

# THE CAROTENOID CONTENT IN THREE EDIBLE POTATO CULTIVARS DEPENDING ON THE BIOSTIMULANTS USED

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## PURPOSE OF RESEARCH

The aim of the study was to assess the total carotenoid content in tubers of three edible potato cultivars depending on the biostimulants used.

## MATERIAL AND METHODS

A field experiment was carried out in Międzyrzec Podlaski, (51°59' N and 22°47' E), Lubelskie Voivodeship, Poland, from 2015 to 2017. The experiment was a two-way split-plot arrangement with three replicates. The factors of experience are illustrated in Table 1.

**Factor I** – three table potato cultivars: Honorata, Jelly and Tajfun

**Factor II** – four variants of application of biostimulants:

**Kelpak SL** (active substance - *Ecklonia maxima* algae extract), containing plant hormones: auxin - 11 mg·l<sup>-1</sup> and cytokinin - 0.031 mg·l<sup>-1</sup>;

**Titanit** (active substance – titanium);

**GreenOk** (active substance – humus substances 20 g·l<sup>-1</sup>);

**BrunatneBio Złoto** (active substances – plant hormones: auxin - 0.06 mg·l<sup>-1</sup> and cytokinin - 12 mg·l<sup>-1</sup>).

The control object was plants potato sprayed with distilled water.

### Chemical analysis methods

The total carotenoid content was determined by spectrophotometric method reagent in fresh potato tuber mass. The principle of the method is based on the extraction of carotenoids from the test sample with petroleum ether and their determination in the obtained extract using the colorimetric method at the wavelength = 450 nm. at the Regional Research Center for Environment, Agricultural and Innovative Technologies, Pope John II State School of Higher Education in Biała Podlaska.

## RESULTS

Table 2. Weather conditions during of potato vegetation (Zawady Meteorological Station)

Months	Air temperature (°C)				Rainfall (mm)			
	multi-year mean	monthly means			multi-year mean	monthly sums		
	1996-2010	2015	2016	2017	1996-2010	2015	2016	2017
April	8.0	8.2	9.1	6.9	33.6	30.0	28.7	59.6
May	13.5	12.3	15.1	13.9	58.3	100.2	54.8	49.5
June	17.0	16.5	18.4	17.8	59.6	43.3	36.9	57.9
July	19.7	18.7	19.1	16.9	57.5	62.6	35.2	23.6
August	18.5	21.0	18.0	18.4	59.9	11.9	31.7	54.7
September	13.5	14.5	14.9	13.9	42.3	47.1	13.6	80.1
April–September	15.0	15.2	15.8	14.6	335.4	295.1	200.9	335.4

The research showed that the dominant factor significantly influencing the total carotenoids content in potato tubers were the varietal traits (Fig. 1). The variety with the most of this ingredient was Jelly, followed by the cv. Honorata and Tajfun. In the presented research, the applied biostimulants influenced the total carotenoid content in the fresh tuber mass in comparison with the control variant. The highest content was recorded in the facilities where the BrunatneBio Złoto® biostimulator was used. After the application of the BrunatneBio Złoto® biostimulator, the average total carotenoid content was 135 mg kg<sup>-1</sup> d.m. In the analyzed growing seasons, significant differences in the content of carotenoids were noted (Figs. 1, 2). In 2017, the lowest total mean concentration of carotenoids was obtained (82.8 mg kg<sup>-1</sup> s. M.). It was the year with the most rainfall and the lowest average air temperature. The highest number of total carotenoids was recorded in 2016 (112.9 mg kg<sup>-1</sup> mg). The year with the lowest average rainfall and the highest air temperature.

