

Cystic Yellow Algae Under Different Initial Nitrogen Levels

Special Grease, Tired, Law

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Abstract: Cystic yellow algae with different initial Nitrogen Levels (*Tribonema utriculosum* SAG 22.94) Oil content and fatty acid composition and content. Fruit, show, cystic yellow, algae in Nitrogen 3.0 mmol/L The highest biological degree 6.39g/l; Nitrogen Content 18.0 mmol/L Fat and fatty acid content is the highest Cell dry weight 44.62% and 42.21%; The above 3A Refers to a body of rate were in nitrogen degree 3.0 mmol/L To the highest points 0.538, 0.209 and 0.206g in L⁻¹ In D⁻¹. In 4A Initial nitrogen of conditions under cystic yellow algae oil and fatty acid content can be with the nitrogen of increase and increase. Fatty Acid Content Analysis fruit showed algae of main fatty acid beans Acid (C14:0), Brown acid (C16:0), Palm oil acid (C16:1 Omega 7), Peanut four Acid (C20:4 Omega 6) and eicosapentaenoic acid (C20:5 Omega 3 EPA). Which brown oleic acid content highest accounted for fatty acid content 36.53%~50.08%. Study fruit show that cystic yellow algae in different initial nitrogen of conditions under has special of oil tired law is a strain has important with price of oily microalgae. Off: Cystic yellow algae; Nitrogen; Fat; Fatty Acid

Keywords: *tribonema utriculosum* SAG 22.94; KG concentration; total lipid; fatty acid

Biological fuel for has sustainable of, guaranteed cost and raw materials more of such as point Renewable Energy open use of research point. Microalgae and more higher plant a can do it photosynthetic role fixed CO₂ Put O₂ And has Photosynthetic Efficiency High students speed fast oil content and carbohydrate compounds content high don't take up [1] Cultivated land and point so microalgae suitable for biological fuel of students raw materials. But microalgae biological fuel of generation high cost can't [2] Foot city demand. Study show that oil-rich algae strains, [3] Of training conditions and use aquatic microalgae biological and Oil [4]

Fat and methods can in certain degree on reduce cost. Culture Conditions of can effective promoting algae the life of change algae cell of biochemical into is improve students efficiency effective of methods. Microalgae cell the life of need to right A element, light, PH, Temperature and degree and. Normal life situation under oil microalgae of oil content General cell dry weight 10%~30% But in a lack of or highlights such as forced conditions under its oil content can be to cell dry weight 60%~80% [56]. Benign algae strains and oil rate, biological yield and the of extraction rate have important relationship. Biological of charge is microalgae biological fuel students process of heavy [7/8]

To. At present about microalgae of Study Main concentration in *Chlorella* (*Chlorella* spp.), *Algae* (*Scenedesmus* spp.) and *Duchenne* algae (*Dunaliella* spp.) Such as cell microalgae in but some algae in training process don't to take and [9.10]

And vulnerable to native of if swallowed . And small yellow algae (*Tribonema minus*) Can in no flocculation of

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conditions under line take yield up 98.69% And-algae Of oil content ultra- Cell dry weight 50% Is a strain has Cell size, large algae, can be very good against the original, swallowing Food. Therefore, the microalgae are not easy to collect, and can resist the original and the swallowing of the product.

Nitrogen is one of the important nutrients in the Process of microalgae.[12]

It is close to the synthesis of microalgae, intracellular nucleic acids and proteins. Under certain nitrogen forcing conditions, microalgae, lipid, carbohydrate, and high additive(Xi, Beta-Hu busu *et al*) And with biological degrees, proteins, and Foster Nitrogen Deficiency, oil-rich algae(*Neochloris oleobundans*) The highest oil content, Cellular stem [14.] Heavy 40%. Wu guixiu 2. Spotted algae(*Eustig-Matos Magnus* And *E. Polyphem*) The lipid content of the algae was higher than that of the total nitrogen, but with the decrease of biological degree. Studies have shown that yellow algae(*Tribonema sp.*) The oil content of yellow and algae can increase with the increase of nitrogen content in a suitable nitrogen content range, their bioavailability and oil content reached the highest.[16]

High bioavailability and high fat content, tired. In general, *Chlorella* and other microalgae can be rich in lipid under low nitrogen or nitrogen-free conditions, it reduces the degree of nitric acid, thus limiting the use of nitrogen in the control of microalgae lipids. And yellow, algae do not exist, one. Therefore, yellow algae and algae play an important role in the development of microalgae biofuels.

