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Conference Paper *in* Acta Horticulturae · September 2021

DOI: 10.17660/ActaHortic.2021.1320.10

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Martinovska Stojcheska, A., Agic, R. and Janeska Stamenkovska, I. (2021). Vegetable production in North Macedonia - competitiveness, trends and challenges. Acta Hortic. 1320, 79-86
DOI: 10.17660/ActaHortic.2021.1320.10
https://doi.org/10.17660/ActaHortic.2021.1320.10

Vegetable production in North Macedonia – competitiveness, trends and challenges

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Abstract

The aim of this paper is to provide an analysis of the vegetable production trends in North Macedonia and examine its comparative advantage. The study is based on desk research data concerning vegetable production and trade, and a tailor-made survey carried out at key informant growers during the period February-April 2019. Emphasis is put on the development of the country's exports determined through the revealed comparative advantage index. Vegetable production is the major single sub-sector contributor to the agricultural gross product in the country, representing around one-third of its output value. The total production over the last decade averaged around 900 thousand tons annually, out of which 20% are exported (around 80% as fresh and the rest as processed or frozen). Key challenge for vegetable growers is competitiveness. Competition from neighboring countries is becoming more intensive in recent years and the comparative advantage of this important sector is weakening. Vegetable growers need to be differentiated from their competitors by better cost structure, efficient production systems, higher quality, product consistency, demand-side capability, flexibility to follow trends, and ability to rapidly change technology. Horizontal and vertical integration in the value chain, with appropriate backing from the advisory and knowledge transfer systems, as well as relevant policy support especially in terms of modernization and structural aids, need to constitute the backbone for increased competitiveness of the sector and overcoming the imminent challenges.

Keywords: vegetables, production, trade, growers' constraints, revealed comparative advantage index

INTRODUCTION

Competitiveness is the ability to operate successfully, producing and selling products profitably at the right price, quality and quantity; competitiveness is a relative measure since it can be analyzed within the domestic market (country level, compared to the other agents in the same sector) or on the foreign market (between countries) (Latruffe, 2010). The competitive advantage concept assumes maximum use of the natural resources, human potential, networks to enable using these resources, domestic demand to develop the potential and supportive business and institutional structure (Porter, 1985).

Vegetable growers all over Europe are bound to improve their performance in order to increase competitiveness (Riedel, 2009). The changing consumer habits and retail chains pressure dictate the rules and conditions of marketing and trade of vegetables, and this pattern is increasingly transferred to the countries in the Western Balkans. Investing in improved production and buyout, post-harvest handling, upgraded pack-house facilities, quality assurance, food safety management systems have become key success factors for the demanding vegetable chain (Jaffee and Masakure, 2005).

Vegetable production is the major single sub-sector contributor to the agricultural gross product in the country, representing around one-third of its output value, with significant export potential. The favorable soil-climatic conditions enable cultivation ofa large

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number of vegetables in the country, but there are various factors that influence the performance of this important sector and its competitive edge. In that respect, the aim of this paper is to provide an analysis of the vegetable sub-sector in North Macedonia, detect the major trends and patterns in production and trade shaping its competitiveness in the last decade, and identify the challenges ahead.

Following the introduction, the methodological approach and data collection are described. Then, the vegetable production trends and the major challenges faced by growers are presented, followed by the import and export situation, the recent trade developments and the revealed competitive advantage. The conclusion with discussion on the further paths to development and increased competitiveness of the sub-sector are given in the end.

METHOD AND DATA

The paper is based on desk research data on production and trade of vegetable products, primarily from the State Statistical Office (2020), Agriculture and agricultural policy dataset (2020) and the World Integrated Trade Solution database (2020). In addition, in order to gain a better direct insight into the current issues in the sub-sector, a supplementary tailor-made survey was organized and carried out with face-to-face semi-structured interviews conducted with around 100 primary vegetable growers during the period February-April 2019. These key informant growers were selected with assistance from the National Extension Agency and represent active farm operators in the three most important production regions (South-East, Skopje and Pelagonia region).

