Process for Increased Yeast Biomass

BACKGROUND

In the food industry, yeast biomass is seen as an excellent source of protein, nucleic acids, and vitamins. Yeast is also widely used in human and veterinary medicine for the production of antibiotics, bioengineered proteins, nutraceuticals, dietary supplements, and other consumer products. For instance, β-glucan a constituent of yeast cell wall is a well-known biological immunomodulator such that it has the ability to prime and activate the immune system. Yeast's wide applicability calls for efficient methods to increase its biomass, which has always been challenging due to catabolite repression, which reduces yields. Hence, there is a need to develop new methods and procedures to address this problem. The current invention is one such solution, leading to a low cost doubling of biomass for natural or engineered strains of yeast.

INVENTION

This Invention relates to a process for increasing yeast biomass by 1.5 to three-fold. The basis is growing yeast in medium containing at least one fermentable carbon source and a non-fermentable carbon source. This invention also relates to a process that can increase growth rate by two-fold and augment the biomass of yeast strains engineered to metabolize naturally non-metabolized carbon sources or any engineered yeast to produce useful commercial products. This invention relates to the process wherein the yeast are grown at a temperature of 24-37°C. The basis is culture in the presence of at least one fermentable carbon source (0.05% sugar source such as molasses) and a non-fermentable carbon source (1-3%ethanol). This invention also relates to a process comprising tailoring the degree of agitation and aeration to maximize the yield. The key to increase is inclusion of ethanol (an inexpensive adduct) into the feedstock under specific growth regimens accessible to small and large production facilities.

APPLICATIONS

- This Invention increases yeast biomass in culture by 50% to 300% for natural strains and strains engineered to metabolize naturally non-metabolized carbon sources (such as modified cellulosic feedstocks), or strains engineered to produce useful commercial products.
- The current invention increases growth rate by up to two-fold.
- The current invention increases the yield of the product by inclusion of ethanol into the feedstock under specific growth regimens accessible to small and large production facilities.

ADVANTAGES

- The use of ethanol (an inexpensive adduct) as a non-fermentable carbon source.
- The growth of yeasts in media containing a sugar, disaccharide, oligosaccharide or polysaccharide supplemented with ethanol increases growth rate, prolongs growth, increases biomass produced, and increases yield of specific products of yeast growth.
- Increase efficiency of industrial and research processes that depend on growing yeast, including, but not limited to, natural yeast products, yeast product food stuffs, and biopharmaceuticals expressed by genetic modifications in yeast.

MARKET

The Global Yeasts, Yeast Extracts, Autolysates Market is poised to grow at a CAGR of around 8.5% over the next decade to reach approximately $16.31 billion by 2025.

TEAM

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