Yellow, algae belonging to yellow algae, yellow, algae, widely distributed in freshwater. Yellow, algae, total 27 Species, China has [17] 16 Seed 2. Seed. At present, most of the researches on yellow and algae are based on the aspects of birth and management, but there is little use of the source. In this study, an ideal oil-like microalgae---Cystoid yellow algae(*Tribonema utriculosum sag* 22.94) Like to nitric acid nitrogen source of Differential Interference poor micro-observation-algae cell oil droplet in Oil-formation with phase of 18. 0,3. 0,1. 0,0 mmol/L 4A Initial nitrogen of line training the purpose was to explore the different initial nitrogen of cystic yellow algae of students, fat and fatty acid into and content of influence reveal its oil tired of Law, rich people-microalgae biological line of microalgae biological fuel of students provide more of raw materials.

1. Material and Methods

1.1 Material

Material cystic yellow algae in Germany, root University algae preservation in investment biological science technology investment and limited the company microalgae Biological Science and Technology Center algae room.

1.2 Methods

1.2.1 Algae cell of training

To fresh water microalgae commonly used BG11 Medium Base NaNO_3 Nitrogen Source, The 4A Initial nitrogen of points 18. 0,3,0,1,0,0 mmol/L Other Yang Yuan su du don't of conditions cystic yellow algae line training. To 4.5×60 cm Of columnar light Biological Anti-the container will 700 ml Algae liquid into the rich in 2.0% CO_2 Of Air holding incident light (300 ± 10) μmol in m^{-2} In S^{-1} Temperature (25 ± 3). Algae cell inoculation in number of initial biological degree (0.4 ± 0.05) g/L Co-culture 12 d Each nitrogen degree were placed 3 Times repeat.

1.2.2 Cell Shape observation and cell in Oil Light staining

Collection 18.0 mmol/L Nitrogen degree in training to the first 0,3,6,12 d Of algae cell production Olympus Differential Interference Optical Micro-observation algae cell shape and light mercury lamp take light photos. The Nile red Light dye liquid algae cell in the oil line staining. Take Nile red 200 mg Dissolved in 10 ml DMSO In get Natural 20g/L Of Mother Liquor. Then DMSO Will the mother liquor dilute 1000 Times have

0.02g/L Of Nile red "With liquid. Staining 1 mL

Of adding 10 μL Nile red "With liquid 50 Water bath in Mechanism 5 min.

1.2.3 Biological and nitrogen of Set

Will aperture 0.45 μm Of GF-CTM Ultra-Membrane placed in 105 Constant temperature oven in Drying 12 h After into a vacuum dryer In Dry Mixture Heavy (W_1). Every 48 h Take algae Liquid

MLThe xian heng heavy of membrane in smoke then placed constant temperature oven in Drying12 hOut after cooling to constant weight(W_2).

The weight difference method a biological degree. Quality Assurance hidden in-80[18] Refrigerator nitrogen of the country method line.

1.2.4 Fat Content set

Get the algae gel to ion washing2Times after placed in cold dryer Drying72 hDry of algae powder preservation in-80Refrigerator. Fat Content The Organic soluble Extraction-Gravimetric Method Line

[19]

. Said take70 mgAlgae Powder placed have ban zi of glass centrifuge tube in join2 mLDimethyl-METHANOL SOLUTION

V:V = 1:9)50Water bath magnetic mix3 HAAfter placed centrifuge in3000 r/minCentrifugal5 minWill supernatant to move the glass vial in. Remaining algae slag join4 mLN-hexyl Solution(V:V = 1:1)Ice bath magnetic mix1.5 h

3000 r/minCentrifugal5 minWill supernatant moved to the above of glass vial in. Join4 mLSteamed water to with supernatant of glass bottle in static the points12 h. Will the clear liquid placed nitrogen blowing in dry . Will after the fat with B Complex of moved to first weighingEPTube(EpTubeOf M_1)Nitrogen blow dry after into a vacuum Constant Temperature Box Constant Weight8 hOf(M_2). Using difference method a fat content. Fat Content Ω_1 (Accounted for algae powder dry of percentage) $\Omega_1 = (M_1 - M_2) / \text{Algae Powder} \times 100\%$.

