Trichophyton mentagrophytes strains, normally coloured, become colourless on repeated subculturing on Sabouraud's medium[7]. As shown by the present results, this could occur also in our strain since we have shown a phenomenon indicating the reversible repression of the genes for the 'colour' enzymes.

Our observations are of interest in that they suggest the existence in fungi of genes that can be alternatively repressed and de-repressed, depending on the environmental conditions. Our system therefore represents a model for studying the still unknown controls of the genes expression in fungi.

Riassunto. Il Phosfon D, composto ritardante la crescita nelle piante superiori, induce la comparsa di pigmenti chinonici in un ceppo incolore del fungo dermatofita *Trichophyton mentagrophytes*. Viene ipotizzato che il Phosfon D dereprima i geni per gli enzimi catalizzanti la sintesi dei pigmenti neoformati.

G. L. VANNINI[19], G. DALL'OLIO[19] and A. BONORA[20,21]

Istituto di Botanica dell'Università, Corso Porta Mare 2, I-44100 Ferrara (Italy); and Istituto di Farmacologia dell'Università, Via Fossato di Mortara 64b, I-44100 Ferrara (Italy),
21 July 1973.

[19] Present address: Istituto di Botanica, Università di Ferrara, Corso Porta Mare 2, I-44100 Ferrara (Italy).
[20] Present address: Istituto di Farmacologia, Università di Ferrara, Via Fossato di Mortara 64b, I-44100 Ferrara (Italy).
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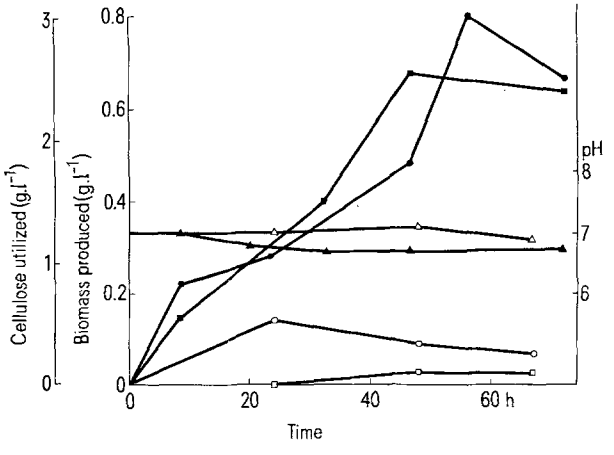
Production of Single-Cell Protein from Waste Paper by a Mixed Culture

The industrial development of Latin America has revealed new problems, such as the exodus of the rural masses toward urban centers in search of employment[1]. This has contributed considerably to a spectacular increase in the municipal solid wastes, a fact especially observed in Mexican cities where in the last 10 years the output has more than doubled. About 40% of that refuse is represented by paper and cardboard[2,3]. In high developed countries like the United Kingdom, the latter figure is close to 50%[4].

The necessity of maintaining or improving the environment, as well as the protein shortage, make imperative the research of processes for conversion of cellulose wastes into microbial foods. In the present paper, the results obtained with the direct transformation of newspaper to biomass will be given.

Materials and methods. Isolation of Y-11 cultured used in these experiments, consisting of 2 gram-positive and 1 gram-negative rods, has been previously described[3].



Biomass production, cellulose utilization and variation of pH using the mixed culture Y-11. The non-degraded newspaper from a first experiment was washed and dried at 55 °C and reused in a new fermentation run.

	Experiment 1	Experiment 2
Biomass produced (g/l^{-1})	●—●	○—○
Cellulose utilized (g/l^{-1})	■—■	□—□
pH	▲—▲	△—△

The fermentation medium contained (in g/l of tap water): finely ground Excelsior newspaper, 20; $(NH_4)_2SO_4$, 4.0; KH_2PO_4, 1.0; KCl, 0.5; $MgSO_4 \times 7H_2O$, 0.5; and corn steep liquor, 1.0. The fermentor used throughout this study was a 14-liter total capacity (Fermentation Design, Inc.) with a working volume of 9 l. The fermentor was autoclaved at 15 psig for 30 min and operated aseptically. Temperature was controlled at 37 °C, initial pH was 7.0 and agitation was at a speed of 400 rpm. Aeration was not at a constant rate, but was controlled by a dissolved oxygen probe[5]. On-off control was used and arranged so that the dissolved oxygen partial pressure did not fall below 0.10 atm. Inoculum was grown in 500-ml Erlenmeyer flasks containing 50 ml of medium and incubation was carried out for 1 day. In all cases 5% (v/v) inoculum was utilized. Each analyzed sample from the fermentor was usually composed of 3 subsamples taken one after each other with an interval of approximately 4 min between subsamples. Cell concentration was determined on a protein basis by a modified LOWRY method using the Folin-Ciocalteu reagent[6,7]. Cellulose was measured by a semimicro method[8].

Results and discussion. In experiment 1 (Figure) the highest cell mass production was attained at the 56th h of cultivation, declining after that time, probably due to lysis of the mixed culture. The utilization of the newspaper also tended to decline following the time period when 2.55 g/l^{-1} of cellulose had been consumed. The pH changed from 7.0 to 6.7. During the fermentation the approximate population ratio was constant. The bacterial cell count consisted of 99% of the 2 gram-positive rods and 1% of the gram-negative rod. Some of the characteristics of the Y-11 culture have already been published[3],

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although no attempts have been made to identify the bacterial species. The calculated yield, in grams of cells per gram of cellulose used, was 0.29. When the medium was not supplemented with corn steep liquor, cell yield was 0.19.

