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Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance

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Declarations

Abstract

Tomatoes are not only a culinary delight but also a nutritional powerhouse. This article comprehensively examines tomatoes, spotlighting their global cultivation, nutritional richness, and diverse applications across industries. As the second most cultivated vegetable worldwide, tomatoes are pivotal in food processing, agriculture, biotechnology, beverages, and pharmaceuticals. Their nutrient profile, characterized by significant water content and intricate composition, positions tomatoes as culinary delights and nutritional powerhouses. The article explores their role in promoting heart health, preventing cancer, supporting eye health, aiding weight management, and enhancing digestive health. Tomatoes transcend the culinary realm, finding applications in diverse industries. In food processing, they contribute to taste, color, and nutritional content. In agricultural research, tomatoes advance genetics, physiology, and

biochemistry, fostering sustainable agriculture. The biotechnology industry leverages their adaptability for genetic manipulation and bioengineering. The beverage sector benefits from health-conscious options like tomato juice and the iconic Bloody Mary cocktail. In pharmaceuticals, lycopene, a potent tomato compound, features in antioxidant formulations and supplements. The article offers a thorough overview of the industrial use of different tomato parts, including seeds, peels, and pomace, in producing various products. It explores the extraction of valuable compounds such as carotenoids and tomato seed oil for applications in diverse industries. Additionally, it discusses the potential of tomato waste in environmental remediation as an adsorption material. In essence, it underscores the remarkable versatility of tomatoes, transcending their culinary role to become a resource with implications for sustainability, innovation, and multiple scientific disciplines.

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1. Introduction

Widely regarded as the world's most consumed vegetable, the tomato, scientifically known as*Solanum lycopersicum*, stands as a fundamental ingredient in an extensive array of raw, cooked, or processed foods (Wang *et al.*, 2023). While inherently a perennial herbaceous plant, it is predominantly cultivated as an annual crop, although biennial and perennial forms exist. Thriving in both tropical and temperate climates, tomatoes grace open fields or find shelter under greenhouses in temperate regions. As a proud member of the Solanaceae family, alongside other commercially significant species, the tomato transcends geographical boundaries, being cultivated globally for local consumption and as an essential export crop (Poojitha, M, 2023).

Tomatoes rank second in terms of acreage among major globally cultivated vegetable crops, surpassed only by potatoes. However, they take the lead when it comes to crops used for processing. With the current global emphasis on adopting organic agricultural methods for sustainable food production (Pinho *et al.,* 2011), tomato farming has experienced substantial growth in the last 50 years. The crop's productivity has increased by approximately 10%, attributed to its role as a vital source of vitamins and minerals for numerous countries. Moreover, recent revelations highlight tomatoes as a significant source of lycopene, a carotenoid with antioxidant properties that may contribute to preventing diseases such as cancer and cardiovascular issues (Bertin & Génard, 2018).

Various methods have been employed to explore the impact of environmental factors on tomato crop development. Changes in land use, particularly the conversion of unproductive land to arable land, influence global carbon cycles linked to climate conditions. Consequently, climate change plays a crucial role in shaping agricultural landscapes, affecting the variability of biophysical processes in agricultural productivity (Ardabili *et al*., 2013).

However, the tomato's significance extends beyond its palatable contributions to meals. Boasting a water content ranging from 93-95%, tomatoes emerge not only as flavorful additions but also as hydrating and nutritionally dense components. Comprising solid matter content of 5.5-9.5%, with a mere 1% attributed to seeds and skin, tomatoes exhibit a complex nutritional profile. The insoluble solids in tomato juices, constituting 15-20% of total solids, are primarily composed of lignin, cellulose, and pectin. While sucrose content is negligible, not surpassing 0.1%, glucose and fructose take the spotlight as the main reducing sugars, contributing 50 to 60% of tomato solids. The total sugar content varies between 2.19 to 3.55%. Additionally, tomatoes house a variety of polysaccharides like xylem, pectin, cellulose, and arabinoxylan, constituting about 0.7% of tomato juices (Zhang *et al*., 2023).

In essence, the tomato transforms from a botanical entity to a nutritional powerhouse, embodying both culinary delight and healthful attributes (Yong *et al.,* 2023). This comprehensive overview unravels the multifaceted nature of the tomato, from its global cultivation patterns to the intricate details of its nutritional composition.

2. Nutrient Profile and Antioxidant Properties

Tomatoes stand as a nutritional powerhouse, offering a wealth of essential vitamins and minerals vital for overall well-being (Martínez *et al.,* 2024). With notable concentrations of vitamin C, potassium, folate, and vitamin K, tomatoes contribute significantly to a balanced diet. What sets them apart is the presence of lycopene, a potent antioxidant responsible for their vibrant red hue and providing unique nutritional benefits (Table 1). Beyond their visual appeal, tomatoes boast a comprehensive nutritional profile: per 100 grams, they contain a mere 18 calories, comprising 95% water, 0.9 grams of protein, 3.9 grams of carbohydrates, 2.6 grams of sugar, 1.2 grams of fiber, and 0.2 grams of fat (Wang *et al.,* 2023). This low-calorie, high-water content combination makes tomatoes not only a flavorful addition to various dishes but also a healthy and hydrating option. Their nutritional richness positions tomatoes as a versatile and valuable ingredient, contributing not only to culinary delights but also to the overall health and vitality of those who incorporate them into their diet (Coelho *et al*., 2023).

The nutritional value of tomatoes is primarily attributed to their phytonutrients, with lycopene being the most extensively studied carotenoid (Górecka *et al*., 2020). Lycopene serves as a potent radical scavenger, providing protection against cellular oxidative damage in humans (Caseiro *et al.,* 2020). While lycopene plays a crucial role in the health benefits of tomatoes, other bioactive compounds also exhibit potential health-protective effects when interacting with various food components. Notably, whole tomato fruit has been reported to offer superior protective and antioxidant properties compared to standalone lycopene supplementation (Gholami *et al*., 2021).

Previous studies have highlighted the preventive effects of plant phytochemicals on chronic degenerative diseases such

as diabetes microvascular complications (Ho *et al*., 2022), viral diseases (Choe *et al.,* 2022), and cancers (Ng *et al.,* 2013). These phytochemicals often interact with each other, producing synergistic, additive, or antagonistic health effects (Fleming & Luo, 2021). Diets rich in plant phytonutrients, like the Mediterranean diet, have been associated with a reduced risk of cancers, cardiovascular diseases, and diabetes (Farinetti *et al*., 2017). The link between the Mediterranean diet and disease prevention supports the concept of food synergy. For example, the traditional Mediterranean-style tomato sauce known as sofrito, comprising tomatoes, onion, garlic, and olive oil, with additional herbs and vegetables in various recipes, serves as an illustrative example of food synergism (Beltrán Sanahuja *et al*., 2019). In a Prevención con Dieta Mediterránea trial, Estruch et al. (2013) found a positive association between an extra virgin olive oil-supplemented Mediterranean diet, including sofrito, and a reduced risk of cardiovascular events. Sofrito contains 40 plant polyphenols and significant amounts of carotenoids (Rinaldi de Alvarenga *et al*., 2019). Storniolo et al. (2020) demonstrated that hydroxytyrosol, naringenin, and lycopene in sofrito collectively induced antioxidant activity. Additionally, the combination of polyphenols and carotenoids exhibited an additive inhibitory effect on intestinal epithelial cancer cell growth, DNA synthesis, and eicosanoid biosynthesis.

Tomatoes emerge as versatile allies for heart health due to their high potassium content, playing a crucial role in blood pressure regulation and reducing the risk of cardiovascular diseases. The synergy of antioxidants and bioactive compounds not only enhances the culinary experience but also contributes to improved cholesterol levels, emphasizing tomatoes as promoters of cardiovascular well-being (Løchen, M. L, 2023). In terms of cancer prevention, various studies suggest the potential of lycopene in tomatoes to lower the risk of specific cancers, including prostate cancer. The combination of anti-inflammatory and antioxidant properties works synergistically, combating oxidative stress and fortifying the body's defenses against the formation of cancerous cells (Martí *et al*., 2016). Tomatoes, rich in beta-carotene, lutein, and zeaxanthin, significantly contribute to maintaining eye health and reducing the risk of age-related macular degeneration (AMD). Regular consumption establishes a protective shield against various eye disorders, positioning tomatoes as an essential component of ocular well-being (Coelho *et al.,* 2023). With their low-calorie and high-water content, tomatoes become an excellent choice for weight management. The presence of chromium may additionally contribute to improved insulin sensitivity and glucose metabolism, making tomatoes a valuable asset for those aiming for metabolic balance (Jeong *et al*., 2023). Furthermore, tomatoes, rich in dietary fiber, actively support digestive health by promoting regular bowel movements and preventing constipation. The fiber content induces a feeling of fullness, aiding in weight control and enhancing overall digestive well-being (Wu *et al*., 2023).

Phytonutrients, natural constituents with immune-modulating properties, play a pivotal role in various positive pharmacological effects such as antioxidation, anti-inflammation, and antimutagenesis. Tomatoes are recognized as rich sources of phytonutrients, including phenolic acids, flavonoids, lycopene, β-carotene, and glycoalkaloids (Ali *et al*., 2020). Phenolic acids (Figure 1a) and flavonoids (Figure 1b), both major groups of phenolic compounds, are particularly abundant in the skin of tomato fruit, with smaller-sized varieties exhibiting higher phenolic compound content due to their increased surface-area-to-volume ratio (Raiola *et al*., 2014). Key phenolic acids in tomatoes, such as chlorogenic acid, gallic acid, caffeic acid, sinapic acid, ferulic acid, and p-coumaric acid, are easily absorbed by the intestines, showcasing antioxidant activities (Neeraj *et al*., 2019). Chlorogenic acid, the most prevalent phenolic acid in tomatoes, has been

associated with improved memory functions in elders, while gallic acid demonstrates a cardioprotective effect by regulating lipoprotein levels (Kato *et al.*, 2018). Flavonoids, including quercetin, rutin, naringenin, resveratrol, and kaempferol, not only contribute to the aroma and color of tomatoes but also serve as non-enzymatic antioxidants, preventing degenerative diseases such as cardiovascular diseases, diabetic microvascular complications, and cancer (Ali et al., 2020). Carotenoids, lipophilic pigments protecting plants from oxidative damage, are prominent in tomatoes, featuring lycopene, α-carotene, β-carotene, lutein, phytoene, and phytofluene (Martí *et al.*, 2016). Lycopene, a highly unsaturated carotenoid, exhibits remarkable antioxidant activity, with the ability to quench singlet oxygen surpassing that of β-carotene and α-tocopherol (Fenni *et al.*, 2017). While β-carotene serves as a precursor to vitamin A, lycopene, responsible for tomato skin color, undergoes cis–trans isomerization influenced by light and heat, with the cis-isomer displaying higher bioactivity and bioavailability (Pinela *et al.*, 2016). Lycopene stands out as the most effective free radical scavenger among carotenoids, making tomatoes a valuable source of these health-promoting compounds (Fenni *et al.*, 2017).

