



Food
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SINGLE CELL PROTEIN PRODUCTION

PROGRESS REPORT - MAY 1991

EXECUTIVE SUMMARY

The objective of the single cell protein (SCP) project is to provide the most suitable technology for large scale production of SCP in South Africa through the execution of a number of co-ordinated tasks. This progress report covers the period 1 November 1990 to the completion of the project at the end of March 1991.

As part of an ongoing isolation programme, a further 165 yeast strains were recovered and tested for suitability in the production of SCP from hexose containing raw materials such as sugar juice and molasses. None of the tested strains were superior to the previously selected strain of choice, *Candida utilis* ATCC 9950.

Further laboratory scale continuous culture optimization studies were carried out on pentose assimilating strains of *Candida blankii* selected previously as candidates for SCP production on hydrolysed sugar-cane bagasse viz CSIR-ESP171 and UOVS-64.2. The use of either of these strains and possibly a protoplast fusant of ESP171, Fusant-H84, will form the basis of the proposed commercial process.

Fermentation optimization data plus data on bagasse pre-treatment and downstream processing on a laboratory and pilot scale have proved adequate for a preliminary economic analysis of the proposed process.

The internal rate of return (IRR) for a process in which bagasse is used during the crushing season (8 months) and molasses during off-crop (3 months) is 18,6%. The process is highly sensitive to SCP price escalation. Should the cost of SCP rise by 20% p.a, against a general inflation rate of 14%; the expected IRR would exceed 27%.

BESTUURSOPSOMMING

Die doel van die enkelselproteïen (ESP) projek is om deur die uitvoering van 'n aantal gekoördineerde take die mees geskikte tegnologie vir grootskaalse ESP-produksie in Suid-Afrika te verskaf. In hierdie vorderingsverslag word die laaste gedeelte van die projek vanaf 1 November 1990 tot die voltooiing aan die einde van Maart 1991 gedek.

Tydens 'n voortgesette isolasieprogram is 'n verdere 165 gisstamme geïsoleer en geëvalueer t.o.v. hul geskiktheid vir ESP-produksie vanaf heksose-bevattende rou materiale, soos suikerrietsap en melasse. Geeneen van die geëvalueerde stamme was beter as die vorige beste gisstam, *Candida utilis* ATCC 9950 nie.

Die optimalisering van kontinue kultuur studies op laboratoriumskaal is voortgesit op pentose-benuttende stamme van *Candida blankii*, CSIR-ESP171 en UOVS-64.2. Hierdie giste is gekies as kandidate vir ESP produksie op gehidroliseerde suikerriet bagasse. Die gebruik van enigeen van hierdie stamme, of moontlik 'n protoplastversmeltingsproduk van ESP171, Fusant-H84, sal die basis van die voorgestelde kommersiële proses vorm.

Inligting oor die optimalisering van die fermentasieproses, die vooraf behandeling van bagasse, sowel as die stroom-af behandeling op laboratorium- en loodsaanlegkskaal, blyk voldoende te wees vir 'n voorlopige ekonomiese analiese van die voorgestelde proses.

Die interne opbrengskoers vir 'n proses waar bagasse gedurende die maalseisoen (8 maande) en melasse gedurende die afseisoen (3 maande) gebruik word, is 18,6%. Die proses is hoogs sensitief vir ESP prysstygings. Indien die ESP prys te midde van 'n algemene inflasiekoers van 14% met 20% per jaar sou styg, sal die verwagte interne opbrengskoers 27% oorskry.