A second experiment was conducted (Figure) in which the non-utilized paper of the previous experiment was reused with fresh fermentation medium, which included all the components except newspaper. The object was to determined if cellulose consumption in experiment 1 was stopped by the deficiency of some nutrient. As can be observed, the values of biomass produced and cellulose utilized were very small. According to AMEMURA and TERUI[9], the amorphous regions in the fringe micelles of pulp cellulose are first attacked, leading to an enrichment of crystalline segments, the latter being the most difficult to solubilize. The resistance of the newspaper to further degradation can probably be explained by the fact that the cellulases produced by the Y-11 culture could only attack the sites more accessible, leaving undegraded most of the crystalline regions.

The conversion of cellulosic wastes into microbial protein is attracting attention. Further studies for the improvement of the substrate utilization are being carried out.

Resumen. Se aisló un cultivo mixto denominado Y-11 con el cual se estudió la conversión de papel periódico a biomasa. Los trabajos se llevaron a cabo a nivel de fermentador. El residuo sólido no degradado de una fermentación previa, fué reutilizado con nuevo medio de cultivo con objeto de determinar si la hidrólisis de esta fuente celulósica se detenía por el agotamiento de algún nutriente o por otros factores.

O. PAREDES-LÓPEZ, J. E. MEDOZA-MADRID and E. CAMARGO

Departamento de Biotecnología, Laboratorios Nacionales de Fomento Industrial, Apdo. P. 41-537. Mexico 10. (D.F. Mexico), 3 August 1973.

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Direct Shell Acquisition by Hermit Crabs from Gastropods

Hermit crabs commonly live in and carry about 'empty' gastropod shells. Acquisition of these shells by means of shell exchange between individuals has been well documented[1-4]. However, for years, biologists have wondered how 'new' gastropod shells (i.e., from freshly killed gastropods) are introduced into the hermit crab population. MAGELHAES[5] hypothesized that hermit crabs prey on gastropods for the shell, while BRIGHTWELL[6-7] gave evidence from laboratory work that the hermit crab *Pagurus bernhardus* acquires shells by removing gastropods injured by predatory fishes. No one to date, however, has observed the acquisition of 'new' gastropod shells in the field or described the mechanisms by which this essential resource enters the hermit crab community. This is of obvious importance to a basic understanding of the structure of any marine ecosystem in which hermit crabs are found. This paper presents the first account of the acquisition of new shells from gastropods just killed by natural predators.

Four species of hermit crabs, *Pagurus pollicaris* SAY, *P. longicarpus* SAY, and *P. annulipes* (STIMPSON) from St. Joseph Bay, Gulf Co., Florida, and *Paguristes grayi*

Sites of predation on gastropods attended by *Pagurus pollicaris*, species of predator and prey gastropods and outcome of competition for prey shell

No. and type of site	No. and species of crabs present	Predator species	Prey species	Rank of crab getting new shell and outcome of competition for shell
1 Prepared	5 *Pagurus pollicaris*	*Fasciolaria tulipa*	*Fasciolaria hunteria*	1, Dominant acquired shell
2 Prepared	6 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	1, Dominant acquired shell
3 Prepared	7 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	1, Dominant acquired shell
4 Prepared	10 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	1, Dominant acquired shell
5 Natural	3 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	1, Dominant acquired shell
6 Natural	3 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	2, Dominant rejected small shell
7 Prepared	14 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	3, Dominant rejected small shell
8 Prepared	12 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	3, Dominant rejected small shell
9 Prepared	4 *Pagurus pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	0,[1] Dominant rejected small shell
10 Prepared	5 *Pagurus pollicaris*	*F. tulipa*	*Fasciolaria hunteria*	0,[2] Dominant rejected small shell
11 Prepared	4 *Pagurus pollicaris*	*F. tulipa*	*Fasciolaria hunteria*	2, Dominant rejected small shell
	1 *Pagurus longicarpus*			
12 Prepared	6 *P. pollicaris*	*F. tulipa*	*Fasciolaria hunteria*	4, Dominant lost shell while fighting
13 Prepared	4 *P. pollicaris*	*Pleuroploca gigantea*	*Fasciolaria hunteria*	3, Dominant lost shell while fighting
14 Prepared	11 *P. pollicaris*	*F. tulipa*	*Fasciolaria hunteria*	2, Dominant not near enough to prey
	1 *P. longicarpus*			
15 Prepared	4 *P. pollicaris*	*F. tulipa*	*Fasciolaria hunteria*	4, Dominant not near enough to prey
16 Natural	4 *P. pollicaris*	*P. gigantea*	*Fasciolaria hunteria*	3, Dominant not near enough to prey
17 Natural	6 *P. pollicaris*	*F. hunteria*	*Polinices duplicatus*	0, Gastropod not completely eaten
	2 *P. longicarpus*			
18 Prepared	1 *P. pollicaris*	*P. gigantea*	*F. hunteria*	0, Only one crab present
19 Prepared	1 *P. pollicaris*	*P. gigantea*	*F. hunteria*	0, Only one crab present
20 Natural	1 *P. pollicaris*	*P. gigantea*	*F. hunteria*	0, Only one crab present

[1] Shell too small for use. [2] Shell dragged from site, abandoned, then occupied by crab not present at site.