

“Hemp; It’s role in food Industry”

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Abstract:

Hemp products are recognised as food by FSSAI. The hemp industry's economic opportunities have been expanded by the recent FSSAI notification to sell and utilise hemp products as food components. Let's talk about what hemp is and how the new FSSAI guidelines will affect it. How is cooking with hemp done? Hemp seed oil that has been cold-pressed has a subtle, nutty flavour that is excellent in salad dressings and for spreading over roasted vegetables. It can also be used for cooking, although because it has such a low smoke point, rapid sautés and stir-fries are more suited to it than deep frying. National law permits the use of medical cannabis with a license, and CBD oil produced in accordance with the Drugs and Cosmetics Act may be obtained and used legally. According to Drugs and Cosmetics

Key words:Hemp, Food Industry, Positive health, Legal concerns

Introduction

Cannabis sativa, also referred to as industrial hemp, is a member of the Cannabaceae family of plants that is farmed for either its bast fibre or edible seeds. Some people mistake cannabis plants, which are used to produce hashish and marijuana, for hemp. Although all three products (hemp, marijuana, and hashish) contain trace levels of tetrahydrocannabinol (THC), a compound that causes psychoactive effects in humans, hemp has significantly less THC than either marijuana or hashish.

Hemp, often known as industrial hemp, is a kind of cannabis plant developed exclusively for industrial purposes. Hemp has been utilised for many purposes for thousands of years, including the production of textiles, paper, and building materials. Hemp has gained popularity as a food source in recent years due to its nutritive benefits and adaptability.

In the food sector, for instance, hemp seed is a popular ingredient due to its strong protein content, good fats and essential nutrients. They're often used for the production of hemp milk, protein powder and oil. You can also make a top for salad, smoothie bowl or any kind of food by using cannabis seed.

The hemp oil derived from the seed contains an abundance of both Omega 3 and Omega 6 fatty acids that are commonly used as cooking oils or salad dressing. The use of the ingredient in bread, snack and other foodstuffs may also be possible.

Besides, the hemp plant is also a source of CBD, an unpsychoactive compound which has been shown to be beneficial for health. You can extract CBD from the hemp plant and use it in a variety of products, such as food or beverages.

Inflorescence and hempseeds are widely used as food and supplement sources across the world. The inflorescence of hemp is abundant in biologically active, non-psychoactive cannabinoids like cannabidiol (CBD), which has strong anticonvulsant, spasmolytic, and anxiolytic properties. Hempseed has a pleasant nutty taste and represents a valuable source of essential fatty acids, minerals, vitamins, and fibers, as well as of essential amino acids contained in the highly digestible proteins edestin and albumin. Hempseed oil is composed for its greater part (>90%) of polyunsaturated fatty acids known for their beneficial effects against cardiovascular diseases, cancer, and inflammatory conditions.

It is possible to eat hemp sprouts. Hemp sprouts are distinguished from hempseeds by their increased level of total polyphenols, flavonoids, and flavonols, which are recognised for their beneficial effects on the cardiovascular and metabolic systems. Thanks to its nutritional properties and adaptability into the kitchen, hemp has grown in popularity within the food industry. A number of foods like granolas, protein bars or smoothies are frequently made with hemp seeds in particular. Hemp seeds can be produced in a variety of ways, including raw, sprouted, processed into hemp meal, or dried sprout powder. In addition, hemp seeds can be mashed into a slurry and added to foods like tisanes and hemp milk, as well as to baked items. Hemp oil is produced by cold pressing the seed and contains a lot of unsaturated fatty acids. When not kept in a dark, airtight container and kept chilled, hemp oil quickly oxidises and goes rancid; improper storage shortens its shelf life. Hemp oil can be destroyed by both heat and light.

In addition, the hemp seed contains no gluten so that it is a safe option for those with celiac disease or Gluten intolerance. Another product that is made from hemp and used in the food industry is hemp oil. It is rich in healthy fats, including omega-3 and omega-6 fatty acids, and has a nutty flavor that can add depth to salad dressings, sauces, and dips.

Objectives

1. To study the forms of hemp fit for consumption.
2. To identify various food products made using hemp.
3. To explore the benefits of hemp on human health.
4. To check awareness of hemp among consumers
5. To check the legal concerns related to use of hemp in food

Research Methodology

Participants:

Professionals in the food sector, hotel management students and ordinary citizens are invited to take part in this survey. The participants will be invited to participate by means of the google forms.