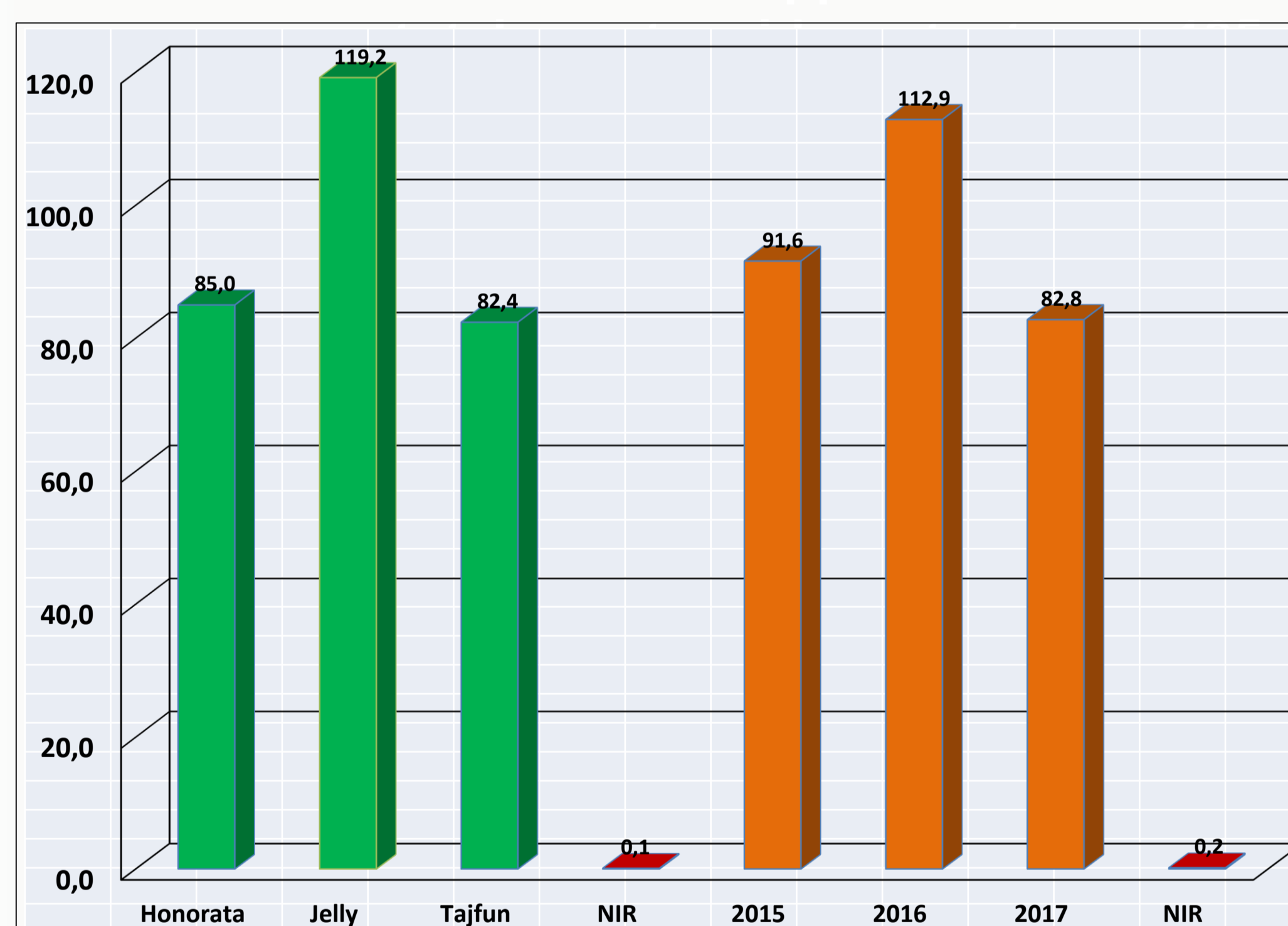


Fig. 1. Total carotenoids content in the fresh weight of tubers of three edible potato cultivars (mg kg<sup>-1</sup>) in 2015-2017