1.2.5 Fatty Acid Analysis

Of methods line. Said take10 mgDry algae powder placed Brown1.5 mlOfGCProducts bottle each product said take3A heavy

2Times. Products bottle of in turn join200 μ LofImitation-Methanol(V:V = 2:1),25 μ LofC13:0-N-hexyl Solution(C = 10g/L)And300 μ LofAcid-METHANOL SOLUTION(V:V = 1:

25). Mix well and place in85Oven1 H. After cooling at room temperature, divide into each bottle and add1 mLZheng ji, ZhenWarm and quiet1.~4 h. To the new good1.5In the bottle, add700 μ LHe, and

μ LSupernatant, vibrationSeal after homogenization. To the above, okay1.5Bottle added5. μ L 1g/LThe fifteen, ZhenEven. UtilizationAgilent 7890b-5977aQi

With Peak surface of General fatty acids

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Fatty acid composition and content were calculated.

1.2.6 Keywords: biological, lipid, fatty acid, rate, biological, lipid, fatty acid, rate, computing

As follows:Rate= Dcw/T;Fat Body, Rate= Dcw * Ω_1 /T;Fatty acid position, Rate= Dcw * tfas/T. Type,DcwBio du(G/L); tfasFatty Acid Content(%); TFoster(D).

1.2.7 Data, Management

Sub, ADOPTEDMicrosoft Excel 2012AndOrigin 8.5.1Data processing, management, andSPSS 17.0Component row difference, binding AnalysisLevelAlpha= 0.05.

2. Fruit and Analysis

2.1 Cystic yellow, algae, cell formation

Research shows that(Nile red)It can be used for quick, sensitive and reliable in vivo Quantitative Determination of intracellular lipid in microalgae. Light color is related to factors such as shot wave and fat type, color range, from golden yellow to deep[22.] Color Range. In the light, the grease often yellow[23.,24]

Light. Differential Interference difference, Light microscopic, observation of cystic yellow, algae, cell shape and intracellular lipid, tired phase, cystic yellow, algae is from, A column or barrel-shaped cell that is not branched, resembling a body, having a pigment that is flaky and often2.~4.Tablets(1:,B).Cell9~15 μ M 17~29 μ MAlgae0.4~3.5mm. Training0,3,6,12 dOf cystic yellow algaeCell ShapeIn18.0 mmol/LNitrogen of conditions

under training 0, 3, 6 d of cell oil droplet in Oil-clear can (1: c, D, E) And to training

12. DOil Fill the whole cell and with leaf body reduce (1: F). Study fruit show that algae cell 0~6 d Oil tired phase slow and 6 d After oil rapid increase.

2.2 Different Nitrogen of cystic yellow algae the effects

Of Nitrogen of the cystic yellow algae of Students Status Analysis Fruit showed Training 12 d After the degree of biological degree have different degree of increase (2). In addition 0 mmol/L Nitrogen of the other nitrogen degree of algae cell are in 2 d After into number; To the first 6 d Algae cell students rate start reduce the most into the plateau. Which nitrogen degree 3.0 mmol/L Biological degree in the whole training cycle in the highest and in 6 d After to difference ($P < 0.05$) Biological degree highest 6.39 g/L. And 0, 1.0, 18.0 mmol/L Nitrogen degree of the highest biological of points 3.025, 5.105, 4.545 g/L. Factors variance analysis fruit show that when training 12 d 4A Initial nitrogen degree of biological degree were difference ($P < 0.05$). According to nitrogen consumption status shows that in 18.0 mmol/L Nitrogen degree in nitrogen degree in the first 4 d Fast decreased then start flat the most medium in nitrogen degree 177 mg/L. And in 0, 1.0 and 3.0 mmol/L Nitrogen In nitrogen in the first 0, 2, 4 d Was all run out. However,

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Cystic yellow, algae and cells can be produced in the medium without nitrogen.

Duan They can use their own nitrogen to produce 35.08% and 34.16%. Factors variance analysis fruit show that all

. So in addition 18.0 mmol/L Of Outside other Nitrogen (18.0 mmol/L) And other nitrogen deficiency degree of the highest

Nitrogen degree of algae cell in 4 d After were in no nitrogen of training Oil content were to difference ($P < 0.05$) And nitrogen deficiency

Medium. Of the highest oil content difference don't. Chlorella, oil-rich

2.3 Different Nitrogen of cystic yellow algae oil tired of influence New algae and four tail algae (*Scenedesmus quadricauda*)

