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MICROGREENS - CURRENT STATUS, GLOBAL MARKET TRENDS AND FORWARD STATEMENTS

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Abstract

The recent statistical data and market studies have shown that the microgreens market is on a continuously upward trend in Europe and globally due to their healthier and nutritious qualities and for fast adoption of indoor and vertical farming especially in the cities. Worldwide the microgreens become of great interest due to their benefits for people`s health and beauty, being 40 times more nutritious than mature vegetables, increasing also the amount of available space that might be put into food production, with environmental benefits and economic profitability. The evolution of microgreens market to its real development potential depends of consumers behaviour and income level. Microgreens are considered 'desert food' by their huge potential to provide food in marginal areas affected by climate change becoming a part of sustainable farming. The present study pursued the evaluation of microgreens global market trends and forward statements in order to identify them as a potential profitable business in the era of Covid 19 pandemic when farmers should adapt food production to the new economic and social contexts. The study showed an increased consumer interest for "healthy" products, so that the change according to their behaviour shall generate an increase in the microgreens market worldwide.

Key words**:** *market, microgreens, statement, status, trend*

INTRODUCTION

During the last decade the agricultural market trends have been changed significantly due to the new cropping technologies adapted to people demand for food diversification and supply, population income, technical and genetically progress, impact of biotic and abiotic constrainers, machinery revolution, faster access to the information, cities development, social and economic context and climate changes that impact agricultural products and people movement from one region to another [2][3][4][5][6][7][8][9][10][11][12][13][14] [15][16][17][26][27][28][30][31][32][33][36][37][39][42][43][44].

With over 10 billion people by 2050 feeding the world`s population will be one of the greatest challenges for both scientists and farmers.

In the light of recent Covid 19 pandemic, the agricultural systems had to face the challenge of food insecurity in many parts of the world. Further, it was a higher demand for ultra-processed food and fresh greens offered by Urban Agriculture (UA). Thus, Urban Agriculture (UA) become recently much more attractive being identified as an important tool in sustaining local food security, creating jobs and income in urban areas [18][25][35][38][40].

A recent report showed that in 2050 is estimated that 80% of the world`s food will be consumed in cities, therefor one current trend is to bring especially fresh food production closer to them [29].

An important part of Urban Agriculture is given by the microgreens production. They are known as green, young leafy vegetables which are harvested at their first stage of growth in a large variety of colours, textures and flavours, becoming a novel culinary ingredient used in salads and to enhance other types of dishes. The most common varieties of microgreens include Amaranth, Mustard, Parsley, Radish, Cabbage, Celery, Chard, Chervil, Cilantro, Cress, Fennel, Kale, Arugula, Beets, Basil, and Sorrel. Cereals such as rice, oats, wheat, corn and barley, as well as legumes like chickpeas, beans and lentils are also sometimes grown into micro greens.

Microgreens are rich in vitamins, minerals (Ca, Mg, Fe, Mn, Zn, Se and Mo) phytonutrients (ascorbic acid, β-carotene, α-tocopherol and phylloquinone) and antioxidants playing an increasing role in health promoting diets, being considered a good source of nutritious and bioactive compounds which prevent malnutrition and chronic disease [1][20][41][45][46][54][55].

The values of phytonutrients in microgreens were found to be up to 40 times more than those reported in mature vegetables leaves [55]. Thus, nutrients present in microgreens stimulate immune system, appetite, prevent muscular degeneration, diabetes, Alzheimer's disease, decrease risk of heart attack, are effective for eyes and skin and improve the overall hormonal balance of the body [21][22][50][53][56].

Microgreens can be produced easily, quickly and with low costs due to simple requirements and a rapid growing from 7 to 21 days [23].

Lately there is a huge and widespread awareness among the consumers to consume microgreens [19]. Thus, microgreens vegetable category has been registering significant growth in the last few years coming up under niche segment.

Considering the aspects above mentioned, the paper aimed to analyse the current status of microgreens consumption, as well as the global market trends and forward statements of this multi-benefits immature fresh vegetables, in order to identify microgreens as a potential profitable business in the era of Covid 19 pandemic when farmers should adapt food production to the new economic and social contexts.

