

ABSTRACT

**BIOLOGICAL AND CHEMICAL PROCESS UTILIZING
CHEMOAUTOTROPHIC MICROORGANISMS FOR THE
5 CHEMOSYNETHETIC FIXATION OF CARBON DIOXIDE AND/OR OTHER
INORGANIC CARBON SOURCES INTO ORGANIC COMPOUNDS, AND
THE GENERATION OF ADDITIONAL USEFUL PRODUCTS**

The invention described herein presents compositions and methods for a
10 multistep biological and chemical process for the capture and conversion of carbon
dioxide and/or other forms of inorganic carbon into organic chemicals including
biofuels or other useful industrial, chemical, pharmaceutical, or biomass products.
One or more process steps utilizes chemoautotrophic microorganisms to fix inorganic
carbon into organic compounds through chemosynthesis. An additional feature
15 described are process steps whereby electron donors used for the chemosynthetic
fixation of carbon are generated by chemical or electrochemical means, or are
produced from inorganic or waste sources. An additional feature described are
process steps for the recovery of useful chemicals produced by the carbon dioxide
capture and conversion process, both from chemosynthetic reaction steps, as well as
20 from non-biological reaction steps.

FIG.1