Standard statistical methods are applied, such as central tendency measures and index numbers as a composite effect of the changes in the representative group of various levels of aggregated annual data. Imports and exports statistics are reported for fresh produce, in quantity and value. In addition, the trade of the five major vegetable crops disaggregated by destination includes both fresh and processing level, converted to the equivalent of fresh raw material (Kotevska et al., 2017).

The Revealed Comparative Advantage Index is the most frequently used measure for identification of a country's weak and strong export sectors and it is applied to approximate the competitive export strengths of the vegetable sub-sector in North Macedonia. This metric, also known as Balassa index, is derived as follows (Balassa, 1965):

$$Balassa\ Index\ (RCA) = \frac{X_{ij}/X_{im}}{X_{wj}/X_{wm}} \quad (1)$$

In equation (1), X represents the exports of the i-th country for the j-th commodity; m is a set of commodities, and w is a set of countries. The revealed comparative advantage approach assumes that trade data are observed (Balassa, 1965). In this study, the comparative advantage of the vegetable sub-sector in North Macedonia is analyzed in relation to both the total export of agricultural products and the total export of the country. The w as set of countries considers three groups: Western Balkan countries (Bosnia and Herzegovina, Serbia, Montenegro, Albania and North Macedonia)[b]; regional EU countries (Slovenia, Croatia, Hungary, Romania, Bulgaria, and Greece) and other remaining EU countries. The Western Balkan countries indices are derived upon calculations using data from the Agriculture and agricultural policy database (2020), while the World Integrated Trade Solutions (2020) database is used for reference to the world trade of vegetables. A RCA value greater than 1, reveals comparative advantage of the country i in the production of vegetables (j), i.e. this production is more important for the country's exports compared to the export of the reference countries. RCA values of less than 1 indicate comparative disadvantage of the vegetable sub-sector, compared to the respective set of countries.

[b] Data on Kosovo are not available in the World Integrated Trade Solutions (2020).

RESULTS

Vegetable production – trends and challenges

Vegetables in North Macedonia are produced on close to 49 thousand hectares, an area that according to the official statistics, remained relatively stable over the last years (SSO, 2020). The total production of vegetables in the period 2010-2019 averaged 889 thousand tons, with a mild upwards trend (Table 1). Key vegetable crops are tomato, pepper, cabbage, watermelon and cucumber, contributing around 70% in production and 87% in export quantities, i.e. 50% in export value of the country's vegetable production (SSO, 2020). Around two-thirds of the production is located in the Southeast region.

Table 1. Vegetable area, production and output value, North Macedonia (Source: State Statistical Office, 2020)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019/2010
Area ('000 ha)	49	49	49	49	49	50	49	49	48	49	100.2%
Production ('000 tons)	885	854	808	820	909	967	948	885	910	903	102.0%
Output value (mill. Euro)	453	431	451	477	518	514	486	464	495	481	106.2%

The production of vegetables is predominantly carried out on small family farms, with approximately 60 thousand engaged growers (SSO, 2019). The average size of a specialized vegetable farm is around 0.8 ha, typically divided on several plots. The conducted growers' survey emphasized the main challenges that the vegetable growers are facing. In terms of production, problems begin with the choice of cultivars - growers plant many different cultivars, in order to disperse the risk, which in turn results in non-unified supply that affects the buyout, as buyers require standardized produce both in terms of quantity and quality. Most growers produce seedlings on their own (few also use their own seeds), hence the losses in the initial phase of cultivation, which is assessed as a critically sensitive phase by the respondents. Harvesting, if being untimely or inappropriate, causes losses and decreases quality. The lack of post-harvest practices and standards is a particular issue. Products are often placed into unsuitable primary packaging so that transfers from the farm to buyout points further increase the losses. No appropriate cooling, to prepare the product for transport, also contributes to the deterioration of the products quality prior to reaching the final destination. On the marketing side, the growers face difficulties with poorly organized buyout, unremunerative prices, lack of trust in buyers and problems with contract farming. The disorganization of the growers themselves, which individually produce relatively small quantities of non-standard product, greatly affects their bargaining power.

All these issues cause declining quantity and quality, recurring loss of productivity and decrease the marketing potential of the products. Growers underestimate the influence of the combination of factors, especially those not directly linked to the production agro-technical measures, on the quality and marketability of the final products.

