



PATENTS ACT 1977

APPLICANT	Island Abbey Foods Ltd.
ISSUE	Whether patent application number GB1514746.5 complies with the requirements of sections 1(1)(b) and 3 of the Act
HEARING OFFICER	B Micklewright

DECISION

Introduction

- 1 Patent application number GB1514746.5 is the national phase application of PCT application number PCT/CA2014/050112, filed on 19 February 2014 and with a declared priority date of 19 February 2013. It was filed in the name of Island Abbey Food Ltd. The international application was published as WO 2014/127474 A1 and was assigned the UK publication number GB 2535560 A.
- 2 The examiner argued that the invention did not involve an inventive step. The applicant disagreed and, following several rounds of amendments and arguments, the matter came before me for a decision on the papers. In their final letter the examiner considered that all 34 of the claims filed on 24 August 2020 did not involve an inventive step.
- 3 The applicant has filed three auxiliary claim sets for my consideration. I will consider these claim sets in my decision.
- 4 Other matters in relation to this application such as considerations of clarity and support have been deferred by the examiner. If this application was to be allowed on the issue before me it would need to be remitted back to the examiner for consideration of these matters.

The invention

- 5 The invention relates to obtaining a molasses product having a low water content of less than 0.5% w/w, giving a solid molasses product. The latest claims were filed on 24 August 2020. Of the 34 claims, claims 1 and 20 are independent claims and read:

1. A solid molasses product consisting essentially of a molasses and having a moisture content equal to or less than about 0.5% (w/w).

20. A process for obtaining a molasses product consisting essentially of a molasses and having a moisture content equal to or less than about 0.5% (w/w), said process consisting of:

(a) heating an initial molasses to a temperature of at least 70°C while applying a vacuum of at least 711 mmHg (28 inHg) so as to provide a treated molasses;

(b) maintaining the treated molasses to a temperature of at least 70°C and under a vacuum of at least 711 mmHg (28 inHg) until the moisture content of the treated molasses reaches at least 0.5% (w/w) so as to obtain a dehydrated molasses product;

(c) optionally depositing the dehydrated molasses product in a mold to obtain a deposited product;

(d) optionally cooling the dehydrated molasses product at room temperature so as to obtain a glossy molasses product;

(e) optionally processing the glossy molasses product into powder, into a granular form, into a crushed form or into a ground form;

(f) optionally adding an additive to the dehydrated molasses product;

(g) optionally packaging the dehydrated molasses product, the glossy molasses product, the powder, the granular form, the crushed form or the ground form in a water-impermeable package; and

(h) optionally coating the dehydrated molasses product or the glossy molasses product with a solution.

The law

6 Section 1(1) of the Patents Act 1977 states that

1(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say –

...

(b) it involves an inventive step;

...

7 Section 3 then explains what is meant by an inventive step.

3. An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above.

- 8 Section 2(2) explains what is meant by the state of the art for the purposes of inventive step.

2(2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.

- 9 As such, a patent cannot be granted if the claimed invention is obvious in the light of any document which was made available to the public before the priority date of the invention.
- 10 In *Windsurfing International Inc v Tabur Marine (Great Britain) Ltd*¹ the Court of Appeal formulated a four-step approach to assessing obviousness. This approach was reformulated in *Pozzoli Spa v BDMO SA*² as follows:

(1)(a) Identify the notional “person skilled in the art”

(1)(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;

(3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Assessment

Step (1)(a): Identify the notional “person skilled in the art”; step (1)(b): Identify the relevant common general knowledge of that person

- 11 The examiner and the applicant do not agree on the identity of the notional “person skilled in the art”. The examiner considered the person skilled in the art to be a process chemist with expertise in sugar processing, whilst the applicant argues the person skilled in the art should be considered a food scientist. The examiner rejected this view because, although the ultimate end use of the molasses product may be as a food or food additive, solid molasses products have numerous alternative uses, e.g. animal feed or pharmaceuticals. In the examiner’s view the application in suit pertains to molasses processing rather than the development of food products *per se* which would be the particular remit of food scientists.

¹ *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd* [1985] RPC 59

² *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588

- 12 The applicant has provided further arguments in their letter dated 25 September 2020, written in response to the examiner's pre-hearing report. In this letter the applicant asserts that the primary use of the molasses product claimed in the present invention is for human consumption, e.g. as a foodstuff for humans. It is therefore critical that the molasses product be palatable and have good organoleptic properties (flavour, intensity, mouth feel). According to the applicant, even in the further uses for molasses mentioned in the pre-hearing report and cited in the specification (such as pharmaceuticals and animal feedstuffs) the organoleptic properties are still essential to ensure the necessary palatability. One example given in the specification is that the molasses of the present invention could be added to a pharmaceutical for the purposes of improving its taste.
- 13 The specification identifies a number of applications for the disclosed molasses product such as in confectionary, in pharmaceuticals, or in animal feed. Some, but not all, of these applications are for human consumption. One particular embodiment is however limited to human consumption. Having read the specification it is apparent that, in many of the embodiments, flavour and other organoleptic properties are relevant considerations to the person skilled in the art. It is however also necessary for the skilled person to have knowledge of processes used to produce molasses, particularly given the lack of specific detail of these processes in the application. I therefore conclude that the "person skilled in the art" would include a process chemist with expertise in sugar processing. I believe that such a process chemist would be aware of the need to maintain the organoleptic properties of molasses during their processing. I however accept that, to the extent that a particular specialised knowledge in this field is required, in particular to produce compositions containing the molasses produced in accordance with the invention, a process chemist may on occasions consult a food scientist with an understanding of how to maintain good organoleptic properties in food products, and so the food scientist may form part of the skilled team. I do however consider the process chemist to be in the driving seat in the team.
- 14 The process chemist's common general knowledge would include standard apparatus and standard sugar processing techniques. They would also be aware of commonplace problems in the sugar processing field. The examiner has argued that the claimed invention is obvious over the skilled person's common general knowledge alone so I will consider the common general knowledge in more detail below.

