A COMPREHENSIVE OVERVIEW OF CANNABIS NUTRIENT COMPOUNDS: ALTERNATIVES AND CHALLENGES

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INTRODUCTION & AIM

Cannabis is not a typical and famous food additive, but in recent years the increasing availability of legal-market cannabis products has raised many questions about the potential benefits or challenges regarding the use of hemp seeds and hemp-derived products (2). "Hemp" refers to low Δ^9-tetrahydrocannabinol (Δ^9-THC) cultivars of *Cannabis sativa* L., while the term "Marijuana" is used for cultivars with high levels of Δ^9-THC, the primary psychoactive cannabinoid found in the plant. Although hemp and marijuana belong to the same genus and species, they differ in terms of chemical and genetic composition, production practices, product uses, and regulatory status (4).

This research aimed to make a comprehensive overview of cannabis nutrient composition, alternatives, and challenges since it has the potential to provide significant benefits by promoting overall health and well-being, but also aspects related to food security that should not be neglected since they are essential for the safe supply of cannabis-based products on the market.

MATERIAL & METHODS

Scientific data of the beneficial effects of non-psychoactive cannabinoids on the human body have increased interest in foods containing hemp components. A diversity of commercial food products can be made from cannabis and hemp extracts, using distillates and isolates, obtained by different manufacturing processes.

For this purpose, we consulted more than 20 original scientific studies, as well as a literature review (for a period of the last five years), through scientific databases (PubMed, SCOPUS, ResearchGate), on hemp seed chemical composition, as well as on the nutritional values of the cannabis plant. In the literature search we used the following keywords: *Cannabis, Diet, Health benefit, Hemp seed, Nutrient.*

RESULTS & DISCUSSION

The hemp seed contains around 25% of the proteins and it provides all nine essential amino acids, making a complete protein source. The two main proteins in hemp seed are edestin and albumin, both high-quality and easily digested proteins. In addition, hemp seed has exceptionally high levels of arginine (6). Hemp seeds contain over 30% oil rich in omega-3 and omega-6 fatty acids, among which are two essential fatty acids, linoleic acid (18:2 omega-6) and α-linolenic acid (18:3 omega-3). The omega-6 to omega-3 ratio in hemp seed oil is normally between 2:1 and 3:1, which is optimal for cardiovascular health, brain function, and inflammation regulation. Considerable amounts of dietary fibers, vitamins (especially vitamin E), and minerals (Mg, P, K, Fe, and Zn) are also present in hemp seed. Controversially, cannabis is often thought of for its psychoactive properties owed to its content of a variety of phytochemicals, including terpenes (cannabinoids) and flavonoids, which can provide significant health benefits with acceptable side effects, so the production technologies for hemp seed and derivatives should be selected with caution (7).

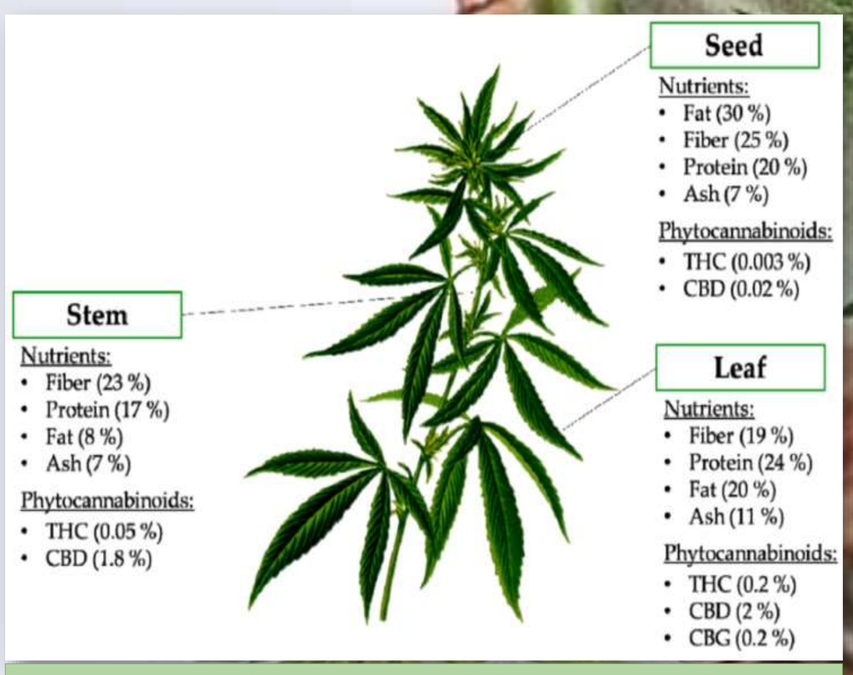

Fig. 1. Nutritional composition and phytocannabinoids present in different parts of the hemp plant (1)

