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Extraction of Enzyme from Gracilaria Corticata and Chladophora Vagabunda

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Abstract: ***Enzymes are biocatalyst and are used in many industries. Protease is one of the important enzyme which exists in all organism. Many organisms such as bacteria, fungi and yeast are the main source of protease enzyme. In this work, protease was isolated from marine algae such as Gracilaria corticata, and Chladophora vagabunda. Protein concentration and specific activities were measured and compared for these species. Among these, Gracilaria coricata showed specific activity of 7.53 and Chladophora vagabunda showed maximum specific activity of 6.77 units/mg of protein.***

Index Terms: Enzyme, protein, marine algae, specific activity.

I. INTRODUCTION

Protease is widely used in the manufacturing of many products such as detergents, food and pharmaceutical. These are used in leather industries, diagnostic sector, waste management and also used in the recovery of silver [1] Bacterial protease are the most significant, than fungal proteases [2].

Many of the fungi and *Bacilllus* were found to be major sources of alkaline proteases [3]. Alkalie protease which are used in detergent industries are produced from *Scolebasidium spp* and *Dendryphiella spp* [4].

Alkaline protease sales were possibly at 15,000 million Yen in Japan during 1994 [5]. *Candida lipolytica* was used to produce alkaline proteases [6], and *Aureobasidium pullulans* [7]. Only few studies are reported alkalophilic actinomycetes which could produce alkaline protease [8].
Few of the *Streptomyces* and *Pseudomonas spp* are also producing proteases. Very limited works have been done on marine algal enzymes [9].

Marine algae are generally classified as red algae, brown algae and green algae. These are used for the production of important enzymes and also used for the extraction of biofuel [10]. Alpha amylase was extracted from marine brown algae *Stoechospermum marginatum* [11]. A fibrinolytic enzyme was isolated from a marine green algae *Codium latum*, and designated Chodium lactum protease (CLP). It also had fibrinogenolytic activity [12]. In this study, marine macro algae were used to isolate protease enzyme and its specific activity were studied.

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II. MATERIALS AND METHODS

A. Sample Collection

Marine algae were collected from Covelong and from Pulicat lake, Chennai, Tamil Nadu. They were identified at Dr.Krishnamoorthy algalogy lab (Chennai, Tamil Nadu, India) and found to be *Gracilaria corticata* and *Chladophora vagabunda*. These samples were dried under sun light then were crushed into small particles by using mixer and stored.

B. Extraction of Protease and analyse the protease activity

The powdered samples were soaked in 10% TCA over night. Centrifugation was carried out at 10,000 rpm for 10 min and then the supernatant was collected and partially purified by sephadex column. The specific activity of protease was measured spectrophometrically at 650nm.

III. RESULT AND DISCUSSION

Protein concentration and specific activity of seaweeds were estimated by spectrometrically. Results showed maximum protein concentration was present in *Gracilaria corticata* 80 µg/ml and *Chladophora vagabunda* showed 73 µg/ml.

Table 1. Protease activity

S.No	Alage	Place	Specific activity units/mg of protein
1	*Gracilaria corticata*	Covelong	7.53
2	*Chladophora vagabunda*	Pulicat	6.77

Table.1 shows the specific activity of seaweed collected from Covelong and Pulicat. Among these, *Gracilaria corticata* from Covelong showed highest specific activity (7.53 units/mg of protein), than *Chladophora vagabunda* from Pulicat Lake 6.77units/mg of protein which was comparatively higher than the protease extracted from *Nicotiana tobaccum* (5.6 units/mg of protein) [13].

IV. CONCLUSION

This study revealed that the marine algal species can be used as a prime source of protease enzyme. Hence optimization of various parameters may be carried out in future for the increasing the yield of protease from algae.

REFERENCES

1. N.K.S. Babu, K.D. Lakshmi, “Optimization of thermostable alkaline protease production from species of Bacillus using rice bran". *Afr.J.Biotechnol* 2005, vol 4, pp 724-726.
2. O.P. Ward, “Proteolytic enzymes”, *Comprehensive Biotechnol*, 1995, vol 3, pp 789-818.
3. H. Matsubara, J. Feder, The Enzyme, 1971,vol 3, newyork , Academic press.
4. K.B. Pedersen, M. Christiansen, P. Lindegaard, “Novel protease”. 1992, PCT patent appl WO 9218622.
5. K. Horikoshi, “Alkaliphiles- from an industrial important point of view,” *FEMS Microbiol* 1996, vol 18, pp 259-270.
6. S. Tobe, T. Takami, S. Ikeda, K. Horikoshi, “Production and some enzymatic properties of alkaline proteinase of *Candida lipolytica," Agric Biol Chem*, 1976, vol 40, pp 1087-1092.
7. J. A. Donaghy, A. M. McKay, “Production and properties of an alkaline protease by *Aureobasidium pullulans," J. Appl Bacteriol*, 1993, vol 74, pp 662-666.
8. Y. Mikami , K. Miyashita, T. Arai, “Alkalophilicactinomycetes,” *Actinomycetes*, 1986, vol 19, pp 76-191.
9. W. A. P. Black, *Rep. Progr. Chem*, 1953, vol 50, pp 322.
10. S. Sharmila, L. Jeyanthi Rebecca, Merina Paul Das and Md Saduzzaman, “Isolation and partial purification of Protease from plant leaves,” *Journal of Chemical and Pharmaceutical Research*, 2012, vol 4(8):3808-3812.
11. Shiladitya Mitra, Sharan Ragunathan, M.K.Tripathi and Rahul Srivastava, “Partial purification and characterization of α-amylase from marine algae *Stoechospermum marginatum*,” *Journal Engineering, Science and Management Education*, 2011, vol 4, pp 4-8.
12. Kiminori Masubara, Kanji Hori, Yasushi Matsuura and Keisuke Miyazawa, *J.Phytochemistry*, 1999 Vol 52, pp 993-999.
13. S. Sharmila, L. Jeyanthi Rebecca, P. Naveen Chandran , E. Kowsalya, Himadri Dutta, Sourav Ray and N. R. Kripanand , “Extraction of biofuel from seaweed and analyse its engine performance,” *International Journal Of Pharmacy & Technology*, vol 7, pp 8870-8875.

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