

Whatever the kind of barcode reader used, the geometrical configuration of the rotating brewing units in centrifugation extraction based systems prevents the barcode reader to read a code spread on a large section of the capsule: as a consequence, the dimensions of the barcode are strictly limited, leading to a very low quantity of coded information for a given level of reliability of the readings, typically around 20 bits only. In addition barcode readers are quite expensive.

Reliably reading code printed on a capsule while said capsule is positioned into a rotating brewing unit implies the reliable recognition of sequences of symbols forming said code, in particular in the harsh environment of the rotating brewing unit. Moreover, the code should also be readable, without knowledge by the code reader of the position and/or orientation in which the capsule has been inserted in the capsule holder. Traditional barcodes and other optical coding element known in the art for a capsule fail to meet these requirements.

Document WO-A-2011/141535 relates to a support adapted to be associated with or be a part of a capsule for the preparation of a beverage. The support comprises a section on which at least one sequence of symbols is represented so as that each symbol is sequentially readable, by a reading arrangement of an external device, while the capsule is driven in rotation about an axis of rotation, each sequence code a set of information related to the capsule. Such invention enables to make a large volume of coded information available, such as about 100 bits of redundant or non-redundant information, without using barcode readers having moving parts like a scanning element which may raise severe concerns in terms of reliability. Another advantage is also to be able to read the code support by rotating the capsule while the capsule is in place, in a ready to brew position in the rotary capsule holder. Document EP-A-2594171 discloses a code support according to the preamble of independent claim 1.

However, there is still a need to improve the pattern and/or structure of the code represented on the support to enhance the reliability of the readings, in the particular conditions met in a centrifugal beverage machine using capsules for the preparation of the beverage. It still exists a need to provide a capsule with a code reliably readable by a code reader without knowledge of the position and/or orientation of said code, when the capsule is positioned in the rotating capsule holder of a centrifugation extraction based system.

- 5
- reading separately, with the reading arrangement, each symbol of the code, while driving the rotational drive means so as to the capsule performs at least one complete revolution; and,
 - checking the validity of the read symbols and then determining a value for each sub-sequence of the sequence(s), using the error-checking symbols of each sub-sequence of each sequence.

Brief description of the figures

The present invention will be better understood with reference to the detailed description and the accompanying drawings, which are given as non-limiting examples of embodiments of the invention in which:

- 5 Figure 1 illustrates the basic principle of the centrifugal extraction;
- Figures 2a and 2b show an embodiment of the centrifugal cell with a capsule holder;
- Figures 3a, 3b and 3c show an embodiment of a set of capsules according to the invention;
- Figure 4 shows an embodiment of a code support according to the invention;
- Figure 5 shows an alternate position of the sequence on the capsule, in particular, when
10 placed on the underside of the rim of the capsule, and the capsule fitted into a capsule holder of the extraction device;
- Figure 6 shows a graphical representation of an example of the results of a NEB filter on a code with a common preamble used by all the sequence of the code;
- Figure 7 shows a graphical representation of an example of the results of a NEB filter on a
15 code according to an embodiment of the invention;
- Figure 8 shows a graphical representation of the number of equal bits in series for a code according to an embodiment of the invention.

Detailed description

- 20 Figure 1 illustrates an example of a beverage preparation system 1 in which a capsule according to an aspect of the invention may be used, aspects of the system 1 are described in more detail in WO2010/026053, which is incorporated herein by reference.

The beverage preparation system 1 comprises a centrifugal unit 2 that comprises a centrifugal cell 3 for exerting centrifugal forces on the beverage ingredient and liquid inside the capsule.