Survey design:

The survey, which will be conducted with a view to gathering information on the existing and possible future use of hemp in food production, shall consist of multiple choice and open ended questions. The questions to be asked in the survey are as follows:

Survey administration:

Through a survey platform like Google Forms, the surveys will be carried out on the internet. Participants will receive a link to the survey via email or social media which they must fill out in order to take part.

LITERATURE REVIEW

1. An analysis of hemp as a food and dietary supplement. Online since: February 12, 2021

By Alfonso Gallo, Biancamaria Pierri, Andrea Fulgione, Ernette Ottoni, Carlo Buonerba, Giuseppe Cannazza, and Pellegrino Cerino, <https://doi.org/10.1089/can.2020.0001>.

The name "hemp" refers to *Cannabis sativa* cultivars produced for industrial use that have lower concentrations of tetrahydrocannabinol (THC), the psychoactive ingredient in cannabis that gives it its psychoactive effects. Given that it can be used to make food, textiles, clothes, biodegradable plastics, paper, paint, lighting oil, animal feed, and other products, hemp is a remarkable crop with immense social and economic significance. Hempseed has a pleasant nutty flavour and is a valuable source of vital amino acids and fatty acids, minerals, vitamins, and fibres. Various components of the hemp plant are valuable sources of food and ingredients for nutritional supplements. Additionally, hemp sprouts are a good source of antioxidants and hempseed oil is a good supply of beneficial polyunsaturated fatty acids. The objective of this review article is to offer a thorough overview from a multidisciplinary viewpoint on the scientific data proving the health benefits of consuming hemp as a food or supplement.

2. **An overview on the use of hemp (*Cannabis sativa* L.) in animal nutrition.** By Željka Klir, Vladimira Preloga, Josip Novoselec, Zvonko Antunović *Agriculture*, Vol. 25 No. 2, 2019 <https://doi.org/10.18047/poljo.25.2.8>

The purpose of the paper was to investigate if hemp (*Cannabis sativa* L.) could be used in animal nutrition. Hemp seeds, hempseed cake, and hemp oil can all be added to feed combinations for animals as supplements. Hemp seeds contain a sufficient amount of linoleic (LA, C18:2 n-6) and linolenic (ALA, C18:3 n-3) acid and are high in crude protein and crude fat. When hemp oil was included in dairy goats' meals, milk fat increased along with the amounts of conjugated fatty acids (CLA) and polyunsaturated fatty acids (PUFA).

3. Challenges towards Revitalizing Hemp: A Multifaceted Crop. By Ling Yuan Trends in Plant Science Volume 22, Issue 11, Published on - November 2017 doi:10.1016/j.tplants.2017.08.004 Craig Schluttenhofer

Throughout human history, hemp has been a significant crop for food, fibre, and medicine. The fundamental biology of hemp plants is still poorly known, despite major advancements achieved by the global research community. To direct future research, certain objectives are required. Hemp is a semi-domesticated plant with several desirable characteristics that can be improved, such as reducing seed cracking, boosting stem fibre production and quality, and raising phytocannabinoids accumulation.

4. Industrial Hemp: Renewed Opportunities for an Ancient Crop. By John Fike Published online: 04 Jan 2017 <https://doi.org/10.1080/07352689.2016.1257842>

Given its wide adaption and variety of uses, hemp (*Cannabis sativa* L.) has been a species of importance to humans for a large portion of our history. Thought to have originated in Eurasia, the plant has spread to much of the rest of the world, primarily for use as a crop for producing fibre. The awareness that the crop offers expanding and diversified uses for not only its fibres but also for its seed grain and essential oils has enhanced the opportunities for hemp. Numerous studies have found that hemp grains make nutritive feed and food additives, and that its essential oils have a variety of pharmacologically advantageous qualities. Building markets for these goods will be a crucial (and probably slow) aspect of hemp's evolution into a productive agronomic species for US growers, despite its abundance of potential advantages and uses.