MATERIALS AND METHODS

The research of the current study is based on a substantial documentation in the field in order to sustain a qualitative informative approach. There were collected various information from text books, scientific articles, news articles, reports and websites.

The relevant literature on the topic was identified and synthetized to provide an integrated overview of the current state-of-knowledge and forward statements on the article topic [51].

To reach the purpose of this paper there were used systematic, semi-systematic and integrative research approaches using an analytic comparation of current literature, papers, studies, reports and statistics in order to offer significant insights based on the article topic and to identify knowledge gaps within literature [47][48]. Text mining method, which is a popular text analytical technique, was used to extract relationships and knowledge from a large number of textual documents.

The literature, papers, studies and reports used in this review are organized into the following sections.

RESULTS AND DISCUSSIONS

The idea of microgreens started in San Francisco, California in the late `80 and they become popular first in to the finest restaurants and upscales grocery stores [52].

Nowadays the interest of people in fresh and nutraceutical foods has been on the rise due to the higher interest for healthy life and beauty [23].

The global microgreens market is expected to grow annually with 7.6%, reaching US$ 17,039.744 million in 2025 [23].

The microgreen market is segmentate by dominant vegetable type (broccoli, lettuce and chicory, arugula, basil, fennel, carrots, sunflower, radish, peas, others), by farming (indoor farming, commercial greenhouses,

vertical farming, others), by growth medium (soil, tissue paper, coconut coir, peat moss and other growth mediums), by end-use (food and beverages, cosmetics, others), by distribution channels (restaurants, hypermarkets /supermarkets, others), by geography (North America, Europe, Asia-Pacific, South America, and Middle-East and Africa).

Broccoli appears to play an important role in the development of microgreens market due to its extensive healthier and nutritious qualities.

According to the Food and Agriculture Organization, in 2017 China and India accounted for 73% of the global production of broccoli, with around 10.4 million metric tonnes, respectively 8.6 million metric tonnes. USA, Spain, Mexico, and Italy hold, each one, around 1 million metric tonnes or less in 2017 [18].

The low requirements for water, soil and inputs, as well as short growing period, recommend microgreens as having great potential for business utilized as a fresh source of nutrients in large geographic areas, even affected by drought, climatic events, soil degradation or other production limiting factors.

The evolution of microgreens market is driven especially by chefs for more colorful dishes and in cosmetic industry where are processed into oils and ingredients used in shampoo and skin care products. Thus, the market of microgreens is anticipated to grow in the next years, especially with adoption of indoor farming practices.

According with Agrilyst, an intelligence platform, the most profitable indoor farming system is deep water culture, followed by greenhouse farming system.

Among the most common grown crops indoors, microgreens recorded 60% profitability due to high revenue [49] (Fig. 1).

Also, in 2017 microgreens and leafy greens had the highest profit margin (40%) among profitable crops in indoor farming system (Fig. 2.)

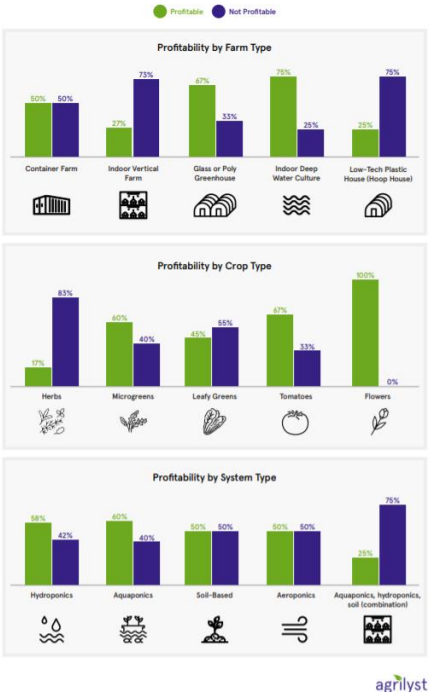

Fig. 1. Farm profitability by farm type, crop type, system type
Source: https://www.cropscience.bayer.com/sites/cropscience/files/inline-files/stateofindoorfarming-report-2017.pdf, [49].

