

Project: Bioactivity in protein hydrolysates as supplements to mammalian cell cultures

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Background

The protein hydrolysates typically used in the food industry have been a source of supplements that can be used as a substitute for serum. These are typically of plant or microbial origin such as the wheat, soy, rice, cotton and yeast hydrolysates produced by Kerry. These are a good source of bioactive components of non-animal origin that support the growth and productivity of producer cell lines used for the large-scale manufacture of biopharmaceuticals including monoclonal antibodies and vaccines. However, the hydrolysates are of largely unknown and variable composition. There is considerable value in identifying bioactive components in these hydrolysates. In the first instance this information could be used to identify markers for the most promising hydrolysates. Secondly, the chemical

identification of the bioactive component(s) could lead to the formulation of fully chemically-defined media that maximise productivity in bioprocesses.

(a) The value of serum-free media for these studies has been widely recognised (Butler, 1986).

(b) The value of using protein hydrolysates from plant or microbial sources was recognised because of their unidentified composition of bioactive components and apparent absence of animal viruses or prions.(Butler,2013)

(c) Methods were developed to fractionate the hydrolysates in an attempt to characterize bioactive components (Spearman et al, 2014).

(d) This led to the identification of some individual components in yeast hydrolysate that could produce enhanced cell growth and productivity (Spearman et al, 2014).

Butler, M. 1986. "Serum-free media" pp. 91-108 In Mammalian Cell Technology; ed. W.G. Thilly; Butterworths

Butler M. Serum-free media: standardizing cell culture systems. Pharm. Bioprocess. 1(4), 1–4: 2013

Spearman M, Lodewyks C, Richmond M, Butler M. The bioactivity and fractionation of peptide hydrolysates in cultures of CHO cells. Biotechnol Prog. 30(3):584-93: 2014

Spearman M, Chan S, Jung V, Kowbel V, Mendoza M, Miranda V and Butler M. Components of yeast (*Sacchromyces cervisiae*) extract as defined media additives that support the growth and productivity of CHO cells. J Biotechnol 233, 139-142: 2016

Proposal

To evaluate the growth-promoting activity of multiple protein hydrolysates in culture media.

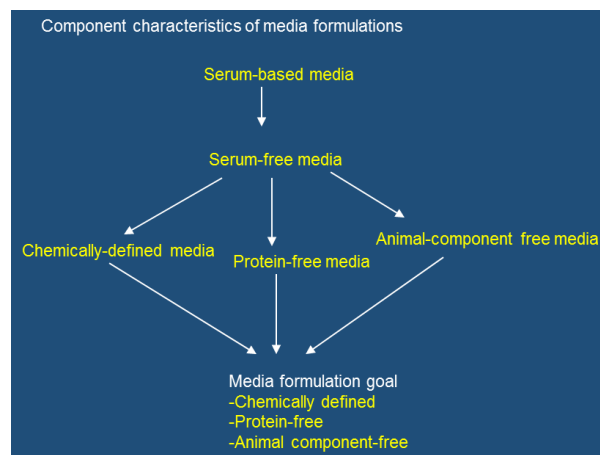
To evaluate the productivity of mAbs as secreted products from these lines.

To fractionate the bioactivity of selected hydrolysates by chromatography.

To characterise the chemical composition of the active fractions .

To identify critical bioactive components in these bioactive fractions.

To formulate a chemically-defined media incorporating the identified components



This project is supported by Kerry and Enterprise Ireland