Table 1. Nutrition Profile of Tomatoes

Nutrient	Amount per 100g
Calories	34.67 kcal
Water	91.18 g
Protein	10.50 g
Carbohydrates	5.96 g
Sugars	2.6 g
Dietary Fiber	11.44 g
Lipid	3.62 g
Vitamin C	36.16 mg
Potassium	403 mg
Folate	14mg
Vitamin K	98.28 µg
Lycopene	8002 µg
β-carotene	9942 µg
Vitamin A	614IU
Vitamin E	15 µg
Total Tocopherol	1.2 mg
Phenolic Acids	25.5 mg CIAE

(Adapted from Ali et al., 2020)

3. Diverse Industrial Utilization of Tomatoes

Tomatoes extend their influence far beyond the culinary realm, finding a multitude of applications in various industries (Fig 1). Tomatoes (*Solanum lycopersicum*) are significant edible plants rich in beneficial bioactive compounds, including carotenoids, fiber, protein, and pectin. These compounds play a protective role against various human diseases. Tomatoes undergo processing to create diverse products like ketchup, paste, sauce, puree, soup, juice, and canned tomatoes. Substantial waste is generated during this process, and these byproducts contain bioactive compounds that contribute to human health. More than half of tomato waste is composed of fiber, sugar, protein, and important carotenoids, particularly lycopene (Kiralan, M., & Ketenoglu, O, 2022)

Tomato pomace, a by-product of processing, comprises peel, seeds, and small amounts of pulp. These components are commonly repurposed in various products. Dried tomato waste finds utility as animal feed and additives in meat products. Tomato seeds, rich in oils and carotenoids, are incorporated into bakery and fermented cereal foods, enhancing the oxidative stability of the oil. Additionally, tomato seed oil can be applied in non-food sectors, such as biodiesel (Lu *et al*., 2019).

Post-harvest processing of tomatoes results in the generation of byproducts and waste throughout the industrial stages. Tomato pomace, consisting of seeds, peel, and pomace liquid, contains valuable compounds for diverse commercial applications. The waste from tomato processing is harnessed for carotenoid extraction, adsorption material preparation, and serves as animal feed. In the realm of sustainable energy, tomato waste, including peels, cores, and leaves, serves as a rich organic feedstock for biogas production, exemplifying the resourcefulness in utilizing every part of the fruit. This byproducts/waste has potential uses in both food (e.g., seed oil, lycopene as a natural colorant, and antioxidant for food product development) and non-food domains. For instance, dried byproducts/waste can be employed as adsorption material to remove synthetic dyes and heavy metals from aqueous waste (Rajan *et al.,* 2022). Tomato seed oil can also be used in non-food applications such as biodiesel. In the cosmetics sector, compounds like lycopene, vitamin C, and potassium, sourced from tomatoes, contribute to anti-aging and skin-protective properties, making them valuable ingredients in skincare products (Eslami *et al.,* 2023).

3.1. Food Processing

Tomatoes take center stage in the food processing industry, serving as natural flavor enhancers and vibrant coloring agents in an array of products such as ketchup, sauces, and soups. The striking red pigmentation of tomatoes not only adds visual allure but also offers a natural alternative to synthetic colorings, significantly enhancing the sensory appeal of food products. These intrinsic qualities play a pivotal role in crafting healthier and visually appealing processed foods (Khan *et al*., 2023). Employing meticulous processing methods, vibrant tomatoes undergo various transformations, contributing to a diverse range of culinary delights (López-Yerena *et al*., 2023). Tomato sauce, beginning with blanching and pureeing, simmers to perfection while infusing flavors with herbs and spices. Iconic ketchup emerges from washed, peeled, and chopped tomatoes, undergoing flavorful alchemy with sugar, vinegar, and spices. Salsa, a lively dance of tomatoes, onions, peppers, and spices, marinates to perfection, delivering a burst of flavors. Crafted through washing, crushing, and moisture reduction, tomato paste creates a concentrated culinary essence. Canned tomatoes, in diverse

shapes, endure heat processing for preservation, becoming a pantry staple. Sun-dried tomatoes, halved or sliced, bask in the sun or dehydrators, packed in oil or vacuum-sealed for an intense burst of flavor. Filtered for purity, tomato juice captures the essence of freshly crushed tomatoes, while tomato-based soup combines richness with additional savory elements. Tomato jam or chutney, a symphony of tomatoes, sugar, vinegar, and spices, simmers to a luscious consistency. Lastly, tomato powder, created through dehydration, encapsulates the essence of tomatoes in a fine, preserved form. These culinary marvels, though nuanced in their processes, collectively celebrate the artistry of transforming tomatoes into a spectrum of delightful and versatile products (Pereira *et al*., 2023). Beyond taste and color, tomatoes offer nutritional benefits to processed foods. Their inclusion introduces essential vitamins, antioxidants, and bioactive compounds, aligning with the growing demand for functional and health-promoting food products. The versatility of tomatoes in various processed forms further expands their applications, solidifying their role as a cornerstone in the food processing industry (Silva *et al*., 2023). In essence, tomatoes not only tantalize taste buds but also provide a natural and healthy dimension to processed foods, reinforcing their crucial role in the food processing landscape.

3.2. Agricultural Research

In the realm of agricultural research, tomatoes emerge as key subjects, offering a genomic canvas that researchers explore to unravel the intricacies of plant biology. Studies delve into the genetics, physiology, and biochemistry of tomatoes, leading to the development of novel varieties with improved yield, disease resistance, and enhanced nutritional profiles (Schreinemachers *et al*., 2017). These advancements contribute significantly to sustainable agriculture and food security.

Tomatoes serve as model organisms for understanding fundamental biological processes in plants. Genetic studies have identified key genes responsible for traits such as flavor, color, and resistance to pests and diseases. This wealth of genetic information has paved the way for targeted breeding programs, accelerating the development of tomatoes with desirable traits (Rothan *et al.,* 2019).

Furthermore, the adaptability of tomatoes to diverse climatic conditions makes them valuable for addressing global agricultural challenges. Their resilience and versatility position tomatoes as invaluable assets in the pursuit of sustainable and resilient agriculture (Litskas *et al*., 2019).

3.3. Biotechnology Industry

Tomatoes, renowned for their genetic stability and ease of cultivation, have found a significant place in the biotechnology industry, acting as promising candidates for cutting-edge applications. The genomic stability of tomatoes makes them ideal subjects for genetic manipulation, gene therapy, and bioengineering (Gerszberg *et al.,* 2015). Researchers leverage the tomato's adaptability to explore innovative avenues, pushing the boundaries of biotechnological advancements.

The application of biotechnology to tomatoes extends beyond mere genetic modification. Scientists harness the potential of tomatoes to serve as bioreactors for the production of valuable compounds, including pharmaceuticals and industrial

enzymes (Ganapathy, M, 2016). This dual role of tomatoes, as both subjects of genetic study and platforms for bioengineering, showcases their versatility and adaptability in the rapidly evolving landscape of biotechnology (Meng *et al.*, 2022).

As the biotechnology industry continues to advance, tomatoes stand as key contributors, facilitating breakthroughs in gene editing, molecular biology, and the production of bio-based materials.

3.4. Beverage Industry

Tomatoes find a distinctive place within the beverage industry, offering a spectrum of options that cater to both health-conscious consumers and those seeking indulgence. Tomato juice, a prominent beverage, stands out as a standalone refreshing drink and serves as a base for various vegetable juices. The iconic Bloody Mary cocktail, featuring tomato juice as a key ingredient, exemplifies the versatility of tomatoes in crafting unique and flavorful beverages (Kumar *et al.*, 2023).

Tomatoes contribute not only to the taste but also to the nutritional profile of beverages. Tomato juice, rich in vitamins, minerals, and antioxidants, aligns with the growing demand for functional and health-promoting beverages. The natural sweetness and acidity of tomatoes contribute to the complexity of flavors, making them a versatile and indispensable ingredient in the beverage industry (Rajoria *et al.*, 2011).

Beyond traditional applications, innovative tomato-based beverages continue to emerge, addressing diverse consumer preferences. From savory concoctions to sweet blends, tomatoes play a dynamic role in shaping the beverage landscape, offering options that go beyond conventional expectations.

3.5. Pharmaceutical Industry

In the pharmaceutical industry, tomatoes take center stage through the potent compound lycopene, a natural antioxidant abundantly present in these fruits. Lycopene extraction from tomatoes has garnered attention for its therapeutic potential, leading to its incorporation into certain pharmaceutical formulations (López-Yerena *et al.*, 2023). The antioxidant properties of lycopene make it a valuable candidate for addressing oxidative stress-related conditions.

Beyond traditional pharmaceutical applications, tomatoes extend their reach into the realm of nutraceuticals. Processed tomato products, such as supplements, harness the health benefits of tomatoes for preventive and therapeutic purposes. Lycopene's role as a natural colorant further contributes to the appeal of pharmaceutical formulations, aligning with the growing preference for natural and plant-derived ingredients (Carvalho *et al.,* 2021).

The exploration of tomatoes in the pharmaceutical sector underscores their potential to serve as sources of therapeutic compounds and highlights the intersection of food and medicine in promoting health and well-being.

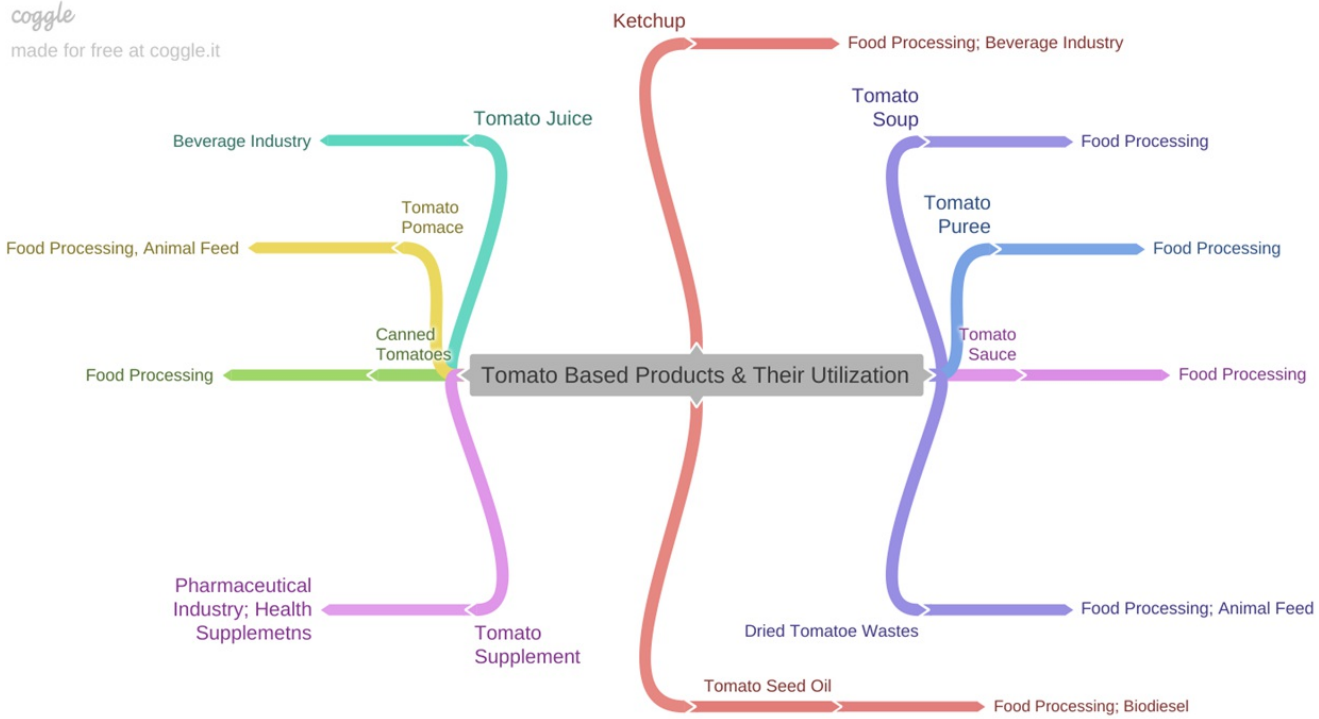

Figure 1. Utilization of Tomato-Based Products in Various Industries

4. Processing Tomato seed oil

Tomato seed oil, also known as lycopene oil, is a type of vegetable oil extracted from the seeds of tomatoes. It is rich in lycopene, a powerful antioxidant that gives tomatoes their red color. Lycopene has been shown to have various health benefits, such as reducing the risk of cancer and heart disease (Kumar *et al.,* 2022). Tomato seed oil is also high in polyunsaturated fatty acids, particularly linoleic acid, which may help lower cholesterol levels. It has a mild, slightly sweet flavor and can be used as cooking oil or in cosmetic products due to its moisturizing and anti-inflammatory properties. However, it should be noted that the yield of tomato seed oil is relatively low compared to other vegetable oils, making it more expensive.