Vegetable trade – trends and challenges

Vegetables are one of the major export commodity groups in the country. The official statistics show that in 2019, a total of 130 thousand tons of fresh vegetables were exported abroad, at an export value of 71 mill. Euro. Roughly 80% of the vegetables are exported as fresh and the rest as frozen or processed (SSO, 2020). Key export vegetables in terms of value were tomato and cabbage (15% share each in the total vegetable exports), followed by pepper (9%), cucumber and watermelon (around 4% each). Although still being a significant export sub-sector, there was a drop of 9% in the volume of exports by 2019 as compared to the early 2010s. In the same period, imports were on steady rise, with notable increase in both quantity and value over the last decade.

Table 2. Import and export of fresh vegetables[1], North Macedonia (Source: State Statistical Office, 2020)

	2012	2013	2014	2015	2016	2017	2018	2019	2019/2010
Volume of trade									
Imports ('000 tons)	19.1	21.9	21.7	25.0	23.7	34.9	32.5	34.7	181.8%
Exports ('000 tons)	142.2	140.3	182.2	141.1	152.7	135.0	133.8	129.5	91.1%
Coverage ratio (%)	13.4	15.6	11.9	17.7	15.5	25.8	13.2	13.2	-
Value of trade									
Imports (mill. Euro)	9.1	9.5	11.1	13.0	13.4	17.5	17.3	18.6	204.6%
Exports (mill. Euro)	51.3	55.5	69.1	65.8	68.6	60.0	55.7	71.1	138.4%
Coverage ratio (%)	17.7	17.2	16.0	19.8	19.5	29.2	31.1	26.1	-

[1]Data comprised in CNCT category 07 "Edible vegetables, plants, roots, tubers" (SSO, 2020).

North Macedonia has always been an important vegetable supplier in the region, stemming from its favorable position and familiarized association with quality and taste on the former Yugoslavian market, which has lingered after the independence. The Western Balkan countries remain the most important destination for almost all vegetable products, absorbing around 40% of the total export (Figure 1). However, the market position has slowly deteriorated on the regional markets and is especially rapidly changing in the last few years. Other significant export destinations are the EU countries in the region (Slovenia, Croatia, Hungary, Romania, Bulgaria, and Greece). Russia is a growing market particularly important for tomatoes in the last few years where exports have increased in export quantities and value. The average export price on this market in all crops is almost twice as high as the total average export price.

Competition from neighboring countries is becoming increasingly present on the domestic market. In Albania, although the farm structure is very fragmented, with small growers facing organization and efficiency problems (Muça et al., 2018), vegetable production has notable development in recent years, as a result of new investments in technology, equipment and machinery and improvement of standards in primary production and processing. Serbia has traditionally been a leader in fruit production in the region, but is now also investing in early vegetable production.

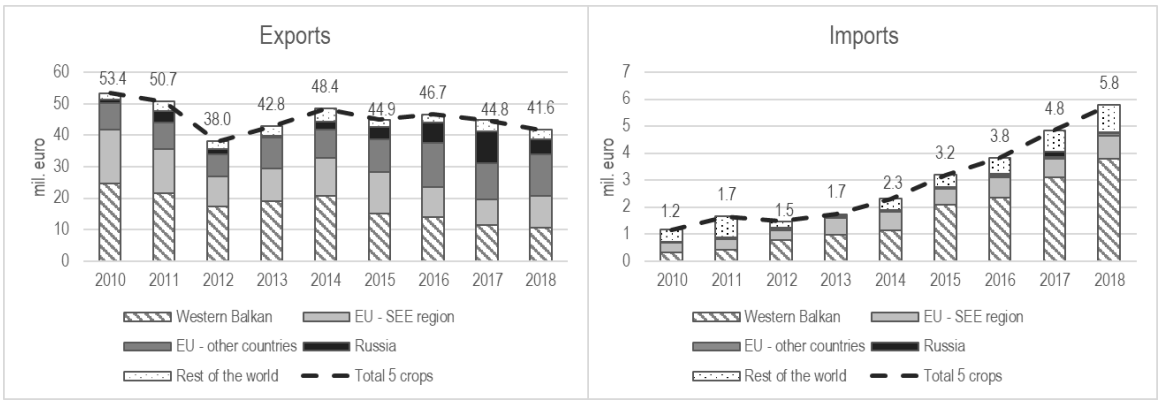

Figure 1. Export and import of the five major vegetable crops (tomato, pepper, cabbage, cucumber and melon) by country groups

