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(54) Title: SPICINESS ENHANCEMENT

(57) Abstract: The present relates to the use of yeast cell walls in crisp seasoning recipes comprising pepper and/or chili, to the crisp seasoning comprising yeast cell walls and to crisps comprising yeast cell walls.



SPICINESS ENHANCEMENT

Field of the invention

The present invention relates to the use of yeast cell walls in crisp seasoning recipes comprising pepper and/or chili. Further, the present invention relates to a crisp seasoning and to crisps.

Background of the invention

Yeast extracts are known for their taste enhancing properties. Yeast extracts comprise only the water soluble components of the yeast cell after removal of the yeast cell wall, the composition of which is primarily amino-acids, peptides, carbohydrates and salts. Yeast extract is produced through the hydrolysis of peptide bonds by the naturally occurring enzymes present in edible yeast and/or or by the addition of food-grade enzymes (Food Chemical Codex), i.e. by autolysis and/or hydrolysis. Alternatively, yeast extracts could be obtained by mechanical or acid treatment of yeast cells. Yeast extracts are often used for providing savoury and umami flavour profiles.

A valuable waste stream in the production of yeast extracts is the yeast cell walls. Yeast cell walls are an unique material that is flexible and able to protect and stabilize the cells and allows absorbing nutrients and discarding of waste materials. The mannoprotein of yeast is also known for having an emulsifying effect.

The slurry of yeast cell walls derived from yeast extract plants is usually dried and used as additive in feed. The beta glucans present in the cell walls provide a nutritional function for animals.

WO2017/050629 relates to another use of the yeast cells walls. A flavour composition is produced by enzymatic treatment of the discarded yeast cells walls with a glucanase and endoprotease followed by solid liquid separation. The provided flavour composition provides a fatty, creamy, mouthfeel and/or lingering flavour in a food product.

There is a need in the art for further flavour enhancing products. For example, there is a need in the art for enhancing the flavour in crisps seasonings. Crisp seasonings are growing in diversity of the flavour profiles since crisps are these days available in numerous flavours. One specific need in the art is the enhancement of spicy favours, such as Szechuan pepper and chili.

The present invention aims to provide a solution to the above problems, amongst other problems. Specifically, it is the objective of the present invention, amongst other objectives, to provide flavour enhancement of spicy flavours.

5 The present inventors found that yeast cell walls enhance the spiciness of a spicy flavour. Specifically, the present inventors found that yeast cell walls enhance the Szechuan pepper flavour in crisp seasoning, preferably for enhancing the spicy flavour of the crisp seasoning. Further, the present inventors found that yeast cell walls enhance the chili flavour in crisp seasoning.

10 Therefore, the present invention relates to the use of yeast cell walls in crisp seasoning recipes comprising pepper or comprising a pepper flavour, or comprising chili or comprising a chili flavour.

Yeast cell walls are defined as a composition comprising insoluble yeast cells walls which composition comprises 15% to 35% (w/w) protein on dry weight and/or 5% to 20% (w/w) lipids on dry weight of the composition. More preferably the composition further
15 comprises 15 % to 40% (w/w) beta glucans and / or 10% to 30 (w/w) mannan-oligosaccharides on dry weight. Preferably the yeast cell walls are is a co-product of the production of yeast extracts.

In a preferred embodiment, the yeast cell walls are disrupted yeast cell walls. In other words, the present yeast cell walls are preferably not whole yeast cells or intact yeast
20 cells. The disruption of the yeast cell walls is the result of lysing the yeast cell wall in a process for the production of yeast extracts. The yeast cell walls are perforated and as a result of this they are disrupted, or leaky, or perforated, yeast cell walls.

In a further preferred embodiment, the present yeast cell walls are dried yeast cell walls. Preferably the present yeast cell walls have a dry matter of higher than 90%, more
25 preferably higher than 95%. Dried yeast cell walls are advantageous for avoiding clogging of a crisp seasoning that mainly consists of powders. Dried yeast cell walls can conveniently be produced via spray drying, for example.

Given the identified flavour enhancing properties of yeast cell walls, the present yeast cell walls are preferably used for enhancing the pepper flavour of the crisp
30 seasoning. Enhancing pepper flavour as used in the present context means that the pepper flavour of a crisp seasoning is perceived as higher than a comparable crisp seasoning that does not comprise the present yeast cell walls.