- 25 The cell 3 may comprise a capsule holder for receiving a capsule therein. The centrifugal unit is connected to driving means 5 such as a rotary motor. The centrifugal unit comprises a collecting part and an outlet 35. A receptacle 48 can be disposed below the outlet to collect the extracted beverage. The system further comprises liquid supply means such as a water

CLAIMS:

1. A code support (60a, 60b) to be associated with or part of a capsule intended for delivering a beverage in a beverage producing device by centrifugation of the capsule, the support comprising a code formed by at least a first sequence of symbols, said code being represented
5 on the support so that each symbol is sequentially readable by a reading arrangement of an external reading device while the capsule is driven in rotation about an axis of rotation, the first sequence comprising at least one first data sequence formed by at least two sub-sequences of symbols,
characterised by
10 each one of said at least two sub-sequences further comprising at least one error-checking symbol for allowing a validity check of the symbols of said sub-sequence,
wherein each sub-sequence of symbols within the first sequence is used to code distinct information related to the capsule.
2. The code support according to claim 1, wherein each distinct information comprises one
15 selected from a group consisting of: information related to a recipe for preparing a beverage with the capsule; code information related to the type of the capsule; information related to the ingredients stored in the capsule; information related to parameters for preparing a beverage with the capsule; information for retrieving locally and/or remotely parameters for preparing a beverage with the capsule; information related to the manufacturing of the capsule; and
20 information for retrieving locally and/or remotely information related to the manufacturing of the capsule.
3. The code support according to any one of the preceding claims, wherein the at least one error-checking symbol of each one of said at least two sub-sequences codes at least one parity bit, the parity bit obtained by performing a checksum of the symbols included in the corresponding
25 sub-sequence.
4. The code support according to any one of the preceding claims, further comprising at least a second sequence of symbols, the second sequence comprising at least one second data sequence identical to the first data sequence of the first sequence.
5. The code support according to any one of the claims 1 to 3, further comprising a whole
30 number n of sequences of symbols, each one of n sequence(s) comprising at least one data sequence identical to the first data sequence of the first sequence, the number n being greater

than or equal to 3.

6. The code support according to claim 5, wherein the whole number n is an odd number.

7. The code support according to any one of the claims 4 to 6, wherein each sequence further comprises at least one preamble sequence of symbols, and wherein the first sequence and at

5 least one other sequence have their preamble sequences distinct.

8. The code support according to claim 7, wherein each preamble sequence is formed by a plurality of preamble sub-sequences, said plurality of preamble sub-sequences being distributed over the sequence according to a pattern among the corresponding sequence.
9. The code support according to any one of the preceding claims, wherein the code comprises
5 at least 100 symbols.
10. The code support according to any one of the preceding claims, wherein the code is arranged along at least a eighth of the circumference.
11. The code support according to any one of the preceding claims, wherein the code is arranged along the entire circumference.
- 10 12. A capsule indented for delivering a beverage in a beverage producing device by centrifugation comprising a code support according to any of the preceding claims.
13. A system for preparing a beverage from a capsule according to claim 12, the system comprising said capsule and a beverage preparation device; wherein said device comprises capsule holding means (32) for holding the capsule and rotational drive means (5) for driving
15 the holding means and capsule in rotation along said axis of rotation; the beverage preparation devices further comprising a reading arrangement (100) configured for decoding the code represented on the code support:
- by reading separately each symbol of the code, while driving the rotational drive means (5) so as to the capsule performs at least one complete revolution; and,
 - 20 • by checking the validity for each distinct information of the read symbols and then determining a value for each distinct information of the sub-sequence of the sequence(s), using the error-checking symbols of each sub-sequence, of each sequence.

14. Method reading a code on a capsule according to claim 12, in a beverage preparation device comprising: capsule holding means (32) for holding the capsule and rotational drive means (5) for driving the holding means and capsule in rotation along said axis of rotation; the beverage preparation devices further comprising a reading arrangement (100), characterized in that the

5 method comprises the following step:

- reading separately with the reading arrangement (100), each symbol of the code, while driving the rotational drive means (5) so as to the capsule performs at least one complete revolution; and,
 - checking the validity for each distinct information of the read symbols and then
- 10 determining a value for each distinct information of the sub-sequence of the sequence(s), using the error-checking symbols of each sub-sequence of each sequence.