5. The relationship between cannabis/hemp use in foods and processing methodology

By Jerry W King Published on - August 2019 <https://doi.org/10.1016/j.cofs.2019.04.007> According to the literature, cannabis and hemp extracts can be used to create a variety of commercial food products using both raw or winterized "oils," distillates, and isolates. These food-related end products are produced using techniques like extraction, phase separation, and vacuum distillation. Using cannabis distillate and extracts infused into a food matrix, this method can also be utilised to formulate a variety of food products. It should be noted that the cannabinoids that were infused undergo heat-induced conversion to other cannabinoids over time. Numerous instances of foods that contain defined cannabis/hemp extracts and distillates are given, and one is supplied as an illustration of how to properly analyse a product that contains cannabinoids and label it accordingly.

6. The Sustainability of Industrial Hemp: A Literature Review of Its Economic, Environmental, and Social Sustainability By Gurinder Kaur and Roland Kander Published on – 11th April 2023 <https://doi.org/10.3390/su15086457>

Industrial hemp is an adaptable, sustainable plant with several uses, including the production of fibre from hemp stalks, food from hemp seeds, and oil from hemp flowers and seeds. Since industrial hemp is a practical energy source that satisfies the three pillars of sustainability—economy, environment, and society—it has the potential to provide a solution to the climate change dilemma. Despite the fact that industrial hemp has long been grown as an agricultural

product in several parts of the world, it was illegal to produce it in the United States due to its link to marijuana. We did a literature analysis to investigate some of the factors that may have contributed to the considerable growth in industrial hemp cultivation in the United States after the ban was implemented. The research's conclusions showed that hemp's swiftly rising popularity in the U.S. since 2018 can be partly due to its sustainability potential, which is defined as the possibility of having a beneficial impact on a product's ability to be produced using renewable raw materials. The knowledge gap regarding hemp's potential as a sustainable crop is filled by this study.

7. A Systematic analysis of the current global industry to determine limitations and identify future potentials within the concept of sustainability. By Erin Michelle Young Published on – December 2005 http://www.vouranis.net/uploads/6/2/8/5/6285823/hemp__sustainability.pdf

Cannabis sativa L., also known as industrial hemp, is an annual herb that grows quickly and has a wide variety of known uses for goods made from fibre or oilseed. Early in the 20th century, when hemp became inextricably identified with marijuana, the species' second genotype that contains higher levels of the hallucinogenic substance THC, cultivation in industrialised nations essentially came to an end. Due to environmental concerns, the overproduction of food crops, and the need for new fibre sources, there has recently been a resurgence of interest in hemp for industrial use. The purpose of this study is to provide a thorough framework for assessing the hemp industry's impact on sustainable agriculture.

8. Analysis of “Marijuana Edibles” – Food Products Containing Marijuana or Marijuana Extracts By Robert F.X. Klein https://www.dea.gov/sites/default/files/pr/microgram-journals/2017/mj14-1_9-32.pdf

"Hemp food edibles," or foods containing the seeds, oil (from pressing the seeds), and/or flour (from grinding the seeds), obtained from "industrial hemp" (henceforth hemp), a cultivar of *Cannabis sativa* L. that (typically) contains only trace to very low amounts of THC and THCA, are a tangential but important subset of marijuana edibles. Hemp is currently a "niche" crop farmed mainly in China, North Korea, Canada, a small number of European Union (EU) countries, and in smaller quantities elsewhere, including the United States. Health advantages of hemp seeds, oil, and flour are frequently exaggerated, especially those of the oil, which is a valuable source of omega-3 fatty acids. Edible hemp products (as well as countless other Consumer goods made from hemp started to become more prevalent in the early to mid-1990s as hemp cultivation was made legal, encouraged, and/or expanded, particularly in Canada and the EU. At first, these products were popular not for their potential nutritional value or health benefits, but rather for their novelty or shock factor (which has since faded, for obvious reasons).

9. A call for weed research in industrial hemp (*Cannabis sativa* L) By L N Sandler, K A Gibson Published on - 07 May 2019 <https://doi.org/10.1111/wre.12368> Globally, there are more than 30 countries where industrial hemp (*Cannabis sativa* L.) is farmed for its fibre, seeds, and flowers. For years, hemp has been touted as a crop that competes well with weeds and needs little maintenance to maintain productivity. We studied the literature and discovered that there isn't much peer-reviewed evidence to back up this assertion. Only three articles that dealt explicitly with weed control in fields were found, and none of them mentioned weed-related

losses in hemp yield. In order to address potential yield losses under diverse production settings and provide a research-based framework for weed control in industrial hemp, these data clearly demonstrate the necessity for research-based information on interactions between weeds and hemp.

