

# ALIEN PROPERTY CUSTODIAN

## ENRICHING BEER WITH VITAMINS

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The present invention relates to a method of enriching beer with vitamins and other active substances of the yeast. The new method consists in carrying out the enrichment of the beer with the vitamins and other active substances of the yeast by the use of yeast plasmolyzed with sugar or highly concentrated beer wort (malt extract) respectively. This method is adapted for the treatment of normal beers as well as beers produced by the use of sugar.

According to the known methods of enriching beer with the vitamins and other active substances of the yeast the destruction of the yeast cells is effected mechanically by autolysis. In contradistinction to these known methods according to the invention another way, i.e. the plasmolysis of the yeast cells, is proposed whereby the fluid of the cell together with the vitamins and other active substances of the yeast is discharged from the cells by osmotic effect.

The new method of enriching beer with vitamins and other active substances of the yeast is far superior to the known methods and this on the one hand, because the plasmolysis of the yeast is technically more simple and therefore more economically to be carried out as for instance a mechanical destruction of the yeast cells by autolysis or by heat treatment, and on the other hand because the treatment of the yeast is effected more tenderly than in connection with the above mentioned known methods.

The mechanical treatment of the yeast requires the use of expensive and complicated devices of the kind of colloid mills to ensure the destruction of the wall or the skin of the cell. The autolysis has the disadvantage that a very close supervision of its process is required to prevent the formation of poisonous substances and, moreover, the autolysate must be subjected to extensive, complicated and expensive cleaning methods causing losses before the autolysate is adapted to vitaminize beer.

The heat treatment of the yeast always is accompanied by an injury of the vitamins and other active substances, because only by an intensive heat treatment it is possible to obtain that certain amounts of the contents of the cells are discharged from the yeast cell or that the skin of the cells is attacked effectively. Moreover, the heat treatment for instance of the wort or beer itself always is accompanied by undesired alterations of the taste.

It is surprising that the most simple way of enrichment of beer with the vitamins and other active substances of the yeast, i.e. the use of

yeast plasmolyzed with sugar or highly concentrated beer wort (malt extract) respectively, hitherto has not been proposed in spite of the fact that this field of the technics has been thoroughly elaborated since a number of years. The new method is also particularly adapted for sweet beers, because then the sugar of the sweet beers itself may be used to plasmolyze the yeast and thereby, during the ordinary production of beer, to prepare and decompose respectively the yeast for the purpose in question.

It is known since a long time to produce yeast plasmolysates and to use them for instance as dietetics and nourishments. Considering this state of the art, it is all the more surprising that it has never been thought of using a portion of the sugar of the sweet beers or of the malt extract to plasmolyze the yeast and thereby to effect the final sugaring of the sweet beers or the final preparation of another beer wort.

The new method will now be explained in connection with the production of a caramel-malt-beer. The conditions are similar in connection with top-fermenting beers, as malt beer, caramel-malt beer free of alcohol ect. produced under addition of sugar (saccharose).

The ordinary caramel-malt beer for instance is obtained in the following manner.

In accordance with one of the usual boiling methods, dark worts of about 6,5-7,0% mother wort are brewed and started with top-fermenting yeast. The beer remains for four days in the tun for fermentation and is then pumped to a stock tub. The after-fermentation lasts four to six days and finally an alcohol content between 1,2 to 1,4% remains. The after-fermentation is very slight and this is true also for the content of carbonic acid. This beer now is brought to a mother wort of 11 to 12% by means of a fifty % sugar solution, admixed with yeast and bottled. The bottles then are brought into the pasteurizer and are maintained at temperatures between 20 and 30° C until the yeast ferments. Thereupon the temperature is raised up to the usual pasteurizing temperatures and maintained for a certain time. The production of carbonic acid in the bottle, depends on the time within which at the most suitable temperature the newly added yeast acts upon the sugars in the beer adapted to be fermented. The time is directly proportional to the amount of fermented extract. Together herewith alcohol is newly formed, whereupon the same legality proves right. In the practical operation, the sparkle formation in the bottle is empirically

ascertained. Therefore, from the original beer containing

Mother wort.....	6,35
Real extract.....	3,74
Apparent extract.....	3,05
Alkohol .....	1,40

a sugared beer having the following features:

Real extract.....	9,20
Apparent extract.....	8,55
Alkohol .....	1,45

is obtained.

