The AJAS THE ASIAN JOURNAL OF ANIMAL SCIENCE
Volume 7 | Issue 1 | June, 2012 : 52-57

RESEARCH ARTICLE

Amino acid profile and protein quality assessment of a novel single cell protein as an animal feed supplement

LEA MATHEW, V.P. POTTY AND G.M. NAIR

ABSTRACT - The study was intended to develop a single cell protein by solid state fermentation (SSF) technique using vegetable waste as the substrate. The SCP with high protein content and good nutritional value was developed to be supplemented in animal feed formulations. The fungal culture used for SSF, molecularly identified as *Penicillium oxalicum* NFCCI 2136, was an indigenous culture isolated from vegetable waste. The SCP showed a fairly high crude protein content of 38 per cent , a 197 per cent increase of protein content from the unfermented sample. The amino acid profile of the SCP was determined to assess its nutritional quality and it was compared with other Food and Agriculture Organization (FAO) standard reference proteins and conventional foods. The SCP was found to be rich in essential amino acids like leucine, methionine, tryptophan and phenylalanine. This was followed by computing the essential amino acid index, nutritional index, biological value and computed–protein efficiency ratio of the SCP. In addition, a multimycotoxin analysis of the SCP reported that the analyzed mycotoxins were not detected in the final product. The importance of this study lies in the fact that an indigenous fungal culture isolated from vegetable waste was used as protein enrichment, which can be suggested as an efficient method of solid waste management coupled with protein production.

KEY WORDS - Single cell protein, Solid state fermentation, Essential amino acid index, Nutritional index. Biological value, Computed –Protein efficiency ratio

HOW TO CITE THIS ARTICLE - Mathew, Lea, Potty, V.P. and Nair, G.M. (2012). Amino acid profile and protein quality assessment of a novel single cell protein as an animal feed supplement. *Asian J. Animal Sci.,* **7**(1) : 52-57.

ARTICLE CHRONICLE - Received : *06.04.2012;* Sent for revision : *20.04.2012;* Accepted : *23.05.2012*

Author for Correspondence -

LEA MATHEW
Department of Civil Engineering,
College of Engineering,
THIRUVANTHPURAM
(KERALA) INDIA
Email: mpolackal@hotmail.com

See end of the article for **Coopted authors'**

INTRODUCTION

Microorganisms can be cultivated on agro-industrial products with production of large amounts of cells rich in proteins that commonly contain all the essential amino acids, in addition to favourably high vitamin and mineral levels (Kuhad *et al.*,1997). It has been reported that Solid Sate Fermentation (SSF) is the most appropriate process in developing countries for the production of single cell protein, due to the advantage it offers (Carrizales and Jaffe, 1986). SSF resembles the natural habitat of microorganism and is, therefore, preferred choice for microorganisms to grow and produce useful value added products (Singhania *et al.,* 2009). The implication of a cheap and abundantly available raw material for SCP production using microbial species could be one of the best possible technologies for SCP commercialization. The amino acid composition is the most important factor in defining food or feed protein quality, followed by the digestibility of the protein and bioavailability of its amino acids (Sindayikengera and Wen-Shui, 2006). While considering the quality of SCP, the amount of protein and amino acid extracted from it needs to be determined, in order to verify it as a productive protein (Ahmadi *et al.*, 2010). Solid-state cultivation of *Aspergillus niger* and *Bacillus coagulans* were carried out to enrich the nutritional value of plant ingredients to use as aqua feed ingredients. The single-cell protein produced here contained all of the essential amino