The processing of tomato seed oil requires specialized equipment and expertise, making it more expensive than other vegetable oils with higher yields (Sangeetha *et al*., 2023). However, the demand for natural and healthy ingredients in various industries is driving research and development efforts to improve the efficiency and yield of the extraction of tomato seed oil, also known as lycopene oil, involves several steps to release the oil from the seeds and separate it from the solids (Méndez-Carmona *et al*., 2023). Here is a detailed description of the extraction process:

- **Tomato Seed Collection:** Ripe tomato seeds are collected either manually or through mechanical methods like centrifugation or flotation. Subsequently, the seeds are dried and stored for further processing.
- **Crushing:** Dried seeds undergo crushing to rupture the seed coat and release the oil. This can be achieved using a hammer mill, roller mill, or a screw press.

- **Screw Pressing:** Crushed seeds are fed into a screw press, applying pressure to extract the oil. The oil is then separated from the solids and collected.
- **Centrifuging:** An alternative method involves mixing crushed seeds with a solvent, like hexane, followed by centrifugation. This process separates the oil from solids and impurities.
- **Filtering:** The crude oil obtained is filtered to eliminate remaining solids and impurities.
- **Decolorization**: Activated carbon or clay is employed to treat the filtered oil and remove any yellowish color caused by carotenoids.
- **Deacidification**: The oil, containing free fatty acids, undergoes treatment with an alkaline solution, such as sodium hydroxide, to neutralize these acids and prevent spoilage.
- **Deodorization:** To eliminate unpleasant odors, the deacidified oil is heated under vacuum at high temperatures.
- **Packaging and Storage**: The purified oil is packaged in airtight containers, stored in a cool, dry place, and shielded from light to prevent oxidation and spoilage.

This meticulous extraction process ensures the production of high-quality tomato seed oil with optimal purity and stability.

5. Conclusion and Future Aspects

In conclusion, the tomato, often celebrated for its culinary appeal, transcends its role as a flavorful ingredient to emerge as a global resource with remarkable versatility and potential for the future. As explored in this article, its global cultivation patterns, nutritional richness, and adaptability have positioned it as a key player across various industries. The tomato's journey from farm to table is intricately woven into the fabric of the food processing industry. Beyond enhancing the taste and color of processed foods, tomatoes contribute essential vitamins, antioxidants, and bioactive compounds, aligning with the ever-growing demand for functional and health-promoting products. Looking ahead, the future of food processing holds exciting prospects, with tomatoes likely to play a central role in the development of innovative and nutritionally enhanced products.

In the realm of agriculture, tomatoes continue to be subjects of extensive research, contributing to advancements in genetics, physiology, and biochemistry. The future holds promise for targeted breeding programs that may yield tomatoes with enhanced nutritional profiles, disease resistance, and adaptability to changing climatic conditions. Sustainable agriculture, bolstered by the resilience and versatility of tomatoes, is poised to shape the future of food production.

The biotechnology industry leverages the genetic stability and ease of cultivation of tomatoes for cutting-edge applications. Looking forward, tomatoes are anticipated to be at the forefront of biotechnological advancements, playing crucial roles in gene editing, molecular biology, and the production of bio-based materials. The intersection of tomatoes with biotechnology holds the potential for groundbreaking innovations that could reshape various scientific fields.

As we peer into the future of the beverage industry, tomatoes stand as dynamic contributors, offering a spectrum of options that align with evolving consumer preferences. The development of innovative tomato-based beverages, addressing both health-conscious and indulgent markets, is an exciting avenue for exploration. Tomatoes are likely to

continue shaping the beverage landscape, challenging conventional expectations and expanding possibilities.

In the pharmaceutical sector, the antioxidant powerhouse, lycopene, extracted from tomatoes, hints at future therapeutic applications. Ongoing research suggests that tomatoes, with their rich bioactive compounds, could play a more significant role in preventive and therapeutic formulations. The intersection of food and medicine is poised for further exploration, with tomatoes leading the way as a source of valuable compounds.

Looking beyond, the future aspects of tomatoes extend to environmental sustainability. Utilization of tomato waste for biogas production and environmental remediation reflects a growing awareness of the importance of waste valorization. Tomatoes, with their potential for creating valuable products from byproducts, embody a sustainable approach that aligns with global environmental goals.

In essence, the future of tomatoes is marked by innovation, sustainability, and health-centric applications across diverse industries. From enhanced food products to breakthroughs in biotechnology and pharmaceuticals, tomatoes are poised to continue their journey as a botanical marvel with far-reaching implications for a healthier and more sustainable future.

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Open Peer Review

Review this Article

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CD

Carmen Lizette Del-Toro-Sánchez posted a **Review**

March 7, 2024

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https://doi.org/10.32388/GPNZ4N

I don't think this article has enough scientific basis. It's more like a descriptive article. I think that the authors should discuss and review more about mechanisms, other studies carried out, mechanisms, make tables, figures, or images that give more understanding of the review, etc.

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Comment

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NT

Nurdan Tuna Gunes posted a **Review**

March 6, 2024

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https://doi.org/10.32388/PNZPPG

A good article, and I think it is beneficial. The health effects of tomatoes were well explained.

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Comment

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KL

Kristina Laužikė posted a **Review**

February 29, 2024

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https://doi.org/10.32388/IDSZY0

The structure of the review is not bad; corrections have improved its quality. However, as a review, few sources have been reviewed. It should definitely be supplemented with publications from the last five years or ten years. You should take a closer look at the recently conducted experiments and their results. Research on tomatoes is very extensive, so you can find a lot of publications.

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Comment

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JA

Jorge Gil Angeles posted a **Review**

February 26, 2024

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https://doi.org/10.32388/D8SPBP

Review of Qeios: Sattar et al (2024): Tomatoes Unveiled: A comprehensive exploration from cultivation to culinary and nutritional significance

Abstract may be further simplified, especially on the authors' insights of the benefits of tomato in health, food processing, agricultural research, biotechnology, and beverage sectors. There are too many details indicated in this part of the manuscript, considering that this is an abstract of a manuscript.

Tone of the manuscript is suggested to be more technical leaning. For example, "As a proud member of the Solanaceae family, alongside other commercially significant species, the tomato transcends geographical boundaries, being cultivated globally for local consumption and as an essential export crop (Poojitha, M, 2023) (Introduction, page 2), "However, the tomato's significance extends beyond its palatable contributions to meals. Boasting a water content ranging from 93-95%, tomatoes emerge not only as flavorful additions but also as hydrating and nutritionally dense components" (Introduction, page 3), and "In essence, the tomato transforms from a botanical entity to a nutritional powerhouse, embodying both culinary delight and healthful attributes (Yong et al., 2023). (introduction, page 3) may be re-written to be a more technical tone.

Various words utilized throughout the manuscript denote a flowery tone.

Page 2 (Section I: Introduction): Please insert a space between “as” and “Solanum lycopersicum.”

Section 2 (page 3): Please place Table 1 near the paragraph that first describes it.

As the table also indicates that tomatoes are rich in B-carotene (9942 ug/100 g tomato), an additional write-up on this metabolite can be further added aside from the discussion on lycopene (8002 ug/100g tomato).

Expand on the sentence and other insights on “Lycopene serves as a potent radical scavenger, providing protection against cellular oxidative damage in humans (Caseiro et al., 2020).” (page 3). What health (clinical, chemical, molecular, cellular, etc.) benefits does the radical scavenging activity of lycopene positively provide to humans (and even animals)?

Expand on the sentence and other insights on: Notably, whole tomato fruit has been reported to offer superior protective and antioxidant properties compared to standalone lycopene supplementation (Gholami et al., 2021). (page 3). Provide more examples and insights.

The discussion on the health benefits of sofrito (pages 3 to 4) may be shortened as the article’s main focus is on tomatoes.

Figures 1a and 1b, which were referred to on page 4, are not included in the text.

Please extend the insights on the health benefits of chlorogenic acid and gallic acid (page 5).

Please concise the introduction part of Section 3.1 (Food Processing) (page 6) and utilize a more technical-leaning tone.

Expand the enumerated thoughts for Section 3.2 (Agricultural Research) (page 7), Section 3.3 (Biotechnology Industry; e.g., what pharmaceuticals and industrial enzymes are grown through tomatoes (page 8)), Section 3.4 (Beverage Industry) (cite other beverages that utilize tomatoes other than the Bloody Mary), and Section 3.5 (Pharmaceutical Industry) (page 8, e.g., Provide a deeper developed composition of what other important pharmaceuticals/phytochemicals are obtained from tomatoes). Please provide more/deeper examples for each thought/insight introduced.

Connect the enumeration of the detailed description of tomato seed oil (pages 10-11) to the overall tone/subject of this manuscript. How is such a part important to the overall schema of this manuscript?

Expand on the perspectives of tomato in agricultural, biotechnological, beverage, and pharmaceutical use and on the utilization of tomato waste (Section 5: Conclusions and Future Aspects, pages 10-11). Please expand each section further by providing more concrete examples and perspectives. What about tomato seed oil?

See more

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Comment

SB

Sabyasachi Banerjee posted a **Review**

February 25, 2024

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https://doi.org/10.32388/KJXT8D

After carefully reading, I will suggest that it still looks like a summary, not a review/mini-review. The topics chosen by the authors are quite interesting, but I am still disappointed with the content in it, though it has been improved to some extent. It could be more elaborative, and sufficient data is needed to improve the quality of the manuscript. Several excellent reviews are available on the internet; authors should go through those. It still needs revision as it seeks more research to be included in each section. I will suggest the authors modify the entire manuscript in detail, and they have to be very careful during writing to avoid grammatical errors, as this one is having many grammatical errors in it.

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Comment

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OA

Omar Alajil posted a **Review**

February 24, 2024

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https://doi.org/10.32388/VKEK9E

Recently, I received a request to review a manuscript titled "Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance". I found the manuscript to be very interesting, fascinating, and well-organized. The paper eloquently summarizes the nutritional, industrial, and cooking properties of tomatoes and their constituents. However, scientifically, it is incredibly shallow and lacks in-depth knowledge of the subject. Additional revisions can be seen below:

1. Throughout the entire manuscript, the scientific names must be italicized.

2. The authors argued that tomatoes are healthy for eye health, but since lycopene, one of the key carotenoids in tomatoes, is not considered a great source of retinol, eye health cannot benefit from them. Please eliminate any eye health-related information from the manuscript.
3. Table 1 is in poor condition with no references. Furthermore, the table should show the recommended daily intake of each nutrient. Furthermore, the quantities of lycopene and chromium are not shown in Table 1.