Pepper as used in the present context is defined as plant parts having a pepper flavour and derived from a plant, preferably from a plant belonging to the genus *Piper* from

the pepper family (*Piperaceae*), the genus *Capsicum* from the nightshade family (*Solanaceae*), the genus *Pimenta* from the myrtle family (*Myrtaceae*), the genus *Zanthoxylum*.

5 The inventors found that the yeast cell walls are particularly advantageous for enhancing the pepper flavour of Szechuan pepper. Therefore, in a preferred embodiment, the present pepper flavour is Szechuan pepper flavour (or Sichuan pepper). Alternatively, the pepper is chosen from red, black, white, green, Java, Indonesian, cayenne, chili and jalapeno pepper.

10 According to a further aspect, the present invention relates to a crisp seasoning comprising yeast cell walls, preferably a crisp seasoning comprising dried and/or disrupted yeast cell walls as defined above.

15 Preferably, the crisp seasoning is a powder or a powder mixture. Such a crisp seasoning is suitable for a use in the production of crisps, preferably the production of crisps having a pepper flavour, or comprising a pepper flavour. For example cheese onion crisps that also comprise a pepper flavour.

Preferably, the present crisp seasoning further comprises pepper and/or chili, preferably Szechuan pepper. Or any of the peppers chosen from red, black, white, green, Java, Indonesian, cayenne, chili and jalapeno pepper. More preferably, the present crisp seasoning has a pepper flavour profile.

20 In a preferred embodiment, the present crisp seasoning further comprises maltodextrin, salt, sugar, garlic, soy sauce powder and/or chili. Advantageously, the present crisp seasoning is packaged and is marked as having a pepper or a chili flavour.

25 According to a further aspect, the present invention relates to crisps comprising yeast cell walls and pepper, preferably comprising Szechuan pepper. Alternatively, the present crisps comprise a pepper chosen from red, black, white, green, Java, Indonesian, cayenne, chili and jalapeno pepper.

Preferably, the present crisps have a flavour profile chosen from, cheese onion, mustard, Masala, sweet chili, paprika, Szechuan pepper, salt and pepper, BBQ, marmite, bacon, tomato ketchup, spicy, pickled onion and salt and vinegar.

Preferably, the present crisps comprise a crisp seasoning as defined above. Preferably, the crisps have a ratio of crisps to crisp seasoning within the range of 3:1 to 12:1, preferably within the range of 8:1 to 10:1, more preferably around 9:1. In other words, the present crisps comprise preferably for 80 to 95% percent of crisps and from 20 to 5% of the present crisp seasoning.

The invention will now be illustrated by some examples which however do not intend to be limiting.

EXAMPLES

Example 1

Preparation of a yeast cell walls (YCW)

Two litres of cream yeast from *Saccharomyces cerevisiae* were heated to 62°C. Subsequently 0.5 ml Alcalase (commercially available serine protease from Novozymes, Denmark) was added for lysis of the yeast cell walls and the mixture was incubated for 4 hours at pH 8 and 62 °C. Subsequently, 5'-phosphodiesterase was added and the mixture was incubated at pH 5, 61°C, for 12 hours. Thereafter, the autolysate was centrifuged and washed to discard the yeast extract and to collect the yeast cell walls. The yeast cell walls are thereafter stored for a period of more than 24 hours at a temperature of 80°C. Thereafter, the yeast cell walls are spray dried.

Example 2

Szechuan pepper crisps

A Szechuan pepper crisp seasoning was enhanced with the yeast cell walls provided of example 1, using the ingredients show in the table below.

Ingredients	Control (%)	Example 2 (%)
YCW of example 1	0,00	0,48
Salt	0,40	0,40
Sugar	2,00	2.00
Soy sauce powder	0,48	0,48
Garlic	0,40	0,40
Ginger	0,03	0,03

Chili	0,40	0,40
Aspartame	0,02	0,02
Black pepper	0,16	0,16
Bleef flavor	0,05	0,05
Citric acid	0,03	0,03
Chicken flavor powder	0,48	0,48
Szechuan pepper	0,40	0,40
Silicon dioxide	0,08	0,08
Szechuan pepper flavor	0,08	0,08
Maltodextrin	2,99	2,51
Crisps	92	92
Total	100	100

Table 1

Figure 1 shows a spider plot of the attributes tested via the Quantitative Description Analysis (QDA) testing method using an experienced sensory panel with 8 members.