Revealed comparative advantage of the vegetable sub-sector

The calculation of the Balassa (RCA) index reveals the specialization of the countries in the trade with vegetable products. The comparative analysis of the Western Balkan countries, where vegetable exports are analyzed in relation to total exports of agricultural products, indicates comparative advantage of North Macedonia. However, although the country is still a net exporter of vegetables, there is an evident decreasing trend of the RCA index during the period 2010-2019. On the contrary, Albania has significantly improved its

exports of vegetables and in 2019 has the highest comparative advantage among the Western Balkan countries (Figure 2). This is mainly due to their improved technologies and earlier production than the other Western Balkan countries. Serbia and Bosnia and Hercegovina have noted comparative disadvantage in the trade of vegetable products, with RCA index lower than 1.

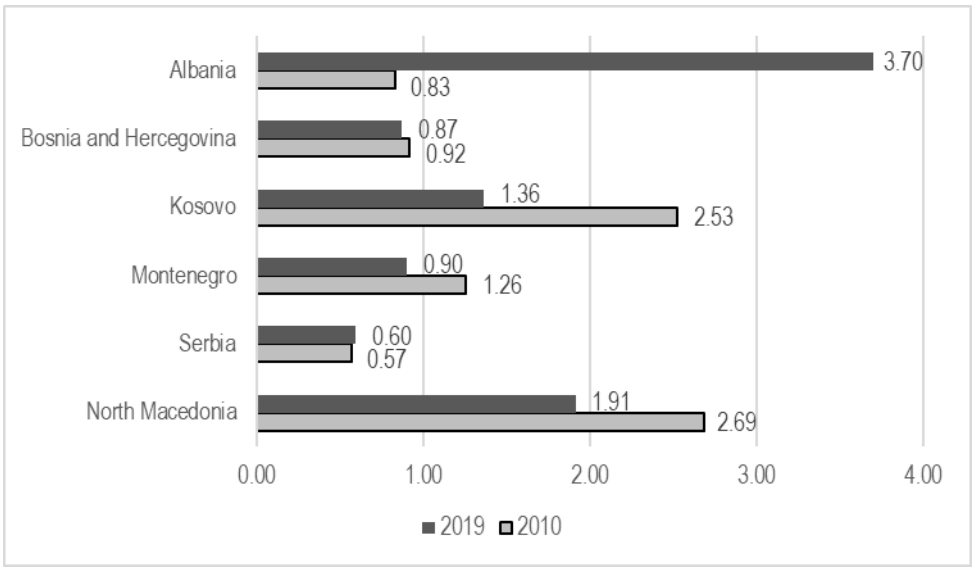

Figure 2. Revealed Comparative Advantage of vegetable products of Western Balkan countries, 2010-2019

The decreasing comparative advantage trend of North Macedonia is also confirmed when analyzed in terms of the specialization of the Western Balkan countries in relation to the vegetables' world trade (Table 3). During the period 2010-2018, North Macedonia has lost its vegetables export competitiveness (RCA<1); compared to 2010, its competitiveness has decreased for about 56% by 2018.

Table 3. Revealed Comparative Advantage of Western Balkan vegetables exports in relation to total world exports, 2010-2018 (Source: World Integrated Trade Solutions, 2020)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018/2010
Macedonia	1.70	1.37	1.30	1.28	1.20	2.00	1.06	0.73	0.75	44.1%
Serbia	3.96	4.34	4.34	3.13	3.39	3.60	3.01	2.68	2.48	62.6%
Albania	0.65	0.70	0.72	0.82	1.13	1.18	1.29	1.22	1.46	224.6%
Montenegro	0.72	0.73	0.77	2.48	2.43	3.26	3.21	0.35	0.78	108.3%
Bosnia and Herzegovina	0.95	0.68	0.71	0.85	0.98	1.55	1.32	1.24	0.95	100.0%

The RCAs of the Macedonian vegetable exports in relation to individual countries' exports show declining comparative advantage of the vegetable trade and weakening export competitiveness (Table 4). Biggest decline (around 81%) is evidenced with respect to the Slovenian vegetable exports, from RCA equalling 3.47 in 2010, to RCA of 0.67 in 2018, respectively. The trend is similar, though with lower intensity, with the net trade to other countries as well, such as Romania, Greece from the EU countries in the region, and Bosnia and Hercegovina from the Western Balkan countries. In terms of the other EU countries average, although with a decreasing trend during the period concerned, North Macedonia still has a comparative advantage in the trade with vegetable products (RCA>1).