Step (2): Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

- 15 Claim 1 is a product claim to a solid molasses product "consisting essentially of a molasses and having a moisture content equal to or less than about 0.5% (w/w)". The claim is not limited to any particular process for producing the product, nor to any particular organoleptic properties of the product. Moreover the specification contains very little information as to the process used in the embodiments for producing the product. The description, on page 9, specifies that "the solid molasses product is not limited to a specific manufacturing technique" but does list some factors to be taken into account when determining the time, temperature and pressure variables to be used in the process.

16 Claim 1 refers to the product “consisting essentially” of a molasses with a defined moisture content. I understand this language to mean that no additives are included in the product. There is however some inconsistency in this as, for example, claim 20 includes a step of “optionally adding an additive to the dehydrated molasses product”. In this light I construe the claim to mean that the raw molasses product consists essentially of the dehydrated molasses with the low moisture content of claim 1, but then additives may then be added to that product depending on the use the product is being put to.

17 Claim 20 is a process claim for obtaining the molasses product of claim 1. The process consists of the following mandatory two steps:

(a) heating an initial molasses to a temperature of at least 70°C while applying a vacuum of at least 711 mmHg (28 inHg) so as to provide a treated molasses;

(b) maintaining the treated molasses to a temperature of at least 70°C and under a vacuum of at least 711 mmHg (28 inHg) until the moisture content reaches at least 0.5% (w/w) so as to obtain a dehydrated product.

18 Claim 20 also includes six optional steps. Including such optional features in claims is generally undesirable as they can create ambiguity as to which features in a claim are essential and which are optional. This will need consideration should the case be remitted back to the examiner. Claim 20 states that the claimed process consists of steps (a) to (h). This term is normally used in patent claims to indicate that no further steps form part of the process³ and I construe it as such in the present case. I think what the application is teaching here is that the process must include steps (a) and (b), it may include steps (c) to (h) but cannot include any further steps. I would however comment that the claim is somewhat unclear in this respect as to which further steps may be included.

19 The optional steps in question relate to depositing the product in a mold, cooling at room temperature to obtain a glossy molasses product, processing the glossy molasses product into powder, a granular form, a crushed form or into a ground form, adding an additive to the product, packaging the product in a water-impermeable package and coating the glossy molasses product with a solution. With the exception of the additive, which I have discussed above, these features cause no particular problems with construction. However, as they are optional features, they do not form part of the inventive concept of claim 20. I will consider them as I would dependent claims.

20 In summary, bearing in mind the construction points I have identified above, the inventive concepts of claim 1 and 20 are:

Claim 1: A solid molasses product consisting essentially of a molasses and having a moisture content equal to or less than about 0.5% (w/w).

Claim 20: A process for obtaining the molasses product of claim 1, said process consisting of heating an initial molasses to a temperature of at least

³ See for example the *Manual of Patent Practice*, paragraph 14.113.1.

70°C while applying a vacuum of at least 711 mmHg (28 inHg) so as to provide a treated molasses, and maintaining the treated molasses to a temperature of at least 70°C and under a vacuum of at least 711 mmHg (28 inHg) until the moisture content reaches at least 0.5% (w/w) so as to obtain a dehydrated product.

Step (3): Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed; step (4): Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

- 21 I will consider steps (3) and (4) of the *Windsurfing/Pozzoli* approach for each prior art document in turn.
- 22 The examiner has cited the following three pieces of prior art in their latest examination report:

D1: US 1983434 A (BLACK *et al*)

D2: CA 1007152 A (WESTERN CONSUMERS INDS)

D3: US 3880668 A (MILLER)

- 23 Documents D2 and D3 have the same disclosure and so can be considered together.
- 24 The examiner also argues that the claimed invention is obvious in the light of the skilled person’s common general knowledge.

