

PHARMACOACTIVE NUTRIENT FROM MARINE ALGAE

BRIEF DESCRIPTION:

Chlorella sp. finds wide application as a food supplement owing to its high nutritive value and medicinal properties. The present invention relates to the process for the production of "Pharmacoactive Growth Promoter" from live (wet) biomass of marine microalgae Chlorella vulgaris by modified hot water extraction method. Beneficial properties of "Pharmacoactive Growth Promoter" include anti inflammatory activity and wound healing property, detoxification, constipation relief and growth stimulation. The process involves isolating a fast growing, high biomass and lipid producing microalgal strain, C. vulgaris, optimized the culture media, culture methodology, harvesting technique and the production of "Pharmacoactive Growth Promoter" from Chlorella vulgaris of marine origin.

SALIENT FEATURES AND APPLICATIONS:

- A nutritionally and pharmaceutically valuable hot water extract "Pharmacoactive Growth Promoter (PGP)" from the live biomass of C. vulgaris cultured in seawater, where in the extract has been prepared by gradual heating.
- The marine C. vulgaris, wet biomass hot water extract "PGP" contains 27.45 % of protein, 39.21 % of carbohydrate and 0.75 % of crude fat.
- Mineral such as calcium, phosphorous, potassium, sodium, magnesium and iron were observed.
- Significantly higher level of vitamins such as vitamin B3 (Niacin-0.29 mg/100 g), vitamin B5 (Pantothenic acid- 2.26 mg/100 g) and vitamin B12 (Cobalamin- 34.42 µg/kg) were recorded.
- Pharmaceutically vital proteins such as thioredoxin, S-adenosylmethionine synthase 1, putative pleiotrophic drug resistance protein 3, dihydrolipoyl dehydrogenase, Brix-domain containing protein, Inositol monophosphatase 2, bearing significant activities such as cell growth, cell cycle regulation, defense, antioxidant, anti-cancer and proteins that are widely used in the treatment of depression, dementia, vacuolar myelopathy, liver injury, migraine, osteoarthritis, bipolar disorder, etc. were recorded in the protein fractions of PGP.
- PGP also documented various biologically important enzymes and proteins. Apart from the aforementioned proteins about 32 uncharacterized proteins were also observed.

Scale of Development: Technology demonstrated and commercialized.

Bio-pharmacological analysis of PGP from the live biomass of marine microalgae, C. vulgaris		
Parameters	Standard	CGF
Anti-diabetic		
α-glucosidase	Acarbose	IC ₅₀ -2.4 mg/mL.
α-amylase	IC ₅₀ - 1.8 mg/mL	IC ₅₀ - 6.1 mg/mL
IC ₅₀ - 1.1 mg/mL		
Anti-inflammatory		
Caspase-3 apoptotic-inflammatory assay	Methotrexate	IC ₅₀ - 0.65 mg/mL
Wound healing	IC ₅₀ - 0.9mg/mL	
In vitro scratch assay	Nitrofurazone	IC ₅₀ - 4 mg/mL
IC ₅₀ - 0.13 mg/mL		
Neuropharmacological effect- Role of CGF on central nervous system depression	Chlorpromazine (5 mg/kg)	25 mg/kg
1. Sleeping test		50 mg/kg
2. Locomotor activity	29% increase in sleep	11 % increase in sleep
3. Muscle relaxant activity	53.91 % reduction	67.61 % reduction
4. Body weight	37.33 % reduction	26.36% reduction
	3.73 % decrease	10.83 % increase