Table 4. Revealed Comparative Advantage of North Macedonia's vegetable exports to other countries, 2010-2018 (Source: World Integrated Trade Solutions, 2020)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018/ 2010
Western Balkan countries										
Albania	2.67	2.94	2.65	1.58	3.58	3.95	4.16	2.08	2.54	95.1%
Bosnia and Herzegovina	1.50	1.06	1.24	1.77	1.48	1.19	1.08	0.92	0.94	62.7%
Serbia	5.92	5.83	4.90	5.28	4.74	5.24	5.02	2.82	3.05	51.5%
Montenegro	1.87	1.81	2.05	2.48	1.99	2.43	2.84	2.40	1.80	96.3%
EU SEE region										
Slovenia	3.47	2.43	2.90	2.24	1.55	1.48	1.02	0.66	0.67	19.3%
Croatia	1.89	1.27	2.11	3.04	2.39	2.47	2.27	1.29	1.46	77.3%
Hungary	16.37	14.79	5.37	9.49	5.76	2.94	1.40	5.24	5.38	32.9%
Romania	1.77	2.51	1.89	1.24	1.03	1.06	1.49	0.67	0.88	49.7%
Bulgaria	2.20	1.96	1.59	1.42	2.01	1.71	1.54	1.10	1.02	46.4%
Greece	1.11	1.06	0.74	0.84	0.79	0.52	0.36	0.62	0.93	83.8%
EU other countries (mean)	4.97	3.14	2.67	3.36	2.35	2.31	2.62	2.48	2.08	49.9%

DISCUSSION AND CONCLUSIONS

The production of vegetable crops is a key subsector of the agricultural sector in North Macedonia. Growers face a number of challenges: how to plan and organize the production, determine the production structure and crop rotation, choose the right cultivars or apply appropriate agro-technical measures. Growers opt to produce a wide range of cultivars, as a way to diversify risk and avoid uncertainty about the product placement, but such practice poses a serious problem for the buyers and especially to foreign markets exports. The production of seedlings is almost exclusively carried out by the growers themselves; support of a seedling production center, to provide healthy, uniform and suitable cultivars demanded on the market plants is a viable intervention. Although total vegetable production is overall increasing, the field survey indicates a trend of changing production structure, i.e. shifting to less labor intensive crops; even raising fruit crops in places where traditionally vegetables were grown or abandoning agriculture altogether.

Appropriate harvest and post-harvest practices are lacking. Growers do not devote time and attention to post-harvest practices, sorting and arranging the products, suitable packaging materials, and on-farm pre-transport storage conditions that could extend the shelf life of the products. This emphasizes the need for pack-houses where products can be processed and stored properly and safely before transport. Such facilities serve to keep the products for a short transit time, so it is important that those are close to the production base and with capacity corresponding to the expected turnover.

The key challenge for the vegetable growers is to be and remain competitive. Main influencing factors on the growers' economic performance are yield levels, buyout price and production costs. Attention must be paid to increasing efficiency by streamlining costs and increasing the quantity and quality of products obtained. Vegetable growers need to be differentiated from their competitors by better cost structure, higher quality, product consistency, applying an efficient production system, continuous and faster adoption of new products and varieties, flexibility to follow trends, and ability to rapidly change technology. In addition, land reforms can also encourage efficiency by scaling up farms.