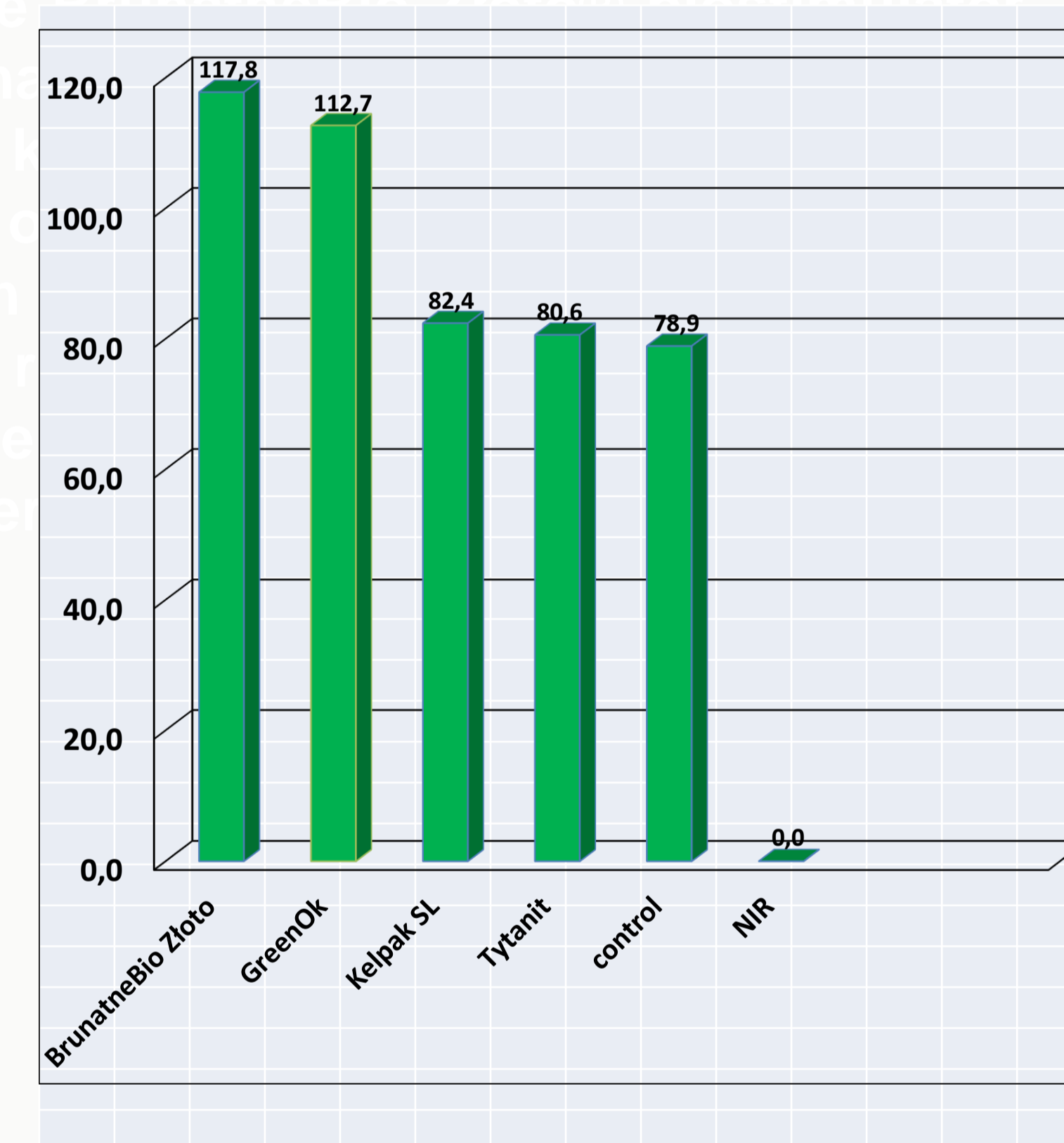


Fig. 2. Total carotenoids content in potato tubers depending on biostimulants used (mg kg<sup>-1</sup>)

## CONCLUSIONS

The variants with biostimulants used in the experiment had a significant effect on increasing the total content of carotenoids compared to the control variant. The highest content was recorded under the influence of the BrunatneBio Gold biostimulator.

The varietal factor influenced the content of carotenoids, the highest average content was recorded in the medium late variety of Jelly.

The total carotenoid content was influenced by climatic conditions, the highest content was recorded in tubers harvested in 2016, with the lowest amount of rainfall. The lowest content was found in 2017, which was characterized by the lowest average air temperature and excessive rainfall in potato tubers