See more

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Comment

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GM

Giada Migliore posted a **Review**

February 23, 2024

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https://doi.org/10.32388/ABVK0L

Compared to the first version, the exposition style has improved, and some contents, previously treated in a too quick and superficial manner, have also improved. The review presents an overview of the main aspects related to tomatoes and their derivatives. It is generic and goes into little technical detail; as an introductory overview, it is appreciable but lacks scientific depth.

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Comment

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AD

Alba Du Toit posted a **Review**

February 23, 2024

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https://doi.org/10.32388/9H560G

The review explores the nutritional benefits and uses of tomatoes in general. The present version is a big improvement on the first version; however, there are a few more improvements to be made to increase the citation rate.

It is well written and informative.

The biggest drawback of the article is the generality and the use of ambiguous terms and phrases. When saying “cultivated globally,” that does not give any information to the reader. The review does not mention that there are many different cultivars, sizes, and colours of tomatoes. The nutrition table immediately raises the question of how it was determined and how it could simply be labelled as “tomato.” It also has only one source, implying that many sources were not used to determine the overall nutritional content of all tomatoes in the world. Thus, to use this table, it is imperative to mention where, when, and how the nutritional data was determined.

The title is misleading as it is not a comprehensive exploration, but rather a review of the nutritional benefits and uses of tomatoes.

The conclusion is actually part of the discussion, and most of the sentences should be part of the introduction of the article. A conclusion of a review should remark about the resent research that was done on the subject and then go on to make recommendations for further research.

The keywords are too ambiguous; use words that people use when they search. Rather use words such as *“Solanum lycopersicum,” “lycopene,” “carotenoids,” “phytonutrients,” “bioactive compounds,” or “nutraceuticals.”*

The question remains if this article could be classified as a review, as a review must be a comprehensive collection of all the resent research done all over the world. It reads more like the literature study of a dissertation or thesis.

See more

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Comment

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SS

Sujoy Saha posted a **Review**

February 22, 2024

https://doi.org/10.32388/HJ0JQR

Excellent article

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Comment

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MD

Miriam Distefano posted a **Review**

February 21, 2024

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https://doi.org/10.32388/H035PS

The article is more divulgative than scientific. Some errors, inaccuracies, and repetitions should be corrected. This version can be considered a good starting draft but, in my opinion, it is not suitable for publication in a scientific journal. The critical slant that a review should have must definitely be implemented.

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Comment

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RN

Renata Nurzyńska-Wierdak posted a **Review**

February 20, 2024

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https://doi.org/10.32388/KHNJA4

The article is more popular and only slightly scientific. I noticed errors and inaccuracies that should be corrected. First of

all, there is a lot of repetition; entire paragraphs are repeated several times, from the summary, through the introduction, further parts, and to the summary. Apart from that:

1. Introduction. Wrong: Solanum copernicium L. - *Solanum lycopersicum* L.
2. Eye Health. Unintelligible, ungrammatical: A rich source of beta-carotene, lutein, and zeaxanthin, tomatoes contribute significantly to maintaining eye health and mitigating the risk of age-related macular degeneration (AMD).

3. Weight Management and Metabolism - Unintelligible, ungrammatical.

1. Agricultural Research. There is no information on tomato agrotechnics at this point. Only breeding work has been marked; I suggest adding more information, e.g., about cultivation in the field (sowing, planting seedlings, dates of sowing/planting and harvesting, irrigation, fertilization, care work, protection) and under cover (fertigation, pollinating insects), crops for industry and consumption.
2. Beverage Industry (?) I suggest processing industry

5. Processing Tomato Seed Oil. Tomato seed oil, also known as lycopene oil - explanation repeated unnecessarily twice

See more

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Comment

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BI

Berindean Ioana posted a **Review**

February 19, 2024

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https://doi.org/10.32388/E805TK

Article: Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance

Considerations:

- The authors of this article present a comprehensive description of these wonderful fruits, tomatoes, from various perspectives, but without adequate scientific basis.

- Also, I recommend they provide precise data regarding their usage in various fields, such as medicine (with concrete case studies), if different extracts have been used in certain treatments and how patients have responded, etc.

- Then, in the field of agriculture and biotechnologies, you mention that "scientists harness the potential of tomatoes to serve as bioreactors for the production of valuable compounds..." and what is the compound? How are they used...bring novelty elements, precise data. I would also recommend bringing novelty regarding the species' genome, if there are studies of genetic engineering conducted on tomatoes and what improvements have been made.

In my opinion, to be published in a prestigious journal, the article requires more scientific value, more precise data, and more pointed conclusions. Good luck.

See more

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Comment

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AA

Aqsa Akhtar posted a **Review**

February 19, 2024

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https://doi.org/10.32388/3NLGZQ

The article has been drafted by using only general discussion and does not contain specificity. It requires significant improvement in terms of the content, flow of study, and scientific language.

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Comment

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DV

Darlene Ana de Paula Vieira posted a **Review**

February 17, 2024

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https://doi.org/10.32388/KRC953

Article: Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance

Considerations:

1. The article is ambitious, but it lacks depth in scientific aspects.
2. The incorporation of statistical data from scientific articles is necessary for relevant aspects of the role of tomatoes.
3. Reviews should include the origin and significance of genetic improvement.
4. The authors should provide a complete explanation of the innovation in this research and its contribution to a deeper understanding in the scientific field.
5. The scientific name of the tomato plant is Solanum lycopersicum L., not Solanum copersicum L., and it should be written in italics.
6. The citation for Silva et al., 2023 in the body of the text is incorrectly written in the reference list.
7. Considering the points mentioned, my evaluation is that the manuscript requires a comprehensive literature review, particularly emphasizing the need for critical analysis. In its current form, the manuscript does not meet acceptance criteria.

See more

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Comment

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JR

Jagbir Rehal posted a **Review**

February 17, 2024

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https://doi.org/10.32388/H1X8B8

The review ‘Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance’ has a catchy title but lacks a detailed explanation of the various aspects; it just touches the various sub-topics superficially. The authors mention the figure numbers but have not added any figures. The figure showing the utilization is also rudimentary and can be improved upon. The authors have not added the process of separation of tomato seeds from the pomace for oil extraction. Nor is the utilization of pomace delved into; the authors can check and refer to my work and include the same in their review.

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Comment

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SD

Sangam Dwivedi posted a **Review**

February 16, 2024

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https://doi.org/10.32388/5PNAQ1

Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance by Sattar et al. [Note, my comments are based on the first version uploaded; not the revised version submitted later on]

Introduction

1. First para: Solanum copernicium L. [very strange, not familiar to me] please replace it with *S. lycopersicum,* the

currently known scientific name of the tomato.

2. 2nd para: Why not use the latest FAO data freely available from the FAO website? It makes no sense to use 2014 statistics; they are outdated.

Section 2:

1. Many claims are made about the health benefits of tomatoes based on a few studies. Better cite large-scale, clinically controlled trial studies on humans to provide quantifiable health benefits of tomatoes?
2. Each section is based on 1 or 2 citations to support a claim?

Sections 3 and 4: I don't find anything new that is not already known about tomatoes as culinary and industrial products. I therefore wonder about the aim of writing such an article.

Section 5: Extracting oil from tomatoes makes no sense as already commercially produced oil crops provide sufficient health benefits to consumers.

Extraction process: all known and nothing new [Who are the target audiences for this article? Certainly not industries engaged in the commercialization of tomato byproducts.]

Overall, it is written as if to be published as a news item in a daily newspaper or in some local magazine, certainly not as a scientific article. I therefore leave it to the judgement of the Editor to decide the utility of this manuscript to the Journal he/she is heading.

See more

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1 comment

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DR

David Romero-Estévez posted a **Review**

February 15, 2024

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https://doi.org/10.32388/IXTIXW

Dear authors:

This article describes, as a summary, the studies carried out on Solanum lycopersicum, includes information related to its

nutritional and nutraceutical benefits for human health, and discusses the different industrial applications of tomatoes in processed products.

The article is well written, but it does not contain new content; it only summarizes previous research without contributing anything new to the nutritional issue of tomatoes. Likewise, it does not include new information generated, new data, or novel interpretations.

In the introduction, the text (section 2, "Phenolic acids (Figure 1a) and flavonoids (Figure 1b)") mentions figures that do not exist.

No further information has been included on the different agricultural methods and their differences (organic, hydroponic, etc.) in the nutritional composition, nor on the possible contaminants that may be present in tomatoes, which, although they present health benefits, in some cases can be a source of exposure to harmful substances.

Best regards,

See more

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Comment

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KK

Karl Kunert posted a **Review**

February 15, 2024

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https://doi.org/10.32388/UL6FSD

Authors should also focus on existing research gaps and not only summarize current knowledge. Also, if the review has resulted in new insights about the potential or current limitations of tomatoes, this should be discussed in the final conclusions.

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Comment

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PC

Pintu Choudhary posted a **Review**

February 15, 2024

https://doi.org/10.32388/Y9XJTB

The article entitled “Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance” focuses on the overview of the tomato.

A number of articles have been published on the tomato, so discussing the different components of tomatoes. I don’t think this is a good topic to publish.

The abstract of the manuscript is too simple; there is nothing innovative and novel in that.

In the second paragraph of the introduction, the authors have presented ten-year-old data, which is outdated.

The authors should have explored more about the bioactive compounds of tomatoes.

The health benefits, such as Heart Health, Cancer Prevention, Eye Health, Weight Management and Metabolism, and Digestive Health, have been discussed in single to two lines. The topics should have been explored more, and the same should have been followed in the processing as well.

There is no conclusion.

The manuscript is without any tables and figures.

The tablem1 seems to be a screenshot from other sources.

See more

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1 comment

DP

Diana Pinto posted a **Review**

February 15, 2024

https://doi.org/10.32388/B0QR69

The manuscript entitled “Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance” fits within the guidelines and criteria of Qeios, providing a comprehensive review of the nutritional and bioactive composition of tomatoes, as well as their health benefits and potential industrial applications. The manuscript seems interesting and well-organized in adequate sections; however, some topics could be deepened considering the existing literature on the topic.

Please find below some suggestions to improve the manuscript:

- Format the scientific name of the tomato plant, “Solanum copernicium,” in italic letters, please. After indicating the full name of the tomato plant for the first time, use the abbreviated name as “S. copernicium,” formatted in italic letters. Please revise it along the manuscript.
- The introduction is well-written and gives a sufficient background for the review. However, more references are needed to support the statements made throughout the introduction.
- References are also missing in the second paragraph of the section “2. Nutrient Profile and Antioxidant Properties.”
- Revise the formatting of Table 1.
- Please revise some formatting issues along the manuscript.
- Some future perspectives on the research about tomatoes and derived products may be discussed to enrich the manuscript.

See more

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Comment

Zakaria Ahmed posted a **Review**

February 15, 2024

https://doi.org/10.32388/0SBG25

The article is well written with sufficient scientific background and cross-references.

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Comment

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AR

Ana L. Ramos-Aguilar posted a **Review**

February 14, 2024

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https://doi.org/10.32388/YJ2GY5

Since its first version, the authors improved the writing and information of the document.
I have other suggestions. I hope they help you:
It would be interesting to highlight the importance of lycopene, the main pigment in tomatoes. It could include information on the absorption of lycopene from different tomato products.

