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BEER AND OTHER BEVERAGES AND THEIR MANUFACTURE

This invention relates to beer and other beverages and to their manufacture. In particular the invention is
5 concerned with the incorporation into a beverage of an additive enabling the beverage to have a head formed on it or to improve the quality of the head that can be formed on it.

10 The invention is primarily applicable to beer, and the term beer is used herein to designate generally any of a variety of alcoholic beverages made by the fermentation of hopped malt wort; it thus includes within its scope
15 ales, lagers and stouts. Beer itself is normally dispensed with a head, but there are also other beer-like beverages that are, like beer, bright and without haze and that are normally dispensed with a head and to which the invention is also particularly applicable, these including
20 beverages which include little or no alcohol but otherwise resemble beer quite closely.

In addition to such beer-like beverages the invention may be applied both to other beverages which are bright and without haze and customarily dispensed with a
25 head and to beverages which are bright and without haze and which have not hitherto been customarily dispensed with a head. These latter beverages may include wines, 'made wines', fortified wines and spirits. The invention is particularly applicable to carbonated beverages, both
30 alcoholic and non-alcoholic, as the release of gas which tends to occur as the beverage is dispensed encourages a tendency to head-formation.

The foam or head that is normally present on a glass
35 of beer is an important feature of the beer, and it has been found that many consumers, when judging the quality

of a beer, consider that for a beer to have a head of good quality is one of the most important factors in that beer's favour. Much the same is also true of other beverages on which a head is formed. It is considered
5 that a head is of good quality if it has a number of attributes, among which are stability, the ability to form 'lacing', that is a lace-like pattern of bubbles left on the side of the glass after the liquid beer or other beverage has been wholly or largely consumed, and a good
10 appearance, that is a good colour (usually a white colour) and a preponderance of small bubbles of substantially uniform size.

The nature of the head on a glass of beer or other
15 beverage depends principally on two factors, one being the constitution or composition of the beverage itself and the other being the way in which the beverage is dispensed. At least inasfar as its application to beer is concerned, the present invention is primarily concerned with the
20 former of those factors.

From a first aspect the present invention consists in a method of modifying or improving beer or other beverage, the beverage being bright and without haze, which
25 method comprises the step of incorporating in the beverage concerned an additive enabling the beverage to have a head formed on it or to improve the quality of the head that can be formed on it, the additive comprising protein fragments made by the partial hydrolysis of albumen.

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Albumen, i.e. white of egg, of a quality and purity suitable for its incorporation in foodstuffs, is a commercially available product that is relatively
inexpensive.

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The amount of additive required to improve the beer or other beverage can readily be determined by experiment. The characteristics of the head which tend to be particularly improved by the addition of the additive are the stability of the head, the whiteness of the head and the ability to form lacing. If the proportion of the additive in the beverage is further increased the beverage may become such that a head formed on it becomes excessively stiff, firm and stable.

It is generally found that the addition of proteins to beer tends to reduce the brightness of the beer or to induce visible haze in the beer. Moreover it is thought that when the beer is heated during pasteurisation there is some tendency for chemical reactions to occur, probably including polymerisation, which increase the tendency to haze-formation in the beer. Likewise the addition of albumen or other protein material to beverages other than beer appears to have similar consequences.

The present invention provides protein-based additives for beer and other beverages which are effective but which tend to give rise to less haze-formation than occurs when unaltered proteins are used.

The additive is preferably formed as an aqueous solution, and that solution may also contain a minor addition of ethyl alcohol.

The partial hydrolysis is preferably carried out with the aid of a pepsin.

Partial hydrolysis of the protein material can yield protein fragments large enough to improve the quality of the head, particularly the stability of the head, without giving rise to any noticeable or unacceptable increase in

haze, even on pasteurisation. The extent of the hydrolysis necessary to achieve such a result can readily be determined by experiment. It is likely that partial hydrolysis will yield a mixture which contains protein material that has not been hydrolysed and/or protein fragments that remain so long as to tend to lead to haze-formation. It is therefore preferred to separate at least some of such unhydrolysed protein material and/or excessively long protein fragments from the mixture before use. This is preferably effected by centrifuging the mixture and discarding the precipitate.

Therefore the additive used preferably comprises fragments of protein material separated from any remaining unsevered protein material.

In the manufacture of beverages that are not fermented the additive may be added at any desired stage of the manufacture. Likewise, in the manufacture of fermented beverages such as beer the additive may be added at any desired stage; nevertheless it is found that protein fragments tend to be destroyed or removed at various stages during manufacture, so it is preferred to add the additive at a relatively late stage. In particular, proteinaceous material tends to be destroyed during fermentation, so it is preferred to add the additive later than the fermentation stage. In addition there is a tendency for proteinaceous material to become concentrated in any froth that may be formed during manufacture and for it to be lost when such froth is discharged. Proteinaceous material may also be lost in any precipitates that may occur during manufacture. Therefore the additive may conveniently be added at a conditioning stage or at a brightening stage, but is preferably added before a pasteurisation stage.

As far as beer and beer-like beverages are concerned, the wort from which they are made usually contains quantities of proteinaceous material that would be quite sufficient for the formation of a head of good quality on the beverage if that material remained present in the same concentration throughout the manufacturing process. As explained above, however, it is normal for a significant proportion of the material to be lost at later stages in the process. The present invention, therefore, in adding proteinaceous material, can be thought of as providing in place of the lost material a replacement proteinaceous material.

From a second aspect the present invention consists in beer or another beverage modified or improved by a method in accordance with the first aspect of the present invention.

The invention will now be illustrated by the following Example.

Example

An aqueous solution of dried egg white is acidified so as to have a pH of 1.5. This is treated with pepsin for 30 minutes at 50°C. The solution is then taken to a pH of 6.5 and is heated to 65°C for 60 minutes. The mixture is then cooled and is centrifuged so that unhydrolysed protein forms a precipitate, which is removed by filtration. The resultant clear liquid is used as an additive for beer and has the effect of modifying or improving the head that can be formed on the beer.

An additive made by the method described in the foregoing Example may also be used as additives for



beverages other than beer but which, like beer, are bright and without haze. Such beverages may be of the kind on which a head is normally formed when the beverage is dispensed or of the kind on which a head has not hitherto
5 normally been formed.

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CLAIMS

1. A method of modifying or improving beer or other beverage, the beverage being bright and without haze
5 which method comprises the step of incorporating in the beverage concerned an additive enabling the beverage to have a head formed on it or to improve the quality of the head that can be formed on it, the additive comprising protein fragments made by the partial hydrolysis of
10 albumen.
2. A method according to claim 1 in which the additive is formed as an aqueous solution.
- 15 3. A method according to claim 2 in which the additive also contains a minor addition of ethyl alcohol.
4. A method according to any one of the preceding claims in which the additive comprises fragments of
20 protein material separated from any remaining unsevered protein material.
5. A method according to any one of the preceding claims in which the beverage is made by a process
25 including a fermentation stage and in which the additive is added at a stage later than the fermentation stage.
6. A method according to claim 5 in which the beverage is beer.
- 30 7. A method of modifying or improving beer or other beverage, the beverage being bright and without haze, which method comprises the step of incorporating in the beverage concerned an additive enabling the beverage to
35 have a head formed on it or to improve the quality of the



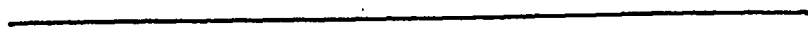
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head that can be formed on it, the method being substantially as hereinbefore described in the Example.

8. Beer or other beverage, which beverage is bright and without haze, the beverage being modified or improved by a method in accordance with any one of claims 1 to 7.

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