10. Hemp (*Cannabis sativa* subsp. *sativa*) Chemical Composition and the Application of Hempseeds in Food Formulations By Jiaxin Xu, Miao Bai, Hong Song, Lina Yang, Danshi Zhu & He Liu Published on – 16th September 2022 <https://doi.org/10.1007/s11130-022-01013-x>

Since ancient times, hemp has been grown for its nutritional and therapeutic benefits. The objective of this review is to map the scientific literature on the primary functional elements and chemical make-up of the hemp plant. Everyone agrees that every part of the hemp plant contains a valuable resource, but the edible fruits and hempseeds are by far the most important component. Hempseeds have a high nutritional value and are a good source of easily digestible proteins, lipids, polyunsaturated fatty acids, and insoluble fibre. Additionally, the positive outcomes have stoked researchers' interest in diets containing hempseeds. Hempseed was created as an essential component but is now used as a significant supplement in many goods, including baked goods, beverages, snacks, and food items. Overall, the goal of this analysis is to encourage more research into legal hemp plants and broaden the use of hempseeds in the realm of functional foods.

11. Hemp Growth Factors and Extraction Methods Effect on Antimicrobial Activity of Hemp Seed Oil: A Systematic Review By Klaudia Ostapczuk, Samuel Obeng Apori, Giovanni Estrada and Furong Tian Published on - 12th October 2021 <https://doi.org/10.3390/separations8100183>

The bioactive Hemp Seed Oil (HSO), which has antibacterial effects against a number of ailments brought on by bacteria and fungi, is growing in popularity in the medical and research domains. However, not enough study has been done on the impact of hemp-growing variables and extraction techniques on the bioactivity of HSO. The purpose of this review is to ascertain how growth factors and extraction techniques affect HSO's antibacterial activity. Google Scholar and the Scopus database were searched for articles, which were then checked against inclusion and exclusion criteria. According to the study, HSO loves warm climates with favourable humidity levels between 20 and 39 °C and 79 and 100% annually, respectively, as well as daily rainfall of 324 mm.

12. CANNABIS SATIVA: Industrial hemp (fiber type) - An Ayurvedic Traditional Herbal Medicine By Ravindra B. Malabadi, Kiran P. Kolkar, Raju K. Chalannavar Published on – 28th February 2023 https://www.researchgate.net/profile/Ravindra-Malabadi/publication/369142499_Cannabis_sativa_Industrial_hemp_fiber_type_-_An_Ayurvedic_Traditional_Herbal_Medicine/links/640b69a3a1b72772e4eb09bb/Cannabis-sativa-Industrial-hemp-fiber-type-An-Ayurvedic-Traditional-Herbal-Medicine.pdf

This review paper emphasizes the therapeutic value of hemp and hemp-based products, such as hemp seeds, hemp oil, and hemp used in food items. According to the literature evaluation, there is substantial scientific evidence in favor of Cannabis saliva's use as a traditional phytomedicine by Indian folk medicine practitioners. The medical efficacy of Cannabis plants was well known more than 3,000 years ago, according to Ayurveda in India. The Atharvaveda might contain the oldest known textual mention to marijuana in India. The home of pharmacy and Ayurvedic medicine is India. In Ayurveda, hemp was mentioned as one of the medicinal plants used to treat numerous ailments.

13. Uncovering the secrets of industrial hemp in food and nutrition: The trends, challenges, and new-age perspectives By Simon Okomo Aloo, Godfrey Mwiti, Louise, Wanjiku Ngugi & Deog-Hwan Oh Published on – 29th November 2022 <https://doi.org/10.1080/10408398.2022.2149468>

Hemp is a significant crop with numerous uses, including those in food, textiles, and even medicine. Hemp uses as food and as component in cuisine has dramatically expanded in recent years. The rise is fueled by hemp's multiple health advantages and the variety of uses it has in the food business. The scientific literature on the advantages of industrial hemp in the food business is presented in this review. Health benefits, contemporary food industry applications, numerous development challenges, and the forecast for the worldwide market for hemp-based food products have all been examined. There is evidence to support the claim that hemp is a common food ingredient today. Foods made from hemp are touted as having a variety of health advantages, although public acceptance and commercial success might vary.