If you consider including the figures of the phenolic compounds, you could also include those for carotenoids such as lycopene.
Due to the wide range of conditions that can impact its chemical composition, the tomato is a highly variable fruit; you could use ranges in quantities. An extensive review is needed. They can also use an internationally recognized database about food composition.

You could include in a table the studies where the beneficial effects of tomatoes have been demonstrated.

Check the calorie data in the text and in table 1.

The title of your article suggests that it includes other topics; you could improve it considering the content.

Thank you for considering the guest researchers' corrections.

See more

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Comment

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HB

Hanane Boutaj posted a **Review**

February 14, 2024

https://doi.org/10.32388/HOIHSW

The article "Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance" provides a detailed examination of tomatoes, encompassing their cultivation, nutritional properties, industrial applications, and processing into various products. Overall, the article is informative and well-structured, but there are some areas where clarity and coherence can be enhanced. Here are some suggestions for improving the quality of the manuscript:

Title: The title is descriptive but could be more engaging. Consider adding an element of intrigue or uniqueness to make it more appealing to readers.

Abstract: The abstract provides a succinct overview of the article's content. However, it could be revised to include more specific information about the key findings or contributions of the review. Additionally, it should avoid repetition of phrases such as "culinary delight" and "nutritional powerhouse."

Introduction: The introduction effectively sets the stage for the discussion on tomatoes. However, it could benefit from a clearer statement of the objectives or aims of the review.

Nutrient Profile and Antioxidant Properties: This section provides a comprehensive overview of the nutritional benefits of tomatoes, particularly focusing on lycopene. It might be helpful to include more recent references to support the claims made about the health benefits of tomatoes.

Diverse Industrial Utilization of Tomatoes: The section on industrial applications of tomatoes is informative. To enhance clarity, consider organizing the subsections into a more cohesive structure, perhaps grouping related industries together.

Tomato-Based Products: This section provides an extensive list of tomato-based products and their processing methods. To improve readability, consider breaking down the information into bullet points or a table format.

Processing Tomato Seed Oil: The section on tomato seed oil extraction is informative but lacks visual aids or diagrams to illustrate the process. Consider adding figures or flowcharts to enhance understanding.

Conclusion: The conclusion effectively summarizes the key points discussed in the review. However, it could be strengthened by emphasizing the implications of the findings and suggesting areas for future research.

References: Ensure that all references are cited correctly and consistently throughout the manuscript. Additionally, consider including more recent references to ensure the relevance and currency of the information presented.

Overall, the article provides a comprehensive overview of tomatoes, but refining certain sections and incorporating visual aids can enhance its readability and impact.

See more

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Comment

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RR

Reelika Rätsep posted a **Review**

February 14, 2024

•••

https://doi.org/10.32388/86WVOV

This article still needs work on the references and citing of relevant facts, but in some cases, the authors have cited their own opinions and emotions about the tomato crop. Also, one reference per paragraph is not enough, especially on the health-related aspects. Some of the references are misused. For example, the publication of Poojitha, M, 2023, does not say anything about the tomato being the essential export crop, but the publication gives an overview of tomato quality and groups its fruits according to color, size, shape, etc. The article by Hernández et al., 2014, does not say anything about the global culinary sensation of the tomato. The publication by Zhang et al., 2023, did not say anything about individual polysaccharides. How can the tomato be named an essential component for health? The Coelho et al., 2023, mention only the potential benefits to eye protection and work, not its being essential. All the facts need to be expressed and cited correctly; cross-citations are not welcome.

This review is written in good faith in order to give input to improve the publication. Please have no hard feelings about it.

See more

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Comment

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Dd

Dora dos S. Costa posted a **Review**

February 13, 2024

•••

https://doi.org/10.32388/5MNM9Z

Thank you for the invitation to review your manuscript. Below are my appointments:

ABSTRACT

- Replace “As the second most cultivated vegetable worldwide” with : As the second most cultivated horticulture worldwide.
- Replace “The article offers a thorough overview …..” with: This review offers……
- Change the position of the sentence “It explores the extraction of valuable compounds such as carotenoids and tomato seed oil for applications in diverse industries. Additionally, it discusses the potential of tomato waste in environmental remediation as an adsorption material”. Put it before the sentence “The article offers a thorough overview of the industrial use of different tomato parts, including seeds, peels, and pomace, in producing various products.”
- The following sentence “In essence, it underscores the remarkable versatility of tomatoes, transcending their culinary role to become a resource with implications for sustainability, innovation, and multiple scientific disciplines” would be better if rewritten like this: "In essence, tomatoes are remarkably versatile, transcending their culinary role to become a resource with implications for sustainability, innovation, and multiple scientific disciplines."
- In the keywords: the word “tomatoes” is in the title and for this reason it may not be used as a keyword. I would advise you to replace the word tomato with *Solanum lycopersicum* in the title of the manuscript or in the key words.
- INTRODUCTION
- In the first paragraph, replace “As a proud member of the Solanaceae…” with “As a member of the Solanaceae…”
- In the second paragraph, “Tomatoes rank second in terms of acreage among major globally cultivated vegetable crops, surpassed only by potatoes,” it is repeated information. You can say it in the first paragraph. On the FAO website, through FAOSTAT, you can find the most current references in productivity. It would be good if you used this reference.

It would also be good to comment on how profitable tomatoes are, how much money they generate in the world. How many fruits (kg) can a table tomato produce on average? How many tons are produced? Is the crop very susceptible to pests and diseases? Which? What varieties of tomatoes are most consumed globally?

- Table 1 appears long after it was first cited.
- Table 1 could be made up of more than one reference in order to better estimate an average, as these values can differ greatly between tomato varieties.
- The topic “Agricultural Research” must be explored. Needs to better explain why and how the tomato has been considered a model plant. It would be interesting to cite research that used it for this purpose.
- The topics “Agricultural Research” and “Biotechnology Industry” would be better off as a single topic.
- Figure 1 is a long way from where it was first cited.
- In the topic “Processing Tomato Seed Oil,” it would be nice if there was a small diagram illustrating the process.
- Ficou faltando um tópico sobre as prinicpais formas de cultivo de tomate: orgânico, hidroponia, cultivo convencional, cultivo protegido, etc.
- A topic was missing about the main ways of growing tomatoes: organic, hydroponics, conventional cultivation, protected cultivation, etc.

See more

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Comment

Ali Jahanban-Esfahlan posted a **Review**

February 13, 2024

https://doi.org/10.32388/A9ZOXL

The authors included most of the comments recommended by the reviewer, so the manuscript could be accepted for publication.

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Comment

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VB

Vasilica Barbu posted a **Review**

February 13, 2024

•••

https://doi.org/10.32388/2283PQ

I reviewed the revised version of the manuscript “Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance.” The authors modified the manuscript and added some information, as well as several references. Thus, they improved the paper, but it is nowhere near a comprehensive review. I find the changes made in the revised version to be acceptable, though.

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Comment

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VB

Volker Böhm posted a **Review**

February 13, 2024

•••

https://doi.org/10.32388/NNBPN7

I reviewed the revised version of the manuscript “Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance.” The authors modified the manuscript and added some information as well as several references. Thus, they improved the paper, being a well-written overview. However, it still simplifies the aspects too much in some parts and is not very innovative. In chapter 4 ("Processing Tomato Seed Oil"), they mainly focus on lycopene. However, there are also other bioactive ingredients in tomato seed oil, e.g., polyphenols and vitamin E. In Figure 1, there is a small typing error (please change “Supplemetns” to “Supplements”). In conclusion, this paper gives a good overview for interested consumers but is not very informative for scientists.

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Comment

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NM

Neha Minocha posted a **Review**

February 13, 2024

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https://doi.org/10.32388/3YIQX0

Changes made in the revised version are acceptable.

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Comment

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MM

Mahmoud M.A. Moustafa posted a **Review**

February 12, 2024

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https://doi.org/10.32388/OG0JZ4

Accept as it is

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Comment

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AM

Autar Mattoo posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/JV7GWI

There are innumerable articles written on tomatoes, and some are highly claimed by authors around the world. This article, as it stands, does not stand out as a worthy piece. Reasons:

1. The authors have not gone through a large body of information on tomatoes present around the world.
2. The review lacks poise, scholarship, and is poorly written up.
3. Innumerable articles on tomatoes are present all over the world, but these authors decided to be selective and thus lost the edge in presenting a scholarly manuscript.
4. I do not see them present the scholarly articles on tomatoes, and it seems these authors are not aware of serious literature.

Under these circumstances, I feel that such articles are not preferred and should not be accepted or published.

See more

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1 comment

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MG

Magín González-Moscoso posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/9DPEQ4

The authors significantly improved their work; however, there are small details to be improved, some of which are listed below:

1. Are the citations Løchen, M. L, 2023; Poojitha, M, 2023; Kiralan, M., & Ketenoglu, O, 2022 correct?
2. Phenolic acids (Figure 1a) and flavonoids (Figure 1b), both major groups of phenolic compounds, are particularly abundant in the skin of tomato fruit, with smaller-sized varieties exhibiting higher phenolic compound content due to their increased surface-area-to-volume ratio (Raiola et al., 2014). In the paper, there are no Figures 1a and 1b; apparently, they copied the text from another article. Please revise it.
3. Figure 1 was designed in Coogle? I recommend removing from the figure the part where it says "Coogle made for free at coogle.it."
4. There are 7 citations in the introduction; I recommend supporting with more citations. There is a lot of information about tomatoes in the world literature.

See more

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Comment

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DM

David Mejía-Reyes posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/FVNC6T

Without any observation.

Although it is only a suggestion and the title looks good, I could adapt it to something more focused on science. The recent title suggests that it is a review referring to economics, although it is a suggestion.

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Comment

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IH

Iqtidar Hussain posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/1RL3VI

Read for publication. All changes are incorporated by the author in the manuscript. Now tally all references in the text and present them in the chapter references. The author is advised to give recommendations and acknowledgments at the end of the manuscript.

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Comment

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DC

Dimitra Chormova posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/UTZ2M9

The article is informative, but it should not be treated as scientific research or as a source of data and information to validate, discuss, or compare other research results in any way or form. It could be considered as “light reading” to provide basic information on the use and value of tomato fruits, but not as a scientific study; it contains no data, and in parts, it is repetitive. To improve, I would suggest making it a bit shorter, to the point, avoiding repetition, and to be treated as light reading; perhaps it would be more suitable for publishing in a culinary or food brochure or magazine.

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Comment

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PM

Paramasivan Manivannan posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/BBKYY8

The research article compiles beneficial roles in nutraceutical prospects of tomato.

Although ample research on tomatoes has been catalogued, their culinary significance poses novelty.

Further dissection of nutritional information will aid food technologists in the view of innovative tomato values.

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Comment

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FV

Fernanda Vilarinho posted a **Review**

February 12, 2024

•••

https://doi.org/10.32388/0ZUAS3

I am grateful to the authors for their dedication in reviewing the manuscript.

The final version is excellent and deserves to be widely shared.

0 0

1 comment

Reviews to other version(s)

•

AS

Alice Stiletto posted a **Review**

March 5, 2024

•••

Preprint v1

https://doi.org/10.32388/B0ESCI

In general, I believe that while the article is enjoyable to read, it doesn't make a substantial contribution to research. The authors list various properties of the tomato in a tone that leans more towards journalism than science. Furthermore, from my perspective, the study's objective is not clear (or, at the very least, inadequately explained in the text, although it can be inferred from the title).