The present operating method shows that a sugar solution of about 50% is used.

This sugar solution allows in a very simple manner to enrich the artificially sugared kinds of beer in question with the vitamins and other active substances of the yeast. For carrying out the method according to the invention the sugar is not used as such, for instance in the form of the known 50% sugar solution, but a plasmolysis of yeast, preferably of top-fermenting brewery yeast, is first effected with the sugar. To this end for instance, pressed top-fermenting brewery yeast having a water content of about 75 to 80% is mixed with about the same amount of sugar (saccharose). In short time plasmolysis of the yeast occurs under volatilization and a sugar liquid and yeast cell fluid having a content of about 50% of sugar, 10 to 12, 5% of dry yeast substance and about 40,0 to 37,5% of water results. In other words, the usual 50% sugar solution is present again which may be used for sugaring in the same manner as the sugar solution without yeast plasmolysate. Eventually the liquefied plasmolysate product may be purified before use by filtration, centrifugation or the like and may also be subjected to the usual heat treatment.

If for instance in connection with a malt beer of a composition according to the above analysis sugaring is effected in such a manner that 10 litres of a 50% sugar solution are used in combination with 90 litres of fermented wort, then in accordance with the new method for instance 9 litres of sugar solution and 1 litre of yeast sugar plasmolysate or 8 litres of sugar solution and 2 litres of yeast sugar plasmolysate etc. are used, whereby the yeast-sugar plasmolysate preferably also is adjusted to a 50% sugar content.

As far as the taste is concerned sweet beers vitaminized in accordance with the present invention do not differ from ordinary non-vitaminized sweet beers.

The method is not limited to top-fermented, sugared special beers as have been mentioned above, but may also successfully be used in connection with sugared underfermented export beers.

For not sugared beers, for instance underfer-

mented shank beers or lager-beers, the method for instance may be carried out in such a manner that a small portion of the boiling house-wort is so highly concentrated that the maltose-content is sufficient to plasmolyze the yeast, i. e. for instance is evaporated as far as to the consistency of the well known malt extracts. This malt extract then is used for the plasmolysis of the yeast and a malt extract-plasmolysis-product results which, if required after dilution to the concentration of the boiling house wort, may be added again to the latter before starting fermentation. More advantageously is a later addition to the beer preferably after completion of the main fermentation. In the same manner as the malt extract-yeast-plasmolysate the sugar-yeast-plasmolysate may be used in connection with the non-sugared usual beers, because the quantities of plasmolysate required for vitaminizing for instance one kg of plasmolysate for 100 litres of beer add slight quantities of sugar to the beer only. In connection with such shank-and lager-beers, having an added sugar-yeast-plasmolysate or malt extract-yeast-plasmolysate, the sugar or the substances of the malt extract capable of being fermented are fermented in the usual manner.

Finally it is to be pointed out that a proportion of 1:1 of sugar to yeast is not absolutely required, but that other proportions also are possible.

In the manufacture of the plasmolysate it is not necessary to start with pressed yeast, but dried yeast also may be employed in which case, of course, a certain addition of water is required to allow the plasmolysis operation.

Top-or under-fermenting brewery yeast eventually deprived of bitterness before the plasmolysis may be used with advantage for carrying out the method according to the invention. Other yeasts adapted for nourishing and appetising purposes, as pressed yeast, also come into consideration for the production of the plasmolysate for the purpose of vitaminizing beer.

For the plasmolysis of yeast in accordance with the present method generally saccharose or maltose, the latter in form for instance of malt extract, are used. In special cases, however, also other kinds of sugar, as glucose, lactose, the latter for instance in the form of concentrated whey may be used, but also starch sirup and invert sugar may be employed.

To enrich the beer also with the vitamin C a sugar yeast plasmolysate may be used which in turn previously has been provided with vitamin C, for instance in the form of l-ascorbine acid; 1 kg of sugar-yeast-plasmolysate is adapted as carrier of for instance 0,25 gr l-ascorbine acid.

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