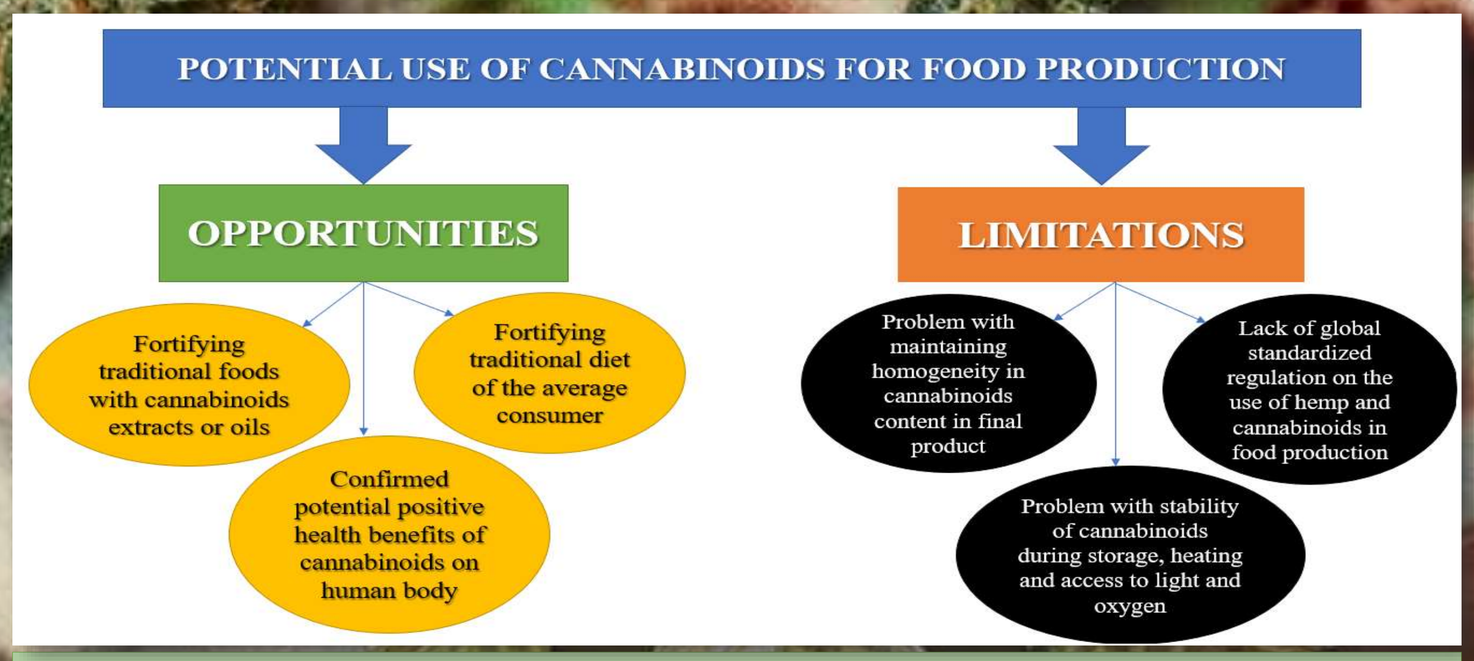

Fig. 2. Major opportunities and limitations that may have an impact on the potential use of cannabinoids in food production (5)

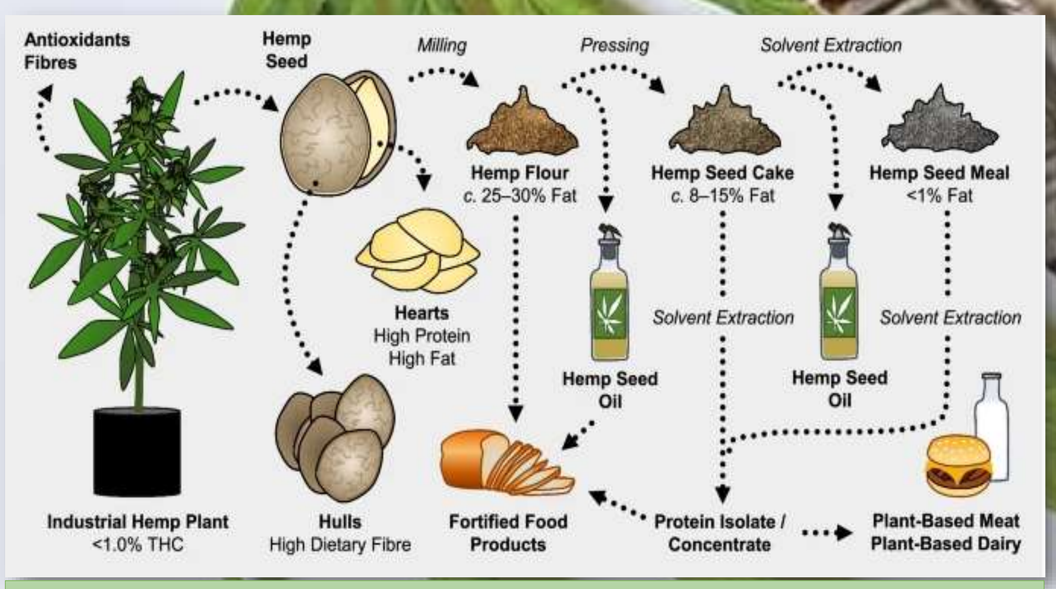

Fig. 3. Processing employed to generate the main types of hemp seed-based food ingredients (3)

CONCLUSION

The advantages of incorporating hemp seeds and hemp-derived products that add to a balanced and nutritious diet by providing valuable nutrients and health benefits outweigh the potential disadvantages for most individuals. The legal status and regulations surrounding hemp and hemp-derived products vary by region. So, the regions where industrial hemp is legalized as an agricultural commodity and hemp seed is included in foods are promoting the expansion of the hemp food industry. It's important to ensure these products are provided from reputable sources and comply with local laws and regulations. However, it's essential to note that individual dietary needs can vary and it's advisable to consult a healthcare professional or registered dietitian for personalized guidance to utilize the benefits of hemp seed products.

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