As can be seen in figure 1, the spiciness of the Szechuan pepper crisp seasoning was enhanced using the yeast cell walls of example 1.

Example 3

Nachos crisps seasoning

A spicy nachos crisp seasoning was enhanced with the yeast cell walls provided of example 1, using the ingredients show in the table below.

Ingredients	Control (%)	Example 3 (%)
YCW of example 1	0,00	3,00
Salt	7,00	7,00
Sugar	19,00	19,00
Paprika oleoresin	0,15	0,15
Capsicum oleoresin	0,10	0,10
Black pepper oil	0,05	0,05
Garlic powder	5,00	5,00
Onion powder	4,00	4,00
Chili powder	6,00	6,00

Black pepper powder	3,00	3,00
Soy sauce powder	6,00	6,00
Gistex standard	5,00	5,00
Maxavor RYE D	2,00	2,00
Maxagusto 0-31	2,00	2,00
Silicon dioxide	0,10	0,10
Maltodextrin	40,60	37,60
Total	100	100

Table 2

Gistex standard is a yeast extract. Maxavor RYE D® and Maxagusto® 0-31 are flavours. All three products are commercially available via DSM Food Specialties, The Netherlands. The powder seasonings according to table 2 where applied on nachos, in an amount of 10% wt. seasoning and 90% wt. crisps.

A sensory evaluation of the nachos shows an enhancement of the spiciness intensity for the sample according example 3 in comparison with the control.

Example 4

Masala crisps seasoning

A Masala crisp seasoning was enhanced with the yeast cell walls provided of example 1, using the ingredients show in the table below.

Ingredients	Control (%)	Example 4 (%)
YCW of example 1	0,00	8,00
Salt	3,5	3,5
Dextrose	15,00	15,00
Maltodextrin	37,70	29,70
Flour (wheat)	15,00	15,00
Chili powder	5,00	5,00
Coriander	8,00	8,00
Cumin	6,50	6,50
Turmeric	0,50	0,50
Ginger	0,20	0,20

Black pepper	0,50	0,50
Clove	0,20	0,20
Cinnamon	0,20	0,20
Star anise	0,20	0,20
Cardamom	0,20	0,20
Fennel	0,20	0,20
Maxagusto Garlic G-28	1,00	1,00
Maxagusto Onion 0-31	1,00	1,00
Maxarome plus	5,00	5,00
Citric acid	0,10	0,10
Total	100	100

Table 3

Maxagusto® Garlic G-28, Maxagusto® Onion 0-31 and Maxarome® plus are commercially available via DSM Food Specialties, The Netherlands. The powder seasonings according to table 3 where applied on salted crisps, in an amount of 10% wt. seasoning and 90% wt. crisps.

5

A sensory evaluation of the crisps an enhancement of the spiciness intensity for the sample according example 4 in comparison with the control.

CLAIMS

1. Use of yeast cell walls in crisp seasoning recipes comprising pepper and/or chili for enhancing the spicy flavour of the crisp seasoning.
- 5 2. Use according to claim 1, wherein the spicy flavour is pepper flavour.
3. Use according to claim 2, wherein the pepper flavour is Szechuan pepper flavour.
4. Use according to claim 1, wherein the spicy flavour is chili flavour.
5. Use according to any of the preceding claims, wherein the yeast cell walls are dried yeast cell walls.
- 10 6. Use according to any of the preceding claims, wherein the yeast cell walls are disrupted yeast cell walls.
7. Crisp seasoning comprising yeast cell walls.
8. Crisp seasoning according to claim 7, wherein the yeast cell walls are dried yeast cell walls.
- 15 9. Crisp seasoning according to claim 7 or claim 8, wherein the yeast cell walls are disrupted yeast cell walls.
10. Crisp seasoning according to any of the claims 7 to 9, wherein the crisp seasoning further comprises pepper and/or chili, preferably Szechuan pepper.
- 20 11. Crisp seasoning according to claim 10, wherein the crisp seasoning further comprises maltodextrin, salt, sugar, garlic, soy sauce powder and/or chili.

12. Crisps comprising yeast cell walls and pepper, preferably comprising Szechuan pepper.
13. Crisps comprising a crisp seasoning as defined in any of the claims 7 to 11.
14. Crisps according to claim 13, wherein the ratio of crisps to crisp seasoning is within the range of 3:1 to 12:1, preferably within the range of 8:1 to 10:1, more preferably around 9:1.

