

# Production of Vital Supplement from Microalgae

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## ABSTRACT

Collagen is a structural protein present in connective tissue of our body. Production of collagen decline leading to sagging skin, weak bones and loose muscles strength and Osteoporosis mostly in females. Vital supplement Intake improves skin health strength muscles and bones, also Intake for fitness and bodybuilding. It also helps in the formation of Collagen in our body naturally. This supplement also contains Ascorbic acid, the most active form of Vitamin C which also helps in the production of Collagen by boost the formation of Hydroxyproline. By adding **Tryptophan** as essential amino acid to the supplement, the requirement of our body is fulfilled as Tryptophan can't produce in our body but we have to intake it as a source of diet or supplement, it also boost the production of collagen. These amino acids can extract by using a BioSource which is *Spirulina platensis* in a form of protein. Initiation from Raw Cultured *Spirulina* into powder form after maceration an extract obtain in which cells are disrupted, to get more components of cell, Sonication plays its role. By which the separation of Biomass with Lipids performing centrifugation help to get the maximum amount of them. For the extraction of Protein from extracted liquid biomass FPLC play its role and for the extraction of amino acids,RP- HPLC is used and for solidifying Lyophilization will perform.

**Keywords:** *Spirulina platensis*, Amino acids, Protein, Hydroxyproline, Tryptophan

## INTRODUCTION

*Spirulina* is a nutritious prokaryote contains up to 60%–70% protein this supplement from *Spirulina* helps in the formation of Collagen with in our body, also help in the, production of antioxidants, hormone stimulation, elasticity of Connective tissues and vessels. For the production of this vital supplement, use of *Spirulina* gave facts to produce highly purified, non-GMO, gluten free product. As it is a bio source no any harmful effect will appear. It is a renewable resource and culture of *spirulina* is very simple and easy. The process is given by seeing the most profitable way, in the form of byproduct. After sonication the maximum amount of lipid extract is possible to receive by simple step of centrifugation. The use of FPLC gave highly purified product.

## OBJECTIVE

Main goal is the production of vital protein supplement that that will be cheaply obtained non-GMO, Gluten free and free from toxic heavy metals, get a good profit by selling it. As it is needed commonly in daily life. Supplements have a variety of health benefits, from relieving joint pain to improving skin health. It plays a role in strengthening skin, also beneficial for hydration and elasticity.

## METHODOLOGY

### Raw material:

*Spirulina platensis* can cultured in an open pond, the only need of three things for perfect grow this temperatura (30 to 31°C), PH (9 to 10), Light (5000lx). Culture rate of *Spirulina sp.* is about 3weeks to becom eviscous and dark green in color. If the culture treatedwithdifferentconc. Of 24-epibrassinolide (24-epiBL), grow thrateincrease in 150/0.5µM.

**Conditions and treatment:**

**Drying:** The fresh cultured *Spirulina Sp.* Separated from the medium, filtered through Nylon cloth of 30 or 50 micron and dried at 20°C for 10h. *Spirulina sp.* convert into powder form.

**Cell Disruption:** The powder of *Spirulina sp.* was macerated for 60min by adding distilled water at 60°C. After 4 days and filter it with Nylon cloth of 30 or 50 micron The process repeated until the extract become colorless.

**Sonication:** The liquid extract then dried for 10h at 20°C. The ultrasound extraction or sonication methods is applied by Ultrasonic bath or Sonicator with frequencies ranging 20 kHz to 2 000 kHz. The ultrasonic frequency (> 20 000 Hz) will activated permeability of thalluscellwallhence more component on the cell can be extracted by the solvent.

**Maceration:** This processe xposes the chemical constituents of thecells, mainly polyphenols, lipids and amino acids. The extract macerated with 50 % ethanol (1:20, w/v) at room temperature for 4days and filter the liquid through a Whatman no.1 filter paper.

**Extraction of Protein:** Forth extraction of protein, we have to pass the extract from Fast Protein Liquid Chromatography (FPLC) using them obilephase Acetonitrile (ACN) and Trifluoroacetic acid (TFA). Using the same condition given below.

**Extraction of Amino Acids:** The Extract of *Spirulina Sp.* After the given procedure turn in colorless solution of highconc. of desired products which is amino acids including some lipids. We can get amino acids including which are the base of collagen and as well as human body by High Performance Liquid Chromatography (HPLC). A LiChrosper *RP-18 HPLC Column*100 (4mm × 125 mL) was used to separate the compound. Them obilephase consisted of two solvents: Mobile phase: Acetonitrile (ACN) and Trifluoroacetic acid (TFA), wavelength of 360 nm to 460 nm.

