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Los alimentos de insectos como una alternativa para el cáncer

Insects as an Alternative Food and Cancer Option

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Abstract:

The consumption of insects around the world is increasingly accepted in different cultures, because they are easy to grow, reproduce simply and do not require much maintenance, so they are being proposed as an alternative and viable source of nutrients, not only for pet consumption but also for human consumption, in addition to this great nutritional benefit insects are used as alternative treatments in traditional medicine, to cure or prevent some diseases, including cancer.

Keywords:
insect consumption, nutritional contribution of insects, cancer

Resumen:

El consumo de insectos alrededor del mundo es cada vez más aceptado en diferentes culturas, debido a que son de fácil cultivo, se reproducen sencillamente y no requieren de mucho mantenimiento, por lo que se están proponiendo como una fuente alternativa y viable de aporte nutricional, no solo para consumo de mascotas sino también para consumo humano, además de este gran beneficio nutricional, los insectos son utilizados como tratamientos alternativos en la medicina tradicional, para curar o prevenir algunas enfermedades, entre ellas el cáncer.

Palabras Clave:

consumo de insectos, aporte nutricional de los insectos, cáncer

Introduction

For centuries, insects have been used as a source of food due to their high protein content, and their availability and ease of reproduction, also their breeding generates less impact on the environment and its maintenance is less burdensome. All life stages of insects are consumed, ranging from eggs, larvae, pupae to adults. The main orders of consumption of the insecta family are: beetles (Coleoptera), caterpillars, butterflies and moths (Lepidoptera), ants, bees and wasps (Hymenoptera), grasshoppers and locusts (Orthoptera), true insects, aphids and Bedbugs (Hemiptera) , termites (Isoptera) and flies (Diptera) (Rumpold and Schlüter, 2013; Yi et al., 2013).

Worldwide they have been used as food, consuming about 1700 species approximately, the consumption of these occurs mainly in indigenous populations and poor countries (about 113 countries and 300 ethnic groups consume them), where there is a shortage of nutritious foods. For Europe it is reported 2% of these for consumption, for Africa 30% and in America up to 39% of total consumption (Ravzanaadii et al., 2012; Siemanowska et al., 2013). In Mexico, the approximate consumption of 104 species of insects is reported, whose most represented order is Hymenoptera, followed by Hemiptera and later Coleoptera (Elorduy et al., 1998).

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Nutritional value of insects

Edible insects have become a viable alternative of proteins for human consumption and their use is progressing constantly due to the advantages they represent, such as their high content of protein and/or fat compared to conventional livestock, their short biological cycle that facilitates its breeding, its great reproductive capacity and its wide distribution in different habitats (Siemanowska et al., 2013; Yi et al., 2013; Smetana et al., 2017).

The main nutritional contribution of insects in dry weight is protein, containing an average of 40-60% and its second nutritional contribution is fat with approximately 25% (Lizhang et al., 2008), however despite having a large fat content, it should be noted that less than 9% are saturated fatty acids and the rest are mono or poly-unsaturated (Ramos-Elorduy and Viejo, 2007). Due to its great nutritional contribution, the Food and Agriculture Organization of the United Nations (FAO) is suggesting the consumption of insects to cover the demands of animal protein intake that are required in the daily diet of human nutrition (Belluco et al., 2013; Dreassi et al., 2017).

Insects as an alternative treatment against various diseases

It has been observed that insects in addition to their great protein intake, fats, vitamins, and minerals (Belluco et al., 2013), have also presented a medicinal option (entomotherapy), throughout the history; among which we can mention: the scorpion used for insolation in children, the wasps for the swelling of knees and joints, the crickets for urine problems, the ants for some types of ocular degenerations, the dragonflies to treat hemoptysis, among others (Cahuich-Campos and Granados, 2014).

Similarly, the use of insects has been reported as an alternative to fight some types of cancer, among which we can mention: *Mylabris phalerata Pallas*, a coleoptera from which cantharidin is isolated, a potent inhibitor of hepatocellular carcinoma cells, causing acute injury to cells, because it interferes with the metabolism of proteins and nucleic acids in cancer cells (Wang et al., 2000). The venom of *Apis melifera*, a very complex mixture of active peptides is attributed an anticancer effect to melittin, a basic polypeptide that produces about 50% of the dry venom, which causes susceptibility in the cell membrane, making it more permeable (Gajski and Garaj-Vrhovac, 2013). In the venom of the Chinese scorpion *Buthus martensii Karsch*, a peptide with antitumor and analgesic activity is found (Liu et al., 2003); Likewise, cecropins, a group of peptides extracted from the hemolymph of the giant silk moth, *Hyalophora cecropia*, which have activity against lymphomas and leukemias *in vitro,* have been studied, their mechanism of action implies the formation of pores in the cytoplasmic membrane (Moore et al., 1994); likewise, it has been reported that the bioactive compounds of the larva of *Protaetia brevitarsis* show cytotoxicity against cancer cells, by means of apoptosis-inducing activity (Yoo et al., 2007); also has been reported the use of *Ulomoides dermestoides*, a coleopter used as a home remedy in traditional Chinese medicine, for the treatment of various pathologies such as diabetes, Parkinson's, arthritis, asthma, and even some types of cancer (Deloya-Brito and Deloya , 2014).

Conclusion

The consumption of insects at present has not been very well accepted, however, their intake provides a great nutritional contribution, mainly in protein and fats of poly-unsaturated type, reason why they are a reliable alternative to cover the protein demands that the Man requires in his daily diet, in addition, insects are used as alternative treatments in traditional medicine, among which we can mention sunstroke, swelling of joints, eye degeneration and against cancer, both in their treatment and prevention.

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