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Comment

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IB

Isaac Duah Boateng posted a **Review**

March 2, 2024

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Preprint v1

https://doi.org/10.32388/ZQACK7

I have carefully reviewed the manuscript. In general, this is a poor review, and it is not suitable for publication in this journal.
The article fails to provide a topic overview, with significant gaps in the coverage of relevant literature and research findings. The discussion is superficial, lacking in-depth analysis and critical evaluation of existing data. The discussion lacks critical insight and does not meet the standard of this journal.
The manuscript article requires revision in grammar, sentence structure, and reference format. Overused passive voice in the manuscript seems hard to read. Please try to reword the phrases in the active voice. Grammar and punctuation mistakes. For consistency, please use just one English style (a non-variant British or American style, etc.) in the manuscript. There are phrases with verbs in the wrong tense. Sentences with words misspelled. Words are overused or unnecessary. Nouns without a determiner or unnecessary. The level of English throughout your manuscript does not meet the journal's desired standard.

Considering these significant issues, I am not recommending the publication of this article. Provide page numbers (line numbers as well, if possible). Page and line numbers make it easier for reviewers and authors to make comments, suggestions, responses, etc.

Below are my comments.

The title is vague.

This is a poor abstract.
You should first draft it like this:
Background (2 to 3 sentences)
Scope and approach (2 to 4 sentences)
Key findings
This should cover >60% of the abstract
Conclusions (2 to 3 sentences)
After you draft it like this, then you remove the sections (background, scope & approach, key findings, and conclusions) and merge all the sentences together.

Introduction
A bibliometric analysis of the growth of importance of this topic over the years (past 5 or 10 years) must be done (using Web of Science), VOS viewer, or lens.org, and a plot with an associated explanation must be added.
Look at these papers as a guide.
Chen, W., Ma, H., & Wang, Y. Y. (2022). Recent advances in modified food proteins by high intensity ultrasound for enhancing functionality: Potential mechanisms, combination with other methods, equipment innovations and future directions. Ultrasonics sonochemistry, 85, 105993.
Ogundipe, S.O., Usack, J.G., Pegg, R.B. et al. Thermal and Non-thermal Processing on the Physical and Chemical

Properties of Tree Nuts: A Review. Food Bioprocess Technol (2024). https://doi.org/10.1007/s11947-023-03314-8

General comments
Compare the results in this study with the most recent related literature and critically evaluate the trends/similarities/differences. What you wrote seems like a book chapter rather than an article to be published in a top journal. Critically discuss.

When crafting your review article, remember to consider the reader's perspective. Look beyond providing a summary of the scientific literature in your topic area and illuminate the cutting-edge and most important paths to the future. You will likely inspire other scientists to accelerate their work more efficiently toward solving critical nutrition and food science challenges.

This paper should be rejected!

See more

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Comment

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SK

Sandeep Kumar posted a **Review**

February 27, 2024

•••

Preprint v1

https://doi.org/10.32388/UN5PFN

The manuscript entitled "Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance" is very ordinary and not up to mark for publication.
1. Overall, this manuscript provides a thorough examination of tomatoes, covering various aspects from cultivation techniques to their culinary and nutritional importance. However, there are a few areas that could be strengthened for clarity and depth.
2. The section on cultivation methods would benefit from more specific details, such as optimal soil conditions, irrigation techniques, and pest management strategies. Providing practical tips for growers would enhance the usefulness of this

information.

3. The discussion on the culinary significance of tomatoes would be helpful to include more diverse recipes or cooking techniques to showcase the versatility of this ingredient in different cuisines around the world.

4. In terms of nutritional significance, the manuscript effectively highlights the health benefits of tomatoes, particularly their high content of antioxidants and vitamins, but there are a lot of missing links. Including recent research findings or clinical studies to support these claims would further strengthen the credibility of the information presented.

5. The organization of the manuscript is generally logical, but there are some sections where transitions between topics could be smoother. Consider revising the flow of information to improve coherence and readability for the reader.

6. Additionally, attention to language and grammar is important for maintaining professionalism. Proofreading for typos, grammatical errors, and sentence structure will enhance the overall quality of the manuscript.

7. Finally, while the breadth of topics covered is commendable, it might be beneficial to delve deeper into specific areas of interest to certain readers if prepared widely.

Overall, "Tomatoes Unveiled" presents a comprehensive exploration of tomatoes, but refinement in certain areas would elevate its impact and appeal to a wider audience.

Finally, I do not recommend this manuscript for publication in its present form.

See more

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Comment

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YR

Yukui Rui posted a **Review**

February 25, 2024

•••

Preprint v1

https://doi.org/10.32388/R11XE8

This article comprehensively reviews the value of tomatoes in enriching human food and nutrition, including their cultivation area and yield, nutritional components, uses, and cooking methods, covering all aspects of tomatoes.

I personally feel that this article is more like a popular science article, and most of the content can be found in textbooks.

To further enrich the content of this article, it is entirely possible to write a popular science book called "Tomatoes."

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Comment

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SK

Shruti Kaushik posted a **Review**

February 13, 2024

•••

Preprint v1

https://doi.org/10.32388/0AHEJ0

Some corrections can be considered, as listed below.

- The botanical name should be italicized wherever used.
- A lot of dot problems in the whole manuscript. The author needs to read the manuscript thoroughly and correct it.
- The manuscript has inadequate recent references. Authors are suggested to replace too old references with recent references wherever possible.
- The table in the manuscript is a picture, and that doesn't follow the author guidelines
- The manuscript is not acceptable in its current form. The authors have not appropriately revised the English language of the manuscript, and hence, it remains unacceptable for the scientific community. The main problem with the manuscript is serious grammatical errors, and usage of words like "latterly," etc., makes the manuscript really bad.
- The author needs to fully explain the innovation of this research and its contribution to the in-depth understanding of related fields.

See more

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1 comment

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GB

Germana Borsetta posted a **Review**

February 12, 2024

•••

Preprint v1

https://doi.org/10.32388/BE72PL

The article is poorly articulated; there is a lack of recent bibliography (e.g., 2011, 2013, 2015 are too old). I suggest using FAO as a reference source for publications on the topic and for sustainable practices. Sometimes there is a lack of sources.

Figures/tables need revision since there is no correspondence between content and figures; in addition, the table description should be at the beginning of the table and not at the end.

The language is good.

I suggest implementing the part on sustainability since it is poorly analysed. In particular, I suggest implementing this section; in particular, tomato cultivation is not always sustainable; for example, in Spain, there is a huge problem of desertification due to their cultivation in greenhouses (Almeria). They are also very often used for analyses on new fertilizers.

Also, it is better to specify that “sofrito” in a Greek traditional recipe, since it could be mistaken with the Italian “soffritto,” which is only made with oil and garlic.

Any reference to the technology used for the extractions presented should be inserted.

In the Conclusion, the concept of biogas should be better analysed, also in the text.

See more

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Comment

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FV

Fernanda Vilarinho posted a **Review**

February 12, 2024

Preprint v1

https://doi.org/10.32388/4ISBVD

The article “Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance” by Saira Sattar et al. meets the criteria set by Qeios for an "Article". It provides a comprehensive review of tomatoes' nutritional and industrial potential based on recent and valid literature.

I have some comments and suggestions to improve the manuscript:

- The title could be confusing to readers. I suggest changing it to "Tomatoes Unveiled: A Comprehensive Exploration of the Culinary and Nutritional Significance".

- Chapter 2, "Nutrient Profile and Antioxidant Properties", could be improved. I suggest changing the title to reflect the health-related information covered in this chapter or creating a subchapter highlighting the data from the different health areas.

- Please add the references for the 2nd paragraph of chapter 2 ("At the forefront of the nutritional benefits....") and the 2nd paragraph of chapter 3 ("In the realm of sustainable energy....").

- The table in the manuscript is an image and does not comply with the author's guidelines. Please provide a reference for this table.

See more

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1 comment

MR

Muhammad Ammar Raza posted a **Review**

February 12, 2024

Preprint v1

https://doi.org/10.32388/IUPYB4

http://I am thankful you assigned me to review this article. I have thoroughly read this article, and I am surprised to know how this article could be considered for publication with this data. I suggest considering it for a brochure.

0 0

Comment

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ZY

Zubaida Yousaf posted a **Review**

February 12, 2024

•••

Preprint v1

https://doi.org/10.32388/NR7AN3

The manuscript contains an elaborate literature review. This is a well-written manuscript that only needs to undergo a few minor changes.

With all factors considered, the data in the work provides insightful knowledge on tomatoes. However, the study omits information regarding growing methods, dietary composition, therapeutic applications, pigment extraction, etc. Better citations can assist the current work in gaining a better perspective on scientific advancement; this is the main area that needs improvement. Better citations will also enable the writers to present more thorough and reliable information about tomatoes.

1. *Throughout the manuscript, there are several language mistakes.*
2. The abstract lacks the following points:

Please focus the abstract on your study. In particular, the last two sentences are vague.

- Abstract needs language improvement.
- Abstract lacks clarity. What does the author want to address in this review?
- The abstract should start with the taxonomic classification of tomatoes.
- Global consumption, cultivation, and utilization of tomatoes.

1. **Introduction**

Correct the taxonomic position of tomatoes.

The manuscript lacks the cultivation details of tomatoes. The title includes the cultivation, but there are no details of cultivation throughout the manuscript.

Soil type, temperature, etc.

2. Nutrient Profile and Antioxidant Properties

The Nutrient Profile and Antioxidant Properties section is incomplete. Sentences lack clarity and should be structured properly.

- Medicinal uses are not included in the nutritional profile and antioxidant properties.
- Nutrient profile should include:
- the extraction and identification of bioactive compounds,
- identification of micro- and macronutrients present in tomato fruits by previous studies,
- the role of bioactive compounds in scavenging free radicals.

How tomatoes lower the risk of cardiovascular diseases and other diseases mentioned in the manuscript? Which bioactive compound defends the medicinal use of tomatoes? Discuss the mechanism of action?

1. Diverse Industrial Utilization of Tomatoes

Industrial utilization of tomatoes needs to be structured properly. Some suggestions are discussed below:

Food Processing

This section should also include the extraction of pigments from the tomato or the effect of various techniques on the extraction of pigments from tomato fruits.

Agricultural Research

Research gaps and factors affecting the crop are missing in this section.

Biotechnology Industry

Biotechnological techniques to get secondary metabolites from the tomato are not mentioned in the manuscript. Such details should be included in the present study.

You may consult the following reference for details on this point:

Minutolo, M., Chiaiese, P., Di Matteo, A., Errico, A., & Corrado, G. (2020). Accumulation of ascorbic acid in tomato cell culture: Influence of the genotype, source explant, and time of in vitro cultivation. *Antioxidants*, *9*(3), 222.

Alseekh, S., Tohge, T., Wendenberg, R., Scossa, F., Omranian, N., Li, J., ... & Fernie, A. R. (2015). Identification and mode of inheritance of quantitative trait loci for secondary metabolite abundance in tomato. *The Plant Cell*, *27*(3), 485-512.

1. Tomato-based products 5. **Processing Tomato Seed Oil**

Overall, this section is clear and well-written. Insufficient information about previous study findings is presented for readers to follow the present study rationale. Some previous studies should be included to follow the present study rationale.

See more

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Comment

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SH

Sayed Samiullah Hakimi posted a **Review**

February 12, 2024

•••

Preprint v1

https://doi.org/10.32388/RCFIWV

The contents and information are interesting and well organized. The below comments may be considered.