14. The Seed of Industrial Hemp (*Cannabis sativa* L.): Nutritional Quality and Potential Functionality for Human Health and Nutrition. By Barbara Farinon, Romina Molinari, Lara Costantini & Nicolo Merindono Published on – 29th June 2020 <https://doi.org/10.3390/nu12071935>

The edible fruits of the *Cannabis sativa* L. plant known as hempseeds were at first thought of as a by-product of the hemp technical fiber business. A increasing interest in the production of hempseeds has emerged in recent years as a result of the reinstatement of the cultivation of *Cannabis sativa* L. plants with a delta-9-tetrahydrocannabinol (THC) content of less than 0.3% or 0.2% (industrial hemp). This is due to the excellent nutritional value and practical qualities of hempseeds. This review's objective is to investigate the scientific literature on the dietary benefits and practical uses of hempseeds. In addition, we updated the research on the possible use of hempseeds and their derivatives as dietary supplements for the prevention and treatment of inflammatory and chronic degenerative illnesses in both animal models and people. The use of hempseeds by the food industry as a supplement to livestock feed and as an ingredient to enhance or fortify daily foods has also been amended in the last section of the evaluation. Overall, the goal of this review is to stimulate further thorough research into the use of hempseeds in the realm of functional foods.

15. Cannabidiol and terpenes from hemp – ingredients for future foods and processing technologies By Chang Chen & Zhongli Pan Published on – December 2021 <https://doi.org/10.1016/j.jfutfo.2022.01.001>

Worldwide, hemp (*Cannabis Sativa* L.) is a widely cultivated plant. The medical benefits and pharmacological qualities of hemp's cannabidiol (CBD) and terpene species, such as their anti-anxiety, pain-relieving, relaxation-promoting, anti-inflammation, and antibacterial activity, have sparked an increase in study interest in recent years. However, because to different legal restrictions, customer preferences, and technological hurdles, research on and usage of hemp CBD and terpenes in food systems are seldom ever documented. Additionally, the methods of processing hemp for a consistent synthesis of high-quality, food-safe CBD and terpene for food purposes—such as drying, extraction, and purification—have not been thoroughly explored and reviewed. The results of this review may stimulate additional food-related research on hemp processing and the use of CBD and terpenes in meals. Additionally, it can assist the hemp sector in increasing the value of hemp as a bioresource and food producers in planning their usage of hemp CBD and terpenes as future functional food additives.

16. How safe are hemp-based food products? A review and risk assessment of analytical data from Germany By Fabian Pitter Steinmetz, Gerhard Nahler, James Christopher Wakefield Published on – 28th February 2023 <https://www.emerald.com/insight/content/doi/10.1108/NFS-04-2022-0129/full/html>

In recent years, hemp-based food items and supplements have become more well-liked in Europe. These products may also include the psychoactive cannabinoid tetrahydrocannabinol (THC), which raises questions about safety and regulatory compliance in addition to the non-

psychoactive cannabinoid cannabidiol. The officially allowed threshold for THC in hemp in the European Union is 0.3%. This study intends to explore the current safety limit and any potential risks using the analytical data that is now available in light of the numerous hemp-based products that have been pulled from the German market in recent months or years.

17. Industrial Hemp (*Cannabis sativa* subsp. *sativa*) as an Emerging Source for Value-Added Functional Food Ingredients and Nutraceuticals By H. P. Vasantha Rupasinghe, Amy Davis, Shanthanu K. Kumar, Beth Murray & Valtcho D. Zheljazkov Published on – 7th September 2020 <https://doi.org/10.3390/molecules25184078>

Cannabis sativa L., sometimes known as industrial hemp, is a long-cultivated plant that originated in Central Asia. It has historically been prized for its fiber, food, and medical properties. Its manufacturing and varied usage were documented by a number of eastern and Asian cultures. Since the production of industrial hemp (fiber and grain) was outlawed in most nations due to its resemblance to the narcotic/medical variety of *Cannabis*, centuries of knowledge and genetic resources were lost. With regard to its use as value-added functional food ingredients/nutraceuticals and health benefits, this review aims to compile recent advances in the science of industrial hemp. It also identifies knowledge gaps and potential directions for future research on this highly valuable, multipurpose plant for the global market.