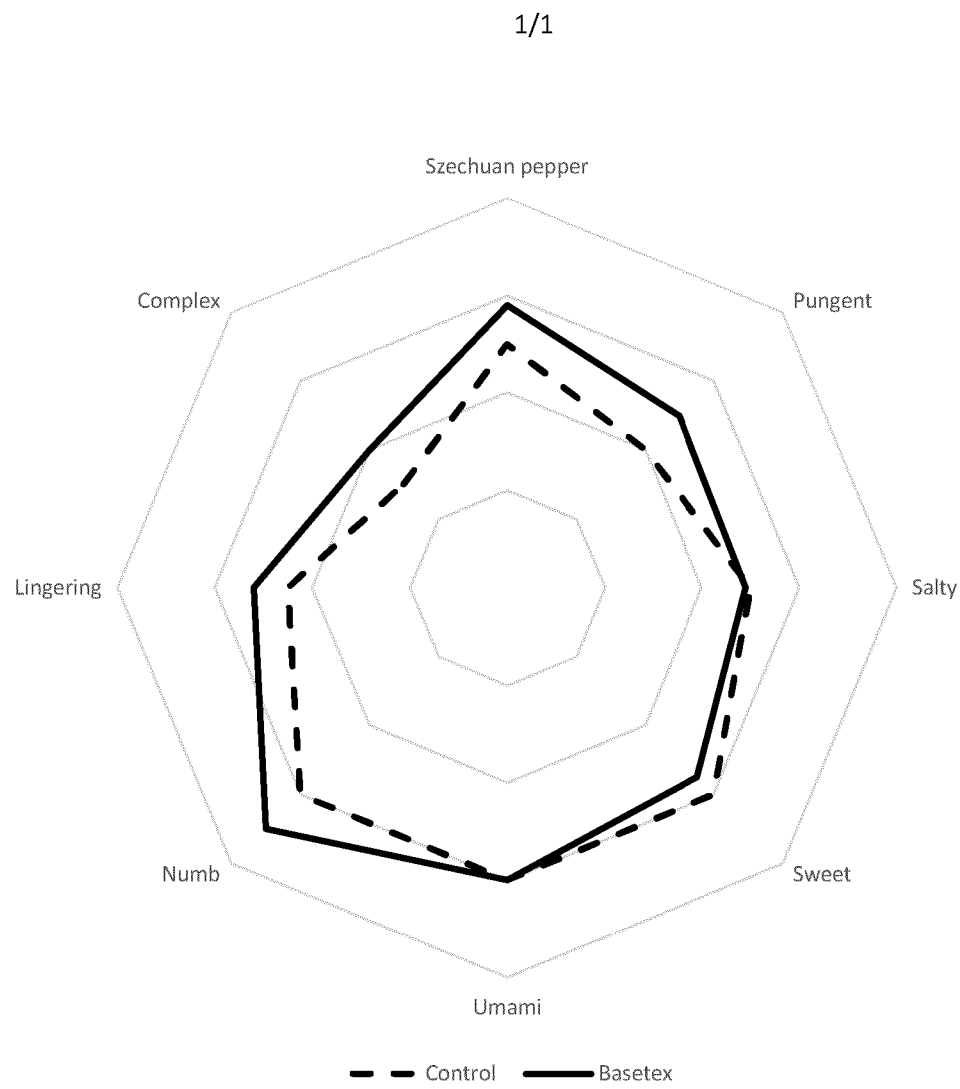


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2021/059374

A. CLASSIFICATION OF SUBJECT MATTER

INV. A23L33/14 A23L19/18 A23L27/14 A23L27/21 A23L27/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2008 263825 A (SANEI GEN FFI INC) 6 November 2008 (2008-11-06) paragraphs [0001], [0019], [0028], [0086], [0089]; examples 1-11; tables 3,4 -----	1-14
A	EP 3 378 334 A1 (DSM IP ASSETS BV [NL]) 26 September 2018 (2018-09-26) the whole document -----	1-14
A	CN 107 897 795 A (ZENG JIA) 13 April 2018 (2018-04-13) the whole document -----	1-14
A	CN 108 420 012 A (SHANDONG TIANBO FOOD INGREDIENTS CO LTD) 21 August 2018 (2018-08-21) the whole document -----	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2021/059374

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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