1. The botanical name may be Solanum lycopersicum (italic).
2. The production data can be updated.
3. The names of some of the major products, such as paste, puree, and concentrate, as well as dried tomatoes, may be added.
4. The use of tomatoes in fresh salads, burgers, and kitchens can be considered as well.

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Comment

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VB

Vasilica Barbu posted a **Review**

February 11, 2024

•••

Preprint v1

https://doi.org/10.32388/UJML7Q

The review is superficial, with too little data, without original statistical interpretations. It lacks scientific depth and is suitable for a mass media publication. The chapter "Diverse Industrial Utilization of Tomatoes" must be improved by consulting several scientific articles, with the synthetic and summary presentation of their results, and with the argumentation of the statements regarding the biochemical, biotechnological, pharmaceutical, nutritional, and agricultural value. There is a lot of research related to micro- or nano-encapsulation of biologically active compounds from tomatoes, especially lycopene, which should find its place in the review.

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Comment

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Sd

Sabrina de Souza Sales posted a **Review**

February 10, 2024

•••

Preprint v1

https://doi.org/10.32388/QS6DTE

Dear editor of the manuscript "Leaching of Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance," your effort and interest in this topic are worthy. However, the structure of the text and the bibliographic review lacks scientific rigor. I hope they will review the work and add more relevant data.

0 0

Comment

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AH

Ashiq Hussain posted a **Review**

February 10, 2024

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Preprint v1

https://doi.org/10.32388/8D452U

This review is interesting and well-designed, unveiling the utilization potential of tomatoes, an ever-green nutritional crop. However, citations are not enough to support each fact/claim/knowledge given in the document. Therefore, authors need to cover this gap.

The abstract is very well structured.

Production data of tomatoes, which is provided in the introduction, is almost 8 to 9 years old; it must be the latest data or a trend from then to now, whether production is increasing or decreasing.

Tomatoes are a nutritional powerhouse; this claim is given many times in the document, which is a repetition of information.

The last paragraph of the second heading (about antioxidant properties) has less information, which is also not supported by any citation.

Under the heading “cancer prevention,” authors have stated numerous studies. Please mention which studies?

Instead of writing beta-carotene, it is suggested to mention the symbol of beta as β.

The second paragraph of heading 3 is without citation.

Authors have summarized tomato-based products with a wide range of names; however, in the last, only one reference is provided ((Pereira et al., 2023), which seems inadequate. Further, this reference is also missing in the reference list.

Under heading 5… Tomato seed oil is also high in polyunsaturated fatty acids, particularly linoleic acid, which may help lower cholesterol levels….. who claimed this?

Table 1: Data on the nutritional profile of tomatoes is taken from which source?

See more

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Comment

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JL

João Lima posted a **Review**

February 9, 2024

•••

Preprint v1

https://doi.org/10.32388/7SJPHJ

Dear editor

The submitted manuscript, "Leaching of Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance," presents a lack of scientific rigor; the subjects are presented based on a small number of references.

0 0

Comment

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MG

Magín González-Moscoso posted a **Review**

February 9, 2024

•••

Preprint v1

https://doi.org/10.32388/N63NJD

Dear editor, the submitted manuscript, "Leaching of Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance," lacks scientific rigor, as there is a lot of scientific literature in the world concerning the cultivation of tomatoes, and it does not demonstrate to have made an exhaustive search to support its writing.

1.- Is it a review or a mini-review?

2.- The introduction has only 4 citations; you need to justify what is said in the introduction with citations.

3.- Homogenize the citations; some have "et al." in italics, and others are normal.

4.- Løchen, M. L., 2023, is wrongly cited.

See more

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Comment

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SB

Seda Erdoğan Bayram posted a **Review**

February 9, 2024

•••

Preprint v1

https://doi.org/10.32388/EYZ99R

In my opinion, after making the changes I have mentioned in the text in the attached file (in the supplementary data section), it can be published in your journal. Of course, the final decision is the Editor's.

Best regards.

0 0

1 comment

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IH

Iqtidar Hussain posted a **Review**

February 8, 2024

•••

Preprint v1

https://doi.org/10.32388/EEWN70

This paper manifests on the nutritional value of tomatoes with its production technology. This review paper is highly appreciated.

It is acceptable after grammar corrections and tallying all references in the text.

0 0

Comment

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JL

José Belisario Leyva-Morales posted a **Review**

February 7, 2024

•••

Preprint v1

https://doi.org/10.32388/7DR7S7

It is recommended to review the form cited in the text; it should be last name, year without including the authors' initials.

The correct scientific name of the tomato is Solanum lycopersicum L.

The article shows scientific and cultural information regarding the importance of tomatoes.

Therefore, consider that it may be of importance to readers of a non-specialized audience.

0 0

Comment

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PM

Paramasivan Manivannan posted a **Review**

February 7, 2024

•••

Preprint v1

https://doi.org/10.32388/3TN50X

Dear Editor,

Greetings.

The article needs novelty and innovation.

Moreover, the research appears basic and requires the demarcation of scoping, narrative, or systematic review.

Further, plant immunity, nutraceutical therapy, and region-specificity need to be addressed.

In the present stage, it needs more intricate and intrinsic tomato research.

Thanks and Regards,

Dr. Manivannan Paramasivan, PhD

See more

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Comment

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DM

David Mejía-Reyes posted a **Review**

February 7, 2024

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Preprint v1

https://doi.org/10.32388/27WN5W

- Is the scientific name correct? When starting the writing, I understand that the idea is to put the current scientific name, but not *Solanum copernicium*.
- I recommend updating references, no more than 5 years (2019-2024).
- Check this wording: 3.9 grams of carbohydrates, 2.6 grams of sugar, are they different types of carbohydrates? What do you mean?
- The benefits of tomato consumption are mentioned, but they do not emphasize more and are limited to only mentioning what it is for; it is considered pertinent to mention some metabolic functions.
- Homogenize reference format.

- The intention of the review is good, but certain aspects need to be added to enrich it.

See more

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Comment

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BA

Bruna Antunes posted a **Review**

February 6, 2024

Preprint v1

https://doi.org/10.32388/YZVAS8

1. Introduction

- Outdated data are presented on global tomato production (2014), please look for current data.

2. Nutrient Profile and Antioxidant Properties

Little has been said about the nutritional profile and properties of the tomato. The composts present and their properties could be further explored.

Add more studies that relate the present non-tomato composts with biological properties.

3. Diverse Industrial Utilization of Tomatoes

Only a few industrial uses of tomatoes are presented. Review literature.

4. Tomato-Based Products

The writing is not technical; it is very allusive. Add the tomato-based products developed to your process.

In general, few bibliographical references are used in this journal. Add more studies on the subject, and improve the writing.

See more

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Comment

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DS

Dr. Inapurapu Santhi Priya posted a **Review**

February 5, 2024

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Preprint v1

https://doi.org/10.32388/0YP25S

The present work explores the extensive reach of tomatoes and emphasizes their significance beyond the dining table. The subject matter was interesting and worthy of review. However, the Introduction and each subheading are too short and need to be revised and improved carefully; the authors should focus more on each subtopic instead of ending them with a single reference, which seems abrupt, as there is a lot of research done on tomatoes and their antioxidant properties' role apart from heart, eye, digestive health, and cancer prevention, like several human degenerative diseases, including diabetes, neurological diseases, and aging, by minimizing oxidative stress caused by ROS.

Some relevant references can be added to the part on Nutrient Profile and Antioxidant Properties as a supplement.

https://doi.org/10.1002/mnfr.201801045

https://doi.org/10.1080/10408398.2021.1880363

https://doi.org/10.5455/faa.136276

https://doi.org/10.3390/foods10010045

Besides, the authors should revise and improve the quality of the part on diverse industrial utilization of tomatoes, which seemed too cursory. No novel technologies have been mentioned, for example, the role of nanotechnology in advancing the industrial applications of tomatoes.

Consequently, this review does not present sufficient novelty when compared to already published work. The topic is interesting and provides relevant information; however, it lacks the above-mentioned details that can be corrected to improve its original form.

See more

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Comment

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EY

Emel Hasan Yusuf posted a **Review**

February 4, 2024

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Preprint v1

https://doi.org/10.32388/K8LHZD

You can see my suggestions below:

1. *Solanum copernicium* is a Latin name that should be italicised.
2. Why are the parts of subtitles so short, only with 1 reference?
3. Lycopene is also an antioxidant and anti-inflammatory agent.
4. Why do you give processes of seed oil production but not, for example, tomato juice or sauce production processes?
5. I recommend major revisions for the paper to expand the information.

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Comment

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AD

Anish Dangal posted a **Review**

February 4, 2024

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Preprint v1

https://doi.org/10.32388/FTUMBZ

Dear Authors,

Thank you for submitting your work to this journal. The topic presented is good, but it needs major revision to be accepted for publication. If only the mentioned revisions are completed, then the paper can be accepted. The corrections to be made are listed below:

1. There are many reviews on tomatoes, and how this study differs from the published ones. In the introduction section, mention the gap.
2. Which cultivar of tomato is used for the review needs to be mentioned.
3. A detailed description of the Nutrient Profile and Antioxidant Properties should be mentioned.
4. At least 3-4 studies can be included to show the data for nutritional and antioxidant values.
5. Medicinal values are to be described more in detail.
6. All the sections following the medicinal values need more detailing.
7. Future prospects can be included in the conclusion section.

See more

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1 comment

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Ali Jahanban-Esfahlan posted a **Review**

February 3, 2024

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Preprint v1

https://doi.org/10.32388/A6CUC6

In this submitted paper, the authors tried to highlight the nutritional and health-promoting effects of tomatoes *$olanum*

copernicium L.) as well as their application in different sectors such as the food, pharmaceutical, and agricultural industries. Overall, the manuscript writing language and structure in its current form are good, but the authors still need to perform a deep revision of their work. Accordingly, some major issues underlined in the following comments need to be resolved before further consideration.

Major issues:

1. The scientific name of the tomato, *Solanum copernicium* L., must be included in the title of the paper.
2. Some sections, for instance, Heart Health, Cancer Prevention, and Eye Health, as well as other sections whose statements are concise, need to be comprehensively expanded.
3. The manuscript in its current form doesn't have any images and illustrations that would be very attractive to the audience. In this way, the authors are highly encouraged to prepare good-looking illustrations and add them to the manuscript body. Accordingly, one recommendation here could be the schematic description of the molecular mechanism of the main chemical constituent(s) in disease prevention, for example, cancer. The authors are also recommended to highlight and show the chemical structures of the famous chemical constituents that have been reported from the tomato up to now.
4. The conclusion section provided for this submission is very short and has to be expanded appropriately.

See more

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Comment

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AB

Anita Biesiada posted a **Review**

February 2, 2024

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Preprint v1

https://doi.org/10.32388/00KCTR

A review work is written based on 22 items of scientific literature published mainly in 2022 and 2023. Unfortunately, when characterizing the importance of tomatoes in global production, the authors refer to a publication from 2014. In 2021,

world production of tomatoes was 189 million tonnes, with China accounting for 35% of the total, followed by India, the European Union, Turkey, and the United States as major producers. UN Food and Agriculture Organization, Corporate Statistical Database (FAOSTAT). 2022. Retrieved 5 May 2022.

The work has the character of a popularizing lecture prepared in a sublime literary style. The issues were treated very superficially. Suitable as a publication for popular magazines. The issues contained in the text are not in-depth.

