CLAIMS

1. A method of enhancing fermentation efficiency of a microorganism selected from lactic acid bacteria, bifidobacteria, yeast, or algae for the production of beer, cider, wine, a biofuel, bread, dairy product or any combination thereof, the method comprising:

contacting fermentation medium containing a carbon source and a lactic acid bacterium, *Bifidobacterium*, yeast, or algae capable of fermentation with methylsulfonylmethane (MSM), wherein the MSM is provided at a concentration of 0.02% to 5% by weight of the fermentation medium, wherein the MSM increases the fermentation efficiency of the lactic acid bacterium, *Bifidobacterium*, yeast, or algae for the production of beer, cider, wine, a biofuel, bread, dairy product or any combination thereof as compared to the fermentation efficiency of the lactic acid bacterium, *Bifidobacterium*, yeast, or algae for the production of beer, cider, wine, a biofuel, bread, dairy product or any combination thereof in the absence of added MSM.

2. The method of claim 1, wherein the MSM is provided in an amount sufficient to produce an at least 50% increase in alcohol, carbon dioxide or acid production in the presence of added MSM by the microorganism as compared to alcohol or acid production in the absence of added MSM.

3. The method of claim 2, wherein the MSM is provided in an amount sufficient to produce an at least 50% increase in production of ethanol, methanol or a combination of thereof as compared to production of ethanol, methanol or a combination of thereof in the absence of added MSM.

4. The method of any one of claims 1-3, wherein the microorganism is yeast and the method of enhancing fermentation is for the production of beer.

5. The method of claim any one of claims 1-3, wherein the microorganism is algae and the method of enhancing fermentation is for the production of biofuel.

6. The method of claim 2, wherein the MSM is provided in an amount sufficient to produce an at least 50% increase in carbon dioxide production in the presence of added MSM by

the microorganism as compared to carbon dioxide production in the absence of added MSM, the microorganism is yeast and the method of enhancing fermentation is for the production of bread.

7. The method of claim 2, wherein the MSM is provided in an amount sufficient to produce an at least 50% increase in lactic acid production in the presence of added MSM by the microorganism as compared to lactic acid production in the absence of added MSM and the method of enhancing fermentation is for the production of a dairy product.

8. The method of any one of claims 1-7, wherein the concentration of MSM is 0.5%.

9. The method of any one of claims 1-8, wherein the fermentation medium comprises a sodium chloride concentration of less than 5% of total moisture content of the fermentation medium.

10. A method for enhancing growth of a microorganism in a diagnostic test sample comprising blood, tissue, bodily fluids, or a combination thereof, the method comprising:

contacting the diagnostic test sample and one or more microorganisms with a fermentation medium comprising a carbon source and that is capable of supporting growth of the one or more microorganisms;

providing methylsulfonylmethane (MSM) to the fermentation medium at a concentration of 0.02% to 5% by weight of the fermentation medium, thereby enhancing the growth of the one or more microorganisms in the diagnostic test sample as compared to growth of the one or more microorganisms in the absence of added MSM.

11. The method of any one of claims 1-9, wherein the method increases the fermentation efficiency of the lactic acid bacterium, *Bifidobacterium*, yeast, or algae in producing primary metabolites for use in the production of beer, cider, wine, a biofuel, bread, dairy product or any combination thereof.

12. The method of claim 11, wherein the primary metabolite is selected from an alcohol, a carbohydrate, lactic acid, carbon dioxide, or any combination thereof.