Growers must have a defined production and marketing plan based on sound technological and business principles, to ensure successful economic performance and profitability of vegetable operations. Wijnands (2001) suggests several strategies for vegetable growers: price strategy (acceptable quality at low costs; though economy of size is a prerequisite for this strategy); quality strategy (high quality at acceptable cost, which assumes high rigor in the production and post-harvest practices and implementation of standards); chain strategy (close long-term relations in the chain and primarily with buyers); and niche strategy (serving specific market segments, for e.g. organic agriculture). This

postulates on Porter's (1985) generic competitive strategies: low cost advantage – price competitive edge in product and delivery, versus differentiation strategy – quality, tradition, brand. These strategic directions can be overly broad or niche in scope, and can be considered as viable sources of competitiveness in an export oriented agriculture.

Coping with shocks, access to market information, unexpected events response mechanisms, contract farming, certification and modern irrigation technologies are among the conditioning factors of competitiveness by smallholder farmers (Ngenoh et al., 2019). The major competitiveness limitations of small growers in high-value agro-food value chains can be addressed with a "holistic" approach through four key pillars: access to markets, access to training, collaborative coordinated horizontal and vertical linkages, and access to finance (Fernandez-Stark et al., 2012).

Competitive advantage can be gained from the resources provided via the cooperation between growers and other actors in the value chains (Riedel, 2009). It is necessary to support producer organizations, so to strengthen growers' position through concentration of supply, production planning, sales contracts, improvement of product quality, promotion of products, procurement of inputs, etc. Producer organizations can be additionally encouraged by joint post-harvest calibration, packaging and storage activities. Vertical integration is also a longer-term prospect, involving key stakeholders in the chain, in order to organize and coordinate production and supply, planning and contracts, conducting export markets analyses, etc.

Competition from neighboring countries that penetrate the domestic market is becoming more intensive in recent years and the competitive edge of this important sector is weakening. The calculated RCAs indicate North Macedonia's existing comparative advantage in vegetable trade, but at the same time, signal a declining trend, both with regional and EU partners. Given that RCAs are built only upon export data, comparative advantage can be derived from pure market forces and competition, but also from other sources such as export subsidies or tax incentives that could boost exports but do not necessarily reflect strong production capabilities, or as a result of low labor costs rather than technological intensity (GSEE, 2019). Also, different studies show that the more than half of the EU countries in 2011 experienced comparative disadvantage in the fruits and vegetables trade, due to their territorial position, but also due to increased domestic consumption of fruits and vegetables resulting from higher household incomes (Bojnec and Ferto, 2016; Gibba, 2017). Regaining the comparative advantage should build upon sectoral development based both on technological upgrading and domestic market growth.

The main export markets, as well as the domestic market, are shifting towards the changing market structure and growing dominance of large retailers. Ensuring traceability in the vegetable chain is a crucial segment, especially given the requirements of such large buyers (supermarkets). In European countries, around 60-90% of vegetable products are sold through supermarkets; supermarkets are very demanding customers, and often require and impose quality standards above the minimal requirements, transferring the pressure onto importers and fresh product buyers (CBI, 2016). In the Western Balkan region, product quality requirements are still somewhat lower, but this situation will inevitably change. Supermarkets, often part of large international chains, are expanding and their share will expectedly grow in the near future. This will have a more pronounced effect on the vegetable production and trade in North Macedonia, but also in the region, and will require adapting of both the production base and the supply chains.

The findings emphasize the continuous need for intensified education, transfer of knowledge and skills to producers, for adequate production and post-harvest practices, as well as awareness of the standards and requirements of the market. In this regard, the advisory segment must function and strengthen its activities. Functional knowledge and innovation transfer across the chain, with the support of the research community, should also contribute to better performance of the sub-sector. Joint cooperation, communication and trust of all stakeholders in the chain is of great importance.

The strategic commitments to support the vegetable sub-sector should focus on overcoming the competitiveness constraints, through agricultural and rural development

policy measures that enable robust development of human, institutional and physical resources. So far, vegetable production has been mostly supported through direct payment measures, while the structural measures are underrepresented. Strengthening the structural measures would contribute to farms' modernization, but also influence the pace and direction of the adjustment of the vegetable chain structures over time and lead to improvement of the overall agricultural production infrastructure. Such relevant policy support, along with horizontal and vertical integration in the value chain, and appropriate support from the advisory and knowledge transfer systems, need to constitute the backbone for increased competitiveness of the sector and overcoming the imminent challenges.

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