Zh Mikrobiol Epidemiol Immunobiol. 2001 Mar-Apr;(2):114-8.

[Biological activity of Spirulina].

[Article in Russian]

Blinkova LP[1], Gorobets OB, Baturo AP.

Author information

Abstract

In this review information of Spirulina platensis (SP), a blue-green alga (photosynthesizing cyanobacterium) having diverse biological activity is presented. Due to high content of highly valuable proteins, indispensable amino acids, vitamins, beta-carotene and other pigments, mineral substances, indispensable fatty acids and polysaccharides, PS has been found suitable for use as bioactive additive. SP produces an immunostimulating effect by enhancing the resistance of humans, mammals, chickens and fish to infections, the capacity of influencing hemopoiesis, stimulating the production of antibodies and cytokines. Under the influence of SP macrophages, T and B cells are activated. SP sulfolipids have proved to be effective against HIV. Preparations obtained from SP biomass have also been found active against herpesvirus, cytomegalovirus, influenza virus, etc. SP extracts are capable in inhibiting cancerogenesis. SP preparations are regarded as functional products contributing to the preservation of the resident intestinal microflora, especially lactic acid bacilli and bifidobacteria, and to a decrease in the level of Candida albicans. The biological activity of SP with respect to microorganisms holds good promise for using these microalgae as components of culture media.

PMID: 11548244 [Indexed for MEDLINE]

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Nutritional and therapeutic potential of Spirulina.

Khan Z[1], Bhadouria P, Bisen PS.

[1]Department of Biotechnology, J.C. Bose Institute of Life Sciences, Bundelkhand University, Jhansi 284128, U.P., India.

Abstract

Spirulina, a filamentous cyanobacterium, possesses diverse biological activities and nutritional significance due to high concentration of natural nutrients, having bio-modulatory and immuno-modulatory functions. Different Spirulina preparations influence immune system viz. increase phagocytic activity of macrophages, stimulating the production of antibodies and cytokines, increase accumulation of NK cells into tissue and activation and mobilization of T and B cells. Spirulina have also shown to perform regulatory role on lipid and carbohydrate metabolism by exhibiting glucose and lipid profile correcting activity in experimental animals and in diabetic patients. Preparations have been found to be active against several enveloped viruses including herpes virus, cytomegalovirus, influenza virus and HIV. They are capable to inhibit carcinogenesis due to anti-oxidant properties that protect tissues and also reduce toxicity of liver, kidney and testes.

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Calcium spirulan, an inhibitor of enveloped virus replication, from a blue-green alga Spirulina platensis.

Hayashi T[1], Hayashi K, Maeda M, Kojima I.
Faculty of Pharmaceutical Sciences and School of Medicine, Toyama Medical and Pharmaceutical University, 2630 Sugitani, Toyama 930-01, Japan
Masaakira Maeda
Department of Biochemistry, Saitama University, Urawa, Saitama, 338, Japan
Ichiro Kojima
Central Technical Research Laboratory, Nippon Oil Company, Ltd., 8 Chidori-cho, Naka-ku, Yokohama 231, Japan

Abstract

Bioactivity-directed fractionation of a hot H2O extract from a blue-green alga Spirulina platensis led to the isolation of a novel sulfated polysaccharide named calcium spirulan (Ca-SP) as an antiviral principle. This polysaccharide was composed of rhamnose, ribose, mannose, fructose, galactose, xylose, glucose, glucuronic acid, galacturonic acid, sulfate, and calcium. Ca-SP was found to inhibit the replication of several enveloped viruses, including Herpes simplex virus type 1, human cytomegalovirus, measles virus, mumps virus, influenza A virus, and HIV-1. It was revealed that Ca-SP selectively inhibited the penetration of virus into host cells. Retention of molecular conformation by chelation of calcium ion with sulfate groups was suggested to be indispensable to its antiviral effect.

J. Nat. Prod., 1996, 59 (1), pp 83–87
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[Studies on evaluation of natural products for antiviral effects and their applications.]

[Article in Japanese]

Hayashi T[1].

[1]Graduate School of Medicine and Pharmaceutical Sciences for Research, University of Toyama, Sugitani, Toyama City, Japan. hayashi9@pha.u-toyama.ac.jp

Abstract

In the search for novel antiviral molecules from natural products, we have discovered various antiviral molecules with characteristic mechanisms of action. Scopadulciol (SDC), isolated from the tropical medicinal plant Scoparia dulcis L., showed stimulatory effects on the antiviral potency of acyclovir (ACV) or ganciclovir (GCV). This effect of SDC was exerted via the activation of viral thymidine kinase (HSV-1 TK) and, as a result, an increase in the cellular concentration of the active form of ACV/GCV, i.e., the triphosphate of ACV or GCV. On the basis of these experimental results, cancer gene therapy using the HSV-1 tk gene and ACV/GCV together with SDC was found to be effective in suppressing the growth of cancer cells in animals. Acidic polysaccharides such as calcium spirulan (Ca-SP) from Spirulina platensis, nostoflan from Nostoc flagelliforme, and a fucoidan from the sporophyll of Undaria pinnatifida (mekabu fucoidan) were also found to be potent inhibitors against several enveloped viruses. Their antiviral potency was dependent on molecular weight and content of the sulfate or carboxyl group as well as counterion species chelating with sulfate groups, indicating the importance of the three-dimensional structure of the molecules. In addition, unlike dextran sulfate, Ca-SP was shown to target not only viral absorption/penetration stages but also some replication stages of progeny viruses after penetration into cells. When mekabu fucoidan or nostoflan was administered with oseltamivir phosphate, their synergistic antiviral effects on influenza A virus were confirmed in vitro as well as in vivo.

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