

Correlation Between the Amount of Soluble Substance and Vitamin C in ten Varieties of Strawberries Under the Influence of Mulch and Fertilizer

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Abstract. The consumers and food processing industries prefer the organic food items, because they also ensure health safety. Many synthetic and organic types of mulch have been used in the raised bed culture system. Plants grown on black plastic mulch produced more runners and fruit than plants grown on clear or white plastic mulches and that total fruit mass was greater with black and clear plastic mulches than with bare soil. The total soluble solids represent the acid, sugars, soluble salts, proteins and other dissolved substances of the cell sap. The total sugars ranged between 50.73 mg/100 g s.p. and 113.43 mg/100 g s.p., and the soluble solids ranged between 7.19% and 13.11%. A strawberry with very low sugar and acid content taste flat. In the same time strawberry are economically and commercially important and widely consumed fresh or in processed forms, such as jams, juices and jellies. Genotype and environmental conditions as well as differences related to methods of extraction and analysis used in the different published papers must be considered in order to understand and justify the wide range in sugar and soluble solids substances content reported above. The sugar content differed significantly among all three mulches treatments, with black polyethylene being the highest and straw – wetch the lowest.

Keywords: fertilizer, mulch system, soluble substances, strawberry, total sugars, varieties.

Introduction. The sugars and acids contents are considerable taste attributes of strawberry fruits (Wosniak, *et al.*, 1997) which attracts the consumers. In fresh strawberries sucrose, glucose and fructose comprise 99% of total sugars (Maniken and Soderling, 1980). According to Cayuela *et al.* (1997) organically produced strawberries contain more sugars than conventionally produced fruits.

Aims and objectives. This research focuses on factors affecting the nutrient composition in ten strawberries cultivars. The correlation between the amount of soluble substances (SS) and the amount of total sugars is also presented. Total sugar content and soluble substances was revealed by simple positive correlations in all varieties examined, both organic fertilization and chemical. In both fertilization were determined linear regression equations for the ten cultivars studied, which aims quantitative evolution in sugar and SS.

Materials and methods. For the experiment fruits were taken from a strawberry commercial farm, growing at a location in Cluj Napoca (Romania). Ten varieties of strawberry (Alba', 'Kimberly', 'Korona', 'Elliany', 'Elsanta', 'Vima Zanta', 'Viktoriana' 'Virena', 'Vima Xima', 'Premial'), three types of mulch (agro-textile, 0.04 mm thick black polyethylene and straw) and two fertilizer systems (poultry manure and liquid NPK 24:8:16, also containing microelements Mg 2.2%, S 2%, B 0.03%, Fe 0.1%, Mn 0.05% and Zn 0.025%) were used in the experiment.

Soluble solids content was determined with a Zeiss refractometer (PN-90/A-75101/02) standardized with distilled water. Determination of total sugar was performed according to the methods described by (Marca, 2003).

Results and Discussion. In summary, mulch type, fertilisation and cultivar appear to affect the quantity of sugar and total content in soluble substances. Comparing the three mulch systems correlation coefficients have different values, but significant. Under the organic fertilizer correlation coefficient of 0.999 in case of agro-textile mulch is superior to straw mulch 0.9939 and polyethylene mulch 0.9989 in total sugar content.

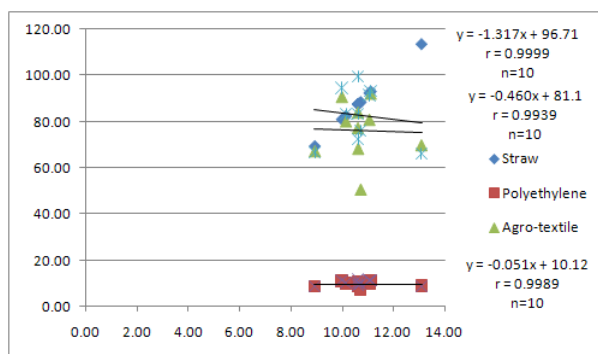


Fig.1. Correlation between soluble substances and total sugar under the mulch and organic fertilizer

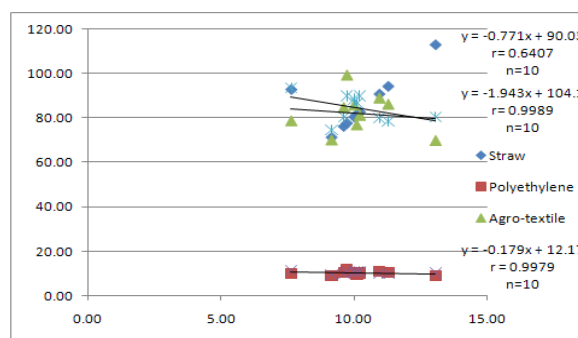


Fig. 2. Correlation between soluble substances and total sugar under the mulch and conventional fertilizer

From the interaction of two factors, mulch x cultivar, Elianny and Vima Zanta genotypes had the highest quantity of total sugar 113.25 g/100 g s.p. and 96.60 g/100g s.p. on agro-textile mulch and straw mulch. The lowest quantity of total sugar was registered by Virena varieties on polyethylene mulch 65.97 g/100g s.p. Under the conventional fertilizer correlation of 0.6407 in case of straw mulch is inferior to agro-textile mulch 0.9979 and 0.9989 on polyethylene mulch. From the interaction of two factors, fertilizer x cultivar, Elianny and Vima Zanta genotypes registered the highest percent in soluble substances 13.08% and 11.48% on agro-textile mulch and straw mulch. The lowest percent in soluble solids substances was registered by Virena varieties on polyethylene mulch 8.63%.

Conclusion

Utilization of suitable manure is a very good practice in improving physiochemical properties of the soil; it is also a good source of essential nutrients. Results clearly showed that poultry manure proved to be dominant quality parameters of strawberry plant efficiently. It was noted that organically grown strawberries had a higher content on total sugar and soluble substances. The highest content in total sugar and soluble substances, strongly recommend the mulch with agro-textile organically fertilized.

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