18. Hempseed in food industry: Nutritional value, health benefits, and industrial applications By William Leonard, Pangzhen Zhang, Danyang Ying, Zhongxiang Fang Published on – 19th December 2019 <https://doi.org/10.1111/1541-4337.12517>

Since prehistoric times, Asian societies have ingested hemp (*Cannabis sativa* L.) seeds. Hempseed's nutritional benefits and potential for use in medicine have recently led to the legalization of its production and consumption in Australia, Canada, and the United States at low (0.3%) tetrahydrocannabinol levels. This study seeks to provide an overview of the *in vitro* and *in vivo* studies that have been conducted to determine the chemical make-up, nutritional content, and potential health advantages of hempseed. Due to hempseed's poor performance on a few functional features, its use in the food sector is restricted. To address this, the most recent processing techniques created to enhance these properties were contrasted. Additionally, elaborated production techniques for adding hemp seeds to current food products are presented. This evaluation would encourage more in-depth study of the recently authorized food resources and maximize its application in the creation of new food products.

19. Hemp as an Agricultural Commodity By Renée Johnson Published on - 22nd June 2018
<https://sgp.fas.org/crs/misc/RL32725.pdf>

An agricultural product known as industrial hemp is grown for use in the manufacture of a variety of goods, including food and drink, cosmetics and personal care items, dietary supplements, clothing and textiles, yarn and spun fibers, paper, building and insulation materials and other manufactured goods. Growing hemp can produce fiber, seeds, or other crops with several uses. But hemp also comes from the same family of plants as marijuana—*Cannabis*

sativa. As a result of hemp's connection to marijuana, American production is constrained, and the American market is heavily dependent on imports of both finished hemp-containing goods and raw materials for further processing (mostly from Canada and China). U.S. hemp product sales, according to recent industry estimates, reached nearly \$700 million annually.

In the 2014 agriculture bill (Agricultural Act of 2014 (P.L. 113-79, 7606)), Congress made significant adjustments to federal hemp policy. According to a pilot agricultural Programme established by the 2014 farm law, certain research institutions and state agriculture agencies may cultivate hemp. A statutory definition of industrial hemp was also established by the bill, which states that it is "the plant *Cannabis sativa* L. and any part of such plant, whether growing or not, with a delta-9 tetrahydrocannabinol concentration of not more than 0.3 percent on a dry weight basis." *Cannabis sativa*'s main psychotropic component is delta-9 tetrahydrocannabinol. Congress has prohibited the U.S. Drug Enforcement Administration (DEA) and federal law enforcement agencies from interfering with state agencies, hemp growers, and agricultural research in future omnibus funding bills. The U.S. Department of Agriculture (USDA) is unable to forbid the transportation, processing, sale, or use of industrial hemp that is grown or cultivated in line with the 2014 farm bill provision due to appropriators' opposition.

Data Analysis and Data Interpretation

1. Have you ever consumed food products from hemp?

Observation: As per my survey 60.8% people have consumed Hemp based food products and 39.2% have not consumed Hemp based food products

Interpretation: As per my survey most of the people have consumed hemp-based food products, while others have not.

2. If yes, what type of hemp food products have you consumed

Observation: 17.6% people have consumed hemp oil, 9.8% people have consumed Hemp based protein powder & 7.8% have consumed hemp seed milk. On the other side, 64.7% people have not consumed hemp-based products.

Interpretation: Most of the people have not consumed hemp-based food products while few have.

3. How often do you consume hemp food products?

Observation: Almost, 50% of the people don't consume Hemp product. 32.6% people consume hemp-based food products once a month, 10.9 % consume on daily basis while 6.5% consume once a week.

Interpretation: 50% of the people don't consume hemp-based food products while the other 50% does consume.

4. What is the reason for consuming Hemp food products?

Observation: 62.5% people want to consume hemp products out of curiosity while 20.8% want to consume it for the nutritional benefits it provides. 12.5% want to consume for its health benefits. 4.2% people want to consume for the taste and flavour.

Interpretation: Maximum number of people consume hemp due to curiosity. Other consume it for its taste & flavour, health benefits & nutritional benefits.

5. Are you aware of the difference between Hemp and Marijuana?

Observation – As per my survey, 62.7% people know the difference between hemp and marijuana while 37.3% are unaware about the difference

Interpretation – Most of the people are aware about the difference between hemp and Marijuana while few are unaware.

6. Have you noticed any positive effects on your health or wellbeing after consuming Hemp based products

Observation: 56.3 % did not notice any change after consuming hemp-based products. 14.6% noticed improved digestion, 12.5% experienced improvement in sleep, 10.4% experienced increased energy. 6.2% of the people experienced reduced inflammation

Interpretation – Most of the people did not observe any change while others experience positive effects on their health.