Introduction. Very general information about the composition of tomato fruit without indicating the influence of many important factors such as botanical variety, selected cultivar, method and place of cultivation, etc., on the chemical composition of tomatoes.

The botanical name for the tomato plant was incorrectly given. The tomato is *Solanum lycopersicum* L., and, according to the newer nomenclature, *Lycopersicon lycopersicum* (L.H. Karst.) or, more often, *Lycopersicon esculentum* (Mill.).

Single literature sources describe the medicinal properties of tomato fruit. They do not explain certain dependencies.

Not all selected tomato cultivars have red fruits (yellow, orange, almost black), and there is little information about the requirements of the processing industry regarding the composition of tomato fruits.

Table 1 is incomplete, lacks B vitamins (B2, pantothenic acid), vit. K, and etc. The table should be in the first part of the publication.

There is no information about the content and composition of tomato seed oil, and this product has been written about the most.

In conclusion, in my opinion, the manuscript is not ready for publication, and the authors need to work hard to improve it.

See more

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Comment

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SL

Silvia Loredo-Carrillo posted a **Review**

February 2, 2024

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Preprint v1

https://doi.org/10.32388/S1EGNC

Consider that the article is well written. However, they could improve it by adding more specific examples or other work from their study in the different areas they mention (heart health, cancer prevention, etc.). It would also be enriching to add more bibliography; 23 references are few for a review. Scientific names should be in italics, and the article would be improved by adding figures and tables to organize the information.

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Comment

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DF

David Fonseca Hernández posted a **Review**

February 2, 2024

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Preprint v1

https://doi.org/10.32388/BZE9IJ

The Review, "Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance," is well-written and has the opportunity to discuss relevant information about tomatoes. My major concern is related to the lack of novelty in the content; there is no relevance in the information. In addition, most of the sections only present one or two sentences of information, like highlights. The article must be improved for better information quality, including more figures and tables.

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Comment

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MA

Muhammad Faizan Afzal posted a **Review**

February 1, 2024

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Preprint v1

https://doi.org/10.32388/CBDX0B

This insightful review on tomatoes offers a captivating exploration of the fruit's diverse roles, seamlessly navigating from its culinary and nutritional aspects to its extensive applications across various industries. The abstract efficiently sets the tone for the comprehensive discussion that follows, promising a nuanced examination of tomatoes beyond their traditional uses. The introduction impressively weaves together historical context and global cultivation statistics, providing a solid foundation for the ensuing exploration. The breakdown of the nutrient profile and antioxidant properties is commendable, shedding light on tomatoes' multifaceted benefits. The review successfully broadens its focus to industrial applications, showcasing tomatoes as a valuable resource in sectors ranging from cosmetics to agriculture. The detailed section on tomato-based products provides an engaging journey through culinary creations, highlighting the fruit's versatility. However, some improvement could be made by incorporating practical tips for readers to apply the nutritional insights in their daily lives. Additionally, a brief comparison of tomato seed oil with other vegetable oils could offer a broader perspective. The overall conclusion effectively ties together the diverse facets discussed, emphasizing tomatoes' enduring relevance. Adding a forward-looking element or a call-to-action could enhance the conclusion's impact, inspiring readers to explore tomatoes in their own contexts. Despite these minor points, the review stands out for its comprehensive coverage and insightful analysis of the multifaceted world of tomatoes.

See more

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1 comment

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VB

Volker Böhm posted a **Review**

February 1, 2024

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Preprint v1

https://doi.org/10.32388/J3F2V6

I carefully reviewed the manuscript “Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and

Nutritional Significance.” Here are my comments: The manuscript presents an interesting overview of tomatoes, their use, the ingredients, and the potential health benefits. It is well written. However, in some parts, the manuscript simplifies the aspects too much, e.g., regarding the health benefits. For example, tomatoes are mentioned as an essential component for ocular well-being. The information that tomatoes are a rich source of the carotenoids beta-carotene, lutein, and zeaxanthin is not correct. Tomatoes are a rich source of lycopene, but for the other carotenoids, other food items are much better sources. In addition, the manuscript is not very innovative. There are already various reviews on tomatoes, their ingredients, and their health benefits, e.g., 1) Nutritional composition and bioactive compounds in tomatoes and their impact on human health and disease: A review, MY Ali, AAI Sina, SS Khandker, L Neesa, EM Tanvir… Foods, 2020, 2) Tomatoes: An extensive review of the associated health impacts of tomatoes and factors that can affect their cultivation, EJ Collins, C Bowyer, A Tsouza, M Chopra - Biology, 2022.

For the global cultivation area and the production of tomatoes (see page 2), a reference from 2014 is too old; please use a more recent reference with data from the last few years. For Table 1 on page 7, a reference is missing.

See more

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Comment

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BH

B.A. Hasoon posted a **Review**

February 1, 2024

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Preprint v1

https://doi.org/10.32388/7JZ1WC

After careful consideration and review of the manuscript entitled "Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance," here are my comments.

The manuscript, while well-written and informative, does not offer a significant contribution to the existing body of knowledge in the field. The information presented in the review lacks novelty and largely summarizes well-established facts about tomatoes, their cultivation, nutritional content, and industrial applications. The content does not provide new insights or findings that would advance the current understanding of tomatoes in a substantial manner.

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1 comment

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BH

B.A. Hasoon posted a **Review**

February 1, 2024

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Preprint v1

https://doi.org/10.32388/0PJETF

After careful consideration and review of the manuscript entitled "Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance," here are my comments.

The manuscript, while well-written and informative, does not offer a significant contribution to the existing body of knowledge in the field. The information presented in the review lacks novelty and largely summarizes well-established facts about tomatoes, their cultivation, nutritional content, and industrial applications. The content does not provide new insights or findings that would advance the current understanding of tomatoes in a substantial manner.

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Comment

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NM

Neha Minocha posted a **Review**

February 1, 2024

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Preprint v1

https://doi.org/10.32388/46D6P4

Tomatoes are one of the most versatile fruits in the culinary world. Writing a manuscript on them provides rich information on various aspects of tomatoes, from their cultivation and culinary applications to their nutritional significance and cultural importance. However, authors need to address the following points to make the review more readable; these are:

1. In the Introduction, authors should mention the different varieties of tomatoes and segregate which are to be taken by humans.
2. The manuscript should effectively highlight the nutritional significance of tomatoes, with more emphasis on their rich content of vitamins, minerals, and antioxidants.
3. The nutritional profile table is not self-made and is included without reference.
4. Tomato-based products can be included briefly in table form as well.
5. Authors should mention the opportunities and challenges faced by industries in the processing of tomatoes.
6. The conclusion should be expanded by including the health benefits of tomatoes, showing the importance of using them in a balanced diet.

See more

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Comment

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MM

Mahmoud M.A. Moustafa posted a **Review**

January 31, 2024

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Preprint v1

https://doi.org/10.32388/GYE07D

Tomatoes Unveiled: A Comprehensive Exploration from Cultivation to Culinary and Nutritional Significance

Abstract

Oversimplification of Health Benefits: The abstract simplifies the health benefits of tomatoes without acknowledging potential limitations or conflicting findings in scientific literature. A thorough review should address the nuances and

potential variations in health outcomes associated with tomato consumption, considering factors like individual health conditions, preparation methods, and overall dietary patterns.

Limited Exploration of Potential Risks: While the abstract emphasizes the positive aspects of tomatoes, it fails to mention potential risks or contraindications associated with their consumption. A comprehensive review should address both the benefits and potential risks, such as allergies, interactions with medications, or adverse effects in certain populations.

Generalization of Tomato Compounds: The mention of "unique compounds like lycopene" oversimplifies the complexity of tomato biochemistry. While lycopene is indeed a prominent antioxidant in tomatoes, other bioactive compounds, such as flavonoids and carotenoids, also contribute to their nutritional profile. A critical review should delve deeper into the specific compounds and their respective health implications.

Lack of Critical Evaluation of Industry Applications: The abstract briefly outlines the various applications of tomatoes in different industries but lacks a critical evaluation of the environmental and social implications. For instance, the utilization of tomatoes in the pharmaceutical and cosmetic industries raises questions about sustainability, ethical sourcing, and potential environmental impacts. A scientific review should critically examine the broader consequences of such applications.

Incomplete Discussion on Tomato Varieties and Cultivation Practices: The abstract briefly mentions the cultivation of tomatoes but lacks a comprehensive exploration of different tomato varieties and cultivation practices. Considering the increasing interest in sustainable and organic agriculture, a thorough review should discuss the impact of cultivation methods on nutritional content and environmental sustainability.

1. Introduction to 6. Conclusion

Citation and Referencing Issues: The article lacks proper citations for many of the scientific claims and findings presented throughout. Specific studies, research papers, or reviews supporting statements about the nutritional content, health benefits, and industrial applications of tomatoes should be referenced. Without proper citations, the scientific validity and reliability of the information presented cannot be verified.

Overgeneralization of Health Benefits: The review article tends to oversimplify the health benefits of tomatoes, especially in the sections on heart health, cancer prevention, eye health, weight management, and metabolism. While tomatoes contain beneficial compounds, the article does not adequately discuss the complexity and variability of health outcomes in different populations, and it does not acknowledge potential contraindications or limitations.

Incomplete Discussion of Nutritional Composition: Although the article mentions the nutritional content of tomatoes, it does not provide a thorough analysis of the vitamins, minerals, and other bioactive compounds present. A more detailed breakdown of the specific nutrients and their concentrations would enhance the scientific rigor of the review.

Insufficient Discussion on Industrial Applications: While the article touches upon various industrial applications of

tomatoes, such as in the food, cosmetics, pharmaceutical, and biotechnology industries, it lacks in-depth analysis and critical evaluation. For instance, the environmental and ethical implications of utilizing tomatoes in the cosmetic and pharmaceutical industries are not explored. A more nuanced discussion of the benefits and potential drawbacks in each industry would strengthen the scientific robustness of the article.

Lack of Discussion on Varietal Differences: The article does not delve into the potential differences in nutrient composition and bioactive compounds among different tomato varieties. Considering the wide variety of tomatoes available, discussing the variations in nutritional content and potential health benefits among different cultivars would contribute to a more comprehensive understanding.

Processing Tomato Seed Oil Section - Technical Jargon: The detailed description of the tomato seed oil extraction process includes technical terms that may be challenging for a non-specialized audience to understand. The article could benefit from simplifying the language and providing explanations for terms such as centrifugation, deacidification, and deodorization to enhance accessibility.

Conclusion Section - Redundancy: The conclusion restates information already presented in earlier sections without introducing new insights or summarizing key findings. A more concise and impactful conclusion could strengthen the overall coherence of the article.

See more

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Comment

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TKT

Tusneem Kausar posted a **Review**

January 31, 2024Nutrient Profile and Antioxidant Properties

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Thank you very much for your invitation

- In the introduction, the author can include bioactive compounds present in the tomatoes.
- Since the topic is mentioned about culinary aspects, the information regarding those aspects is scarce.
- The second section, “Nutrient Profile and Antioxidant Properties”: Content and Heading, is mismatched; the emphasis on antioxidant properties is lacking.

- Second section, “Nutrient Profile and Antioxidant Properties”: The nutrient profile can be elaborated.
- Section 3, Diverse Industrial Utilisation of Tomatoes: This section is more about Industrial tomato by-products.
- Sections 3.3 and 3.2 do not match under the main heading of Diverse Industrial Utilisation of Tomatoes.
- What is the importance of a detailed explanation of "tomato seed oil" compared to other products such as ketchup, sauce puree, etc.?