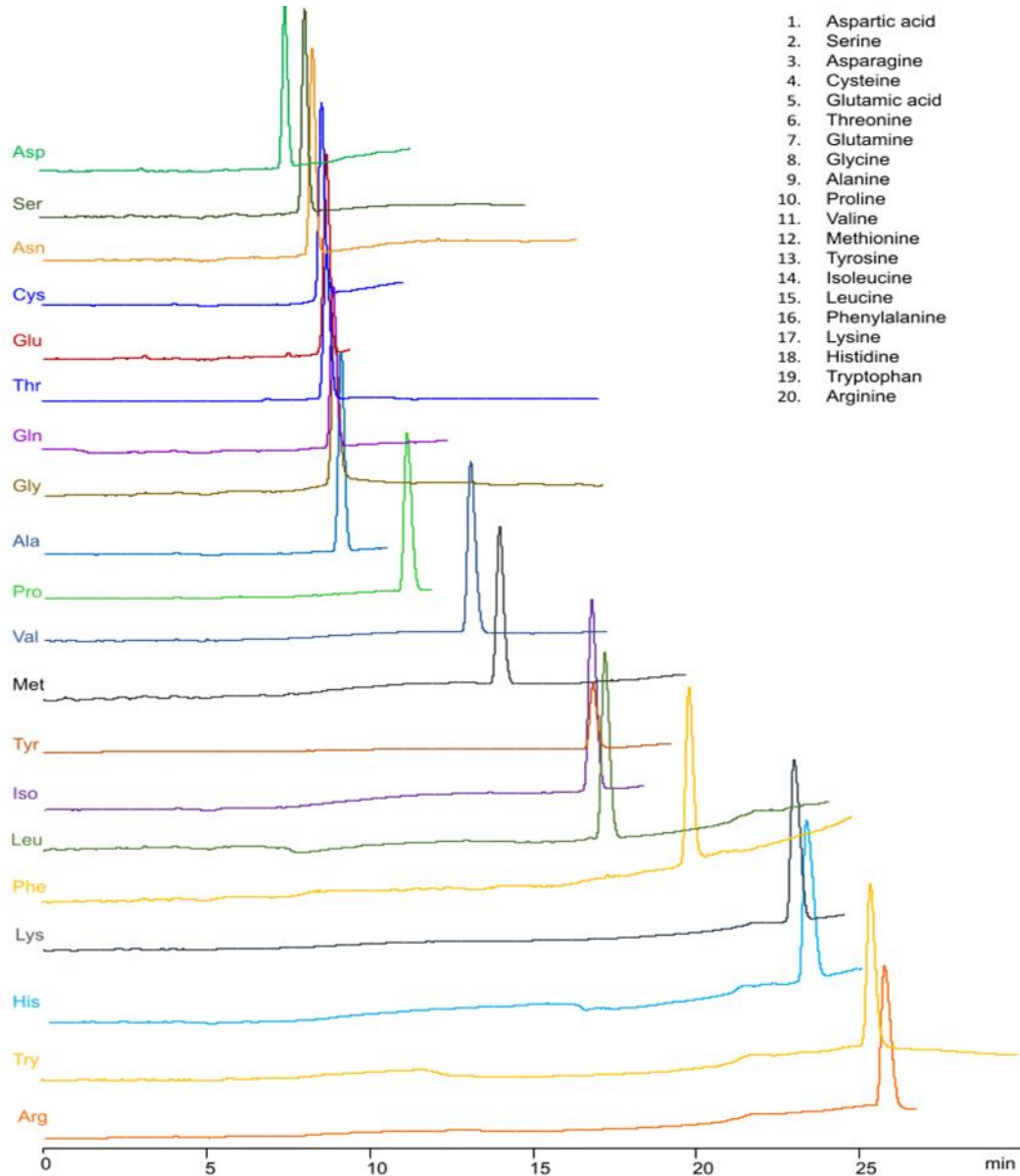
**HPLC**

High Performance Liquid Chromatography (HPLC) is a form of column chromatography that pumps a mixture or analyte in a solvent (them obilephase) at high pressure through a column with chromate graphic packing material (stationary phase). The pressure makes the technique much faster. This allows using much smaller particles for the column packing material. The smaller particles have a much greater surface area for interactions between the stationary phase and the molecules flowing pastit. This results in a much better separation of the components of the mixture. The reversed-phase HPLC column is them ostversatile and commonly used column type and can be used for a wide range of different types of analytes. Normal-phase HPLC column shave polar packing. The Mobile phase is nonpolar and therefore usually anorganic solvent.

**EXPECTED RESULT**

The need of vital supplement increase day by day, this product is unflavored, highly purified, non-GMO and Gluten free, addition of tryptophan gave this product a massive hit. The main purpose is the availability of vital supplement at low cost to overcome the rate of diseases without medication. i.e. osteoporosis. In current market 300g of the Vital supplement cost 7000.00 PKR. This product of 500g cost approx. 5000.00 PKR fully purified including Tryptophan and Vitamin C. With supplement, the selling of extracted lipid and other amino acid specially Tryptophan as a solo product also chase the target of industry for maximum profit.

The following graph shows the HPLC rate at which different amino acid separated;



By: <https://helixchrom.com/compounds/phenylalanine/>

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