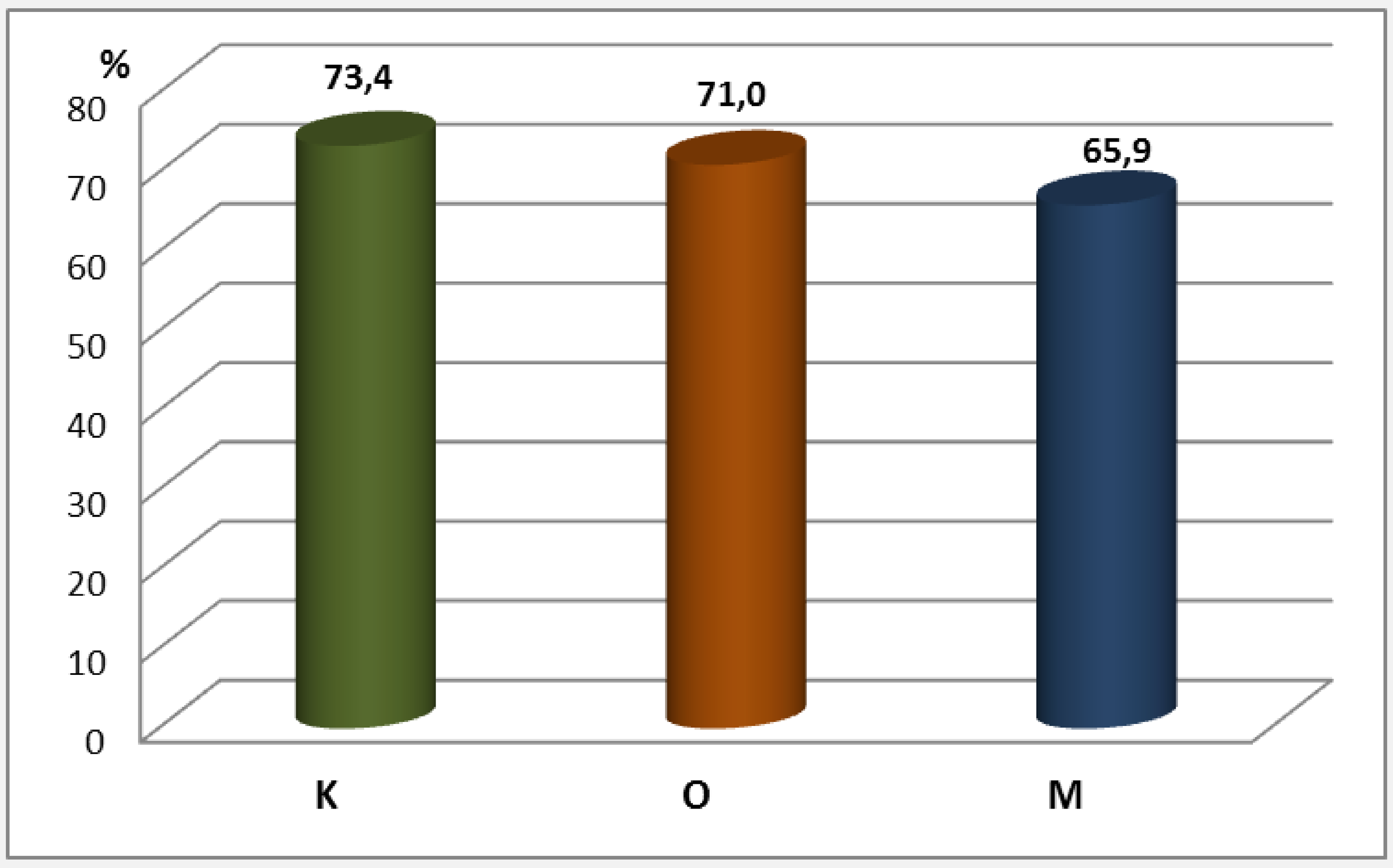

Fig. 4. Water-stable soil aggregates under the different fertilization systems
(in private farm near by Šatės, Skuodas r., 2016)
K – Control (no fertilization applied); O – organic (1–10 t ha^{-1} slurry twice per rotation, 2–20 t ha^{-1} slurry once per rotation); M – mineral (1 – $N_{55}P_{30}K_{65}$ 2 – $N_{55}P_{55}K_{55}$) fertilization systems

Conclusion: **the amount of water stable aggregates in the soil using different fertilizer systems did not differ much, however the tendency was that more of them were formed under the organic fertilizing system. This indicates that the structure of the soil and its water stability in crop rotation are determined mainly by soil cover homogeneity and soil management practice that was applied.**

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