7. Did you experience any negative effects of hemp products on your health?

Observation – 66.7% people who consumed hemp food products experienced no negative changes on their health. 22.9% people had an upset stomach. Some of the people experienced vomiting as well as an allergic reaction

Interpretation – Most of the people did not experience any change on their health. Some of the people had negative effects on their health after consumption of hemp products.

8. Do you know the legal status of Hemp in India?

Observation – 51.9% of the people who took the survey are aware of the legal status of Hemp in India. 48.1% people are not aware of the legal status.

Interpretation – Maximum number of people who took the survey are aware that hemp-based food products are legal to consume in India.

9. Do you believe Hemp should be legal to use in food products?

Observation –64% people believe that hemp products should be legal to use while 36% believe these products should not be legal

Interpretation – Many people believe and accept that hemp should be legal while some don't.

10. Do you believe that using hemp in food products possesses any legal risk?

Observation – As per my survey, 58.8% people believe that consumption of hemp products does not have any legal risk. 41.2% believe that consumption of hemp has legal risks

Interpretation – Most the people accept that consumption of hemp does not have any legal risks while other think that it has legal risks

11. Do you think Hemp has the potential to become a major ingredient in the food industry

Observation – 56% of the people who took the survey think that hemp has the potential to be a major ingredient in the food industry. 44% people think that hemp will not become a major ingredient

Interpretation – Maximum number of people believe hemp will become a major ingredient while others don't.

12. In your opinion, what are the most promising applications for Hemp in the food industry?

Observation – As per my survey, 34% people think that hemp will be a promising application in baked goods and desserts, 32 % people believe nutritional supplements are useful for hemp. 20 % people think hemp is suitable for snacks and bars while 14% people think hemp should be used in beverages.

Interpretation – Maximum number of people think hemp is most suitable application for baked goods and desserts and Nutritional supplements while some think it is suitable for beverages and snacks and bars.

13. Are you aware that the Hemp products should have less than 0.3 THC for them to be legal?

Observation – 52.9% people who answered the survey know that 0.3% is the legal amount of THC in a hemp product while 47.1% are unaware about it.

Interpretation –

Most of the people are aware about the legal amount of Tetrahydrocannabinol (THC) in hemp while some are unaware.

Suggestions/ Recommendations:

While conducting the research, the researcher felt that there are some areas where further research can be carried out in future.

These areas are as follows;

1. There is wide scope of research in developing awareness about hemp-based food products in future.
2. People should be made aware of health benefits of about hemp products
3. People should know the pros and cons about hemp.
4. Hemp based food should be promoted.
5. People should get more knowledge about use of hemp in food and food products

Conclusion

Hemp can be used as a food ingredient in various forms, including hemp seeds, oil, and protein powder. It is a good source of protein, fiber, and essential fatty acids, making it a nutritious addition to a balanced diet. Hemp seeds and oil have a nutty flavor and can be used in salad dressings, dips, and smoothies. Hemp protein powder can be added to shakes and baked goods.

Due to its high source of protein, fiber and essential fatty acid, hemp can be a useful and nutritional addition to an adequate diet. In a variety of recipes, you can use hemp seeds, oil or protein powder to make different foods such as dressing and dip.

Nonetheless, in view of the fact that some countries have restrictions on its use, it is vital to be aware of their Local Regulations concerning the use of hemp in foodstuffs. Additionally, some individuals may have allergies or sensitivities to hemp, so it's important to speak with a healthcare provider before consuming hemp-based food products.

Hemp, which offers a good source of proteins, fibers and essential fatty acids, can be valuable in the diet for improving health and balance. A range of recipes can use hemp seed, olive oil or protein powder including salads, dips, smoothies, shake and baked goods.

Since hemp is a good source of proteins, fiber and essential fats, it may be an important component for the food industry. A wide variety of recipes can be used, such as snacks, baked foods and more, with hemp seeds, oil or protein powder.

However, it's important to note that the use of hemp in food products may be restricted in some countries, so it's important to check local regulations before consuming or selling hemp-based food products. It's also worth noting that hemp is related to marijuana, and while it does not have psychoactive properties, it may contain trace amounts of THC, so it's important to purchase from reputable sources and check for lab testing results to ensure safety and legality.

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