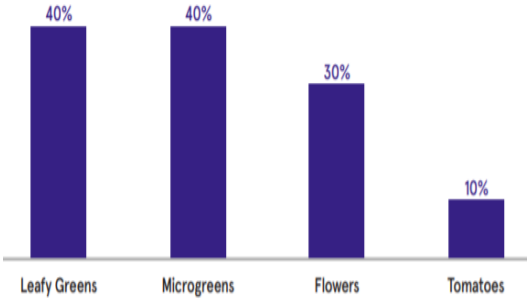

Fig. 2. Profit margin among profitable crops in indoor farming system
Source: https://www.cropscience.bayer.com/sites/cropscience/files/inline-files/stateofindoorfarming-report-2017.pdf, [49].

Also, in 2017 the microgreens have extended with 26% in large farms and 10% in small farms following an ascendent trend and being expected to increase with 6% annually in the next future [49](Fig. 3).

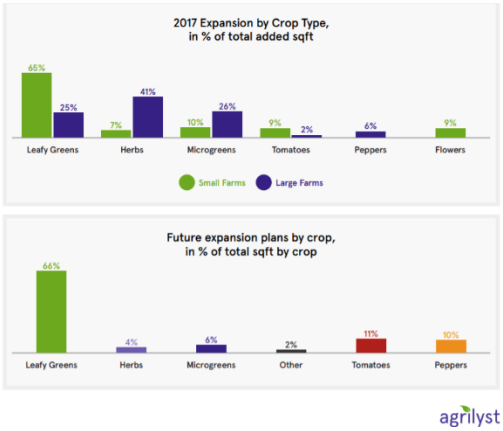

Fig. 3. Expansion of indoor farming by crop type
Source: https://www.cropscience.bayer.com/sites/cropscience/files/inline-files/stateofindoorfarming-report-2017.pdf, [49].

The higher cultivation of microgreens in greenhouses was in the South and North of United States regions, recording 71% and, respectively 59% profitability, in 2020 [34] (Fig. 4).

Fig. 4. Microgreens Market: % of microgreen cultivation in total greenhouse cultivation, United States, 2020
Source: Mordor Intelligence Platform, 2020 [34].

Moreover, hydroponic farming, indoor and vertical farming practices appear to enhance farmers to produce microgreens on large scale. The highest microgreens market was in 2020 in United States, Canada, Asia and Australia driven by the increased demand from chefs and cosmetic industry and tends to become more and more competitive market globally (Fig. 5).

Fig. 5. Microgreens Market: Market size, by region, 2020
Source: Mordor Intelligence Platform, 2020 [34].

According with Knowledge Sourcing Intelligence Platform, in November 2020, Urban Oasis, a Swedish Vertical farming company raised USD 1.2 million to build a new facility completely automated which will surge the production by 15 to 20 times. This Mega Farm will become a huge competitor specialized in growth and cultivation of microgreens such as kale and Bok Choi. In September 2020 it was designed a smart garden, known as 'Solace' to cultivate and grow food in compact and small spaces [23].

CONCLUSIONS

The climate and social emergency, such as Covid 19 pandemic, are forcing us to rethink the ways that we produce food fortified with bioactive components that promote health and sustain immune system. Urban Agriculture (UA) comes as a driver for this new look approach, particularly in towns and cities. The microgreens production seems to reintegrate nature into the city, strengthen urban food production system, renew urban development, expand food security and change people`s buying and consuming habits and empower independence in homes. Also, microgreens provide adequate nutrition for the consumers demand while minimizing the negative impact on the environment. While the consumers are becoming more interested in healthier life style and beauty, microgreens could make future of farming more accessible and secure, with environmental benefits. As long as farmers are looking to avoid climate change impact on crops and to leave less carbon footprint, microgreens production will continue to grow worldwide.

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