2.5 Different Nitrogen of cystic yellow algae a training body biological, fat and fatty acid rate of influence

This study, 4A Initial nitrogen of conditions under cystic yellow on culture to the first 12 d 3.0 mmol/L Nitrogen degree of Students Of, fat and fatty acid a body rate were the highest points 0.538, 0.209, 0.206 g in L^{-1} In D^{-1} . And its 3A of a body biological of rate size order sort 1.0 mmol/L > 18.0 mmol/L > 0 mmol/L Fat and fatty acid rate size order sort 18.0 mmol/L > 1.0 mmol/L > 0 mmol/L (5). Nature in there more-algae it belong to different [27] Of such as algae, yellow algae and. Some-algae in spirulina (*Spirulina sp.*) Common People know has students fast, protein content high and anti-dyeing and point wide [28] Pan-health care products and food line. Some-algae has good of nitrogen, phosphorus absorption ability commonly used in water management. [29] Liu Such. Study show that when water of nitrogen and phosphorus than low hair algae (*Cladophora sp.*) Can effective assimilation phosphoric acid in phosphorus; And when water of nitrogen and phosphorus ratio Fishy algae (*Pseudanabaena sp.*) Can effective absorption nitrate nitrogen. [30]

Wang Such. Of study sheath algae (*Oedogonium sp.*) Can efficient use water of nitrogen line students. In addition-algae has been has added of biological active, [31]

Chen Such. Study Habitat orange algae (*Trentepohlia arborum*) Cell containing big Of-Added Activity Of---Hu Bu. At present, domestic and foreign on oily microalgae of study phase less. This study cystic yellow algae is a strain very with price of oily microalgae has special of and oil performance can be used as oily microalgae of mode algae strains open use.

Is take algae cell ideal of methods for big mode life with the close efficiency often and algae cell of size was proportional relationship. Phase in Chlorella, micro-algae (*Nanno-chloropsis sp.*) Algae, cystic yellow, algae with large cell size, the algae, degree greater than most of the original ($5 \mu M \sim 0.5$) (Caterpillars And worms) Can be very good The resistance to native, the swallowing of matter, and In the process, Sac Like yellow, algae, can use, some spirulina,

harvest work. Nitrogen is the essential nutrient element of microalgae. In a suitable nitrogen level, nitrogen deficiency will cause the algae cell biology and protein content decreased, and with the increase of carbohydrate and lipid content. In this study⁴. The results of the study show that the cystic yellow algae have a short life cycle and are in 3.0 mmol/L. The biomass was higher under nitrogen condition. Especially in certain The content of lipid in algae varies with the nitrogen content.

Down two, glycerin, base, shift(Dialylglycerol yl-transferase)Will be activated, is grease, tired off. Therefore, in a certain range of nitrogen, low nitrogen forcing can promote the increase of microalgae and intracellular lipid content. However, the control mechanism of Lipid accumulation in yellow, algae and cells under nitrogen-rich conditions needs further study. Keywords: Cystic yellow, algae, main fatty acids, beans, acid (C14:0)Brown acid(C16:0)Brown oil acid(C16:1.Omega7)Peanut four, sour(C20:4.Omega6)And twenty carbon five acid

C20:5.Omega3.,EPA), In which the brown oil acid(C16:1.Omega7)

The highest content. With the increase of initial nitrogen content, algae, brown cells, oleic acid(C16:1.Omega7)And twenty carbon five acid(C20:5.Omega3.,[33]

EPA)The content is also increasing.China, etc.Nitrogen deficiency may limit the synthesis of fatty acids, includingEPAA series of fatty acid content decreased. Biodiesel from raw to fully burned, not in the processCO₂OfEmissions are typically colored fuels. The most common fatty acid A in biodiesel, including palmitic acid(C16:0)Stearic acid(C18:0)Oleic Acid(C18:1), Oleic acid(C18:2)And hemp Acid(C18:3)^[34]And cystic yellow algae of fatty acid composition similar but algae of don't fatty acid content higher accounted for fatty acid

8%~53.0%. Phase in more don't fatty acid don't?

And fatty acids help to improve biological diesel of ignition of and Antioxidant[35]Of. High oil rate and fatty acid rate is decided to microalgae can[36] Line workers with of important quasi. The nitrogen forced the methods improve oil content will of biomass reduce out of oil of also phase low so oil content and can't direct-[37] Mapping microalgae of oil efficiency. Study show that in nitrogen sufficient conditions under yellow algae can high biological degree and high oil [16]

Of but this did not this like. The can belong to different kind of algae its characteristics there certain area. The

Analysis shows that,3.0 mmol/LNitrogen of conditions under cystic yellow algae of biological, fat and fatty acid A rate were the highest. So,3.0 mmol/LNitrogen degree is cystic yellow algae to maximum biological, fat and fatty acid rate of best balance degree. More than fruit show that cystic yellow algae in different initial nitrogen of conditions under has unique of and oil tired law is a strain for students biological fuel of oily microalgae.

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