The common general knowledge

- 25 I will first consider the present invention in the light of the common general knowledge of the person skilled in the art. I have found that the person skilled in the art is a process chemist who may receive guidance from a food scientist as necessary.
- 26 The examiner in their latest letter states the following:
- “This application achieves the stated moisture content via vacuum-drying (the simultaneous application of reduced pressure and heat, the exemplified conditions are 28 inches of mercury (711 mmHg) and temperatures of 70-80 °C). The process of vacuum-drying is commonplace and extremely well-known for the drying of substances, particularly those that are heat sensitive. The skilled person would be aware of the process of vacuum-drying and its merits for drying heat sensitive materials, they would also be well aware of the instability of molasses at high temperatures (it being a common problem in the field of sugar processing). The skilled person would also be motivated to reduce the water content of molasses to avoid the well-known issues with handling and/or the instability of liquid molasses (see the introductory/background discussions of documents a)-c) as examples of the skilled person’s common general knowledge). The invention therefore lies in taking an entirely standard and well-used process to achieve a goal that is already known to those skilled in the art. Consequently, both the product claims (1-19) and the method

claims (20-34) are considered to be obvious from the skilled person's common general knowledge."

- 27 The applicant argued that, although the person skilled in the art would be aware of dehydrating molasses compositions to a water content of around 5%, they would further be aware that further dehydrating molasses, e.g. below 1% is extremely challenging and generally results in damage to the product. Furthermore, during dehydration the flowability of the dehydrated product can be reduced which can undermine downstream processing. Also, some products do not solidify and cannot be handled properly. The applicant also submitted that prior art processes, such as those described in example IV of the present specification, were unable to provide improved products according to the present claims. In addition to being unable to provide the required high levels of dehydration, the prior art processes resulted in burnt or otherwise unpalatable molasses and were not therefore suitable for human consumption. Thus, the applicant argued, the skilled person would not even attempt such further dehydration and would have a prejudice against seeking a molasses product as defined in the present claims. According to the applicant, molasses products produced in accordance with the present claims are significantly improved over prior art formulations, as they allow for improved handling and organoleptic properties, as well as having higher stability on storage.
- 28 The applicant further submitted that the present invention further provides an advantageous method for producing such dehydrated molasses compositions, consisting of a single step dehydration which allows the previously unobtainable levels of dehydration to be achieved. Furthermore, this method reduces foaming during dehydration, as well as limiting degradation of nutritional elements in the molasses, thus preserving the flowability, nutritional content and organoleptic properties of the molasses.
- 29 There are two questions here which I need to consider. Firstly, would the problem be known and understood by the person skilled in the art, based on their common general knowledge? Secondly, would the particular solution to the problem which forms the inventive concept in the present invention be part of the person skilled in the art's common general knowledge?
- 30 Firstly, I consider the desirability of reducing moisture content in molasses to be something the person skilled in the art would appreciate, as it is a very well-known problem, as is indicated in the cited prior art. They would therefore be motivated to seek to reduce moisture content in molasses as much as possible. I note the applicant's comment that reducing the flowability of the dehydrated products could undermine downstream processing but do not consider that this would be a barrier to the skilled person's desire to reduce moisture content as much as possible, particularly when the molasses may well be in a liquid state at higher temperatures. I understand the applicant's arguments as to the difficulty in further dehydrating molasses and the technical challenge in retaining organoleptic and nutritional properties but do not believe that this would deter the person skilled in the art from at least understanding the desirability of further dehydration.
- 31 Secondly, I agree with the examiner that the process of vacuum-drying is commonplace and extremely well-known for the drying of substances, particularly those that are heat sensitive. I also agree that the skilled person would also be well aware of

the instability of molasses at high temperatures (it being a common problem in the field of sugar processing).

- 32 What is less certain is whether the skilled person would be able to fine tune the vacuum-drying process so as to reduce the moisture content to less than or equal to about 0.5% (w/w). The applicant has argued that this is considered challenging, particularly without damaging the product.
- 33 I would add at this point that the claims do not define any specific parameters or characteristics for the flowability, nutritional content and organoleptic properties of the molasses, nor does the specification specify the nature of any such properties which are preserved except for in very general terms such as “the organoleptic and physical characteristics of the solid molasses product are very similar to those of untreated molasses” (page 1). But I take the view that the skilled person would understand the desirability of preserving at least some of these properties in general.
- 34 It is less certain whether the skilled person would select the temperature and vacuum parameters specified in claim 20, particularly given the desirability of maintaining at least the taste of the molasses product.
- 35 I however note that, apart from the specification of the temperature and vacuum parameters, the process described in the description and claimed in the claims is entirely standard. It is helpful to set out the full details of the process as it is described in the application in suit. The description makes clear that “the solid molasses product is not limited to a specific manufacturing technique”. The most detailed description of the process is found in the following paragraph on page 9 (emphasis mine):

“In an embodiment, the molasses can be heated from ambient temperature to a temperature equal to or less than 80°C (e.g., less than 75°C, 70°C or 65°C, for example). Simultaneously, a pressure of 711 mmHg (28 inHg) is simultaneously applied to the heated molasses. This vacuum is maintained until the moisture content reaches a specific threshold (for example, equal to or less than 0.5%, 0.4%, 0.3%, 0.2%, 0.1%, 0.09%, 0.08%, 0.07%, 0.06%, 0.05%, 0.04%, 0.03%, 0.02% or 0.01%), depending on the final application of the product. Depending on the moisture content of the original molasses, the dehydration process for the production of the solid molasses product can last at least 60 minutes, at least 65 minutes, at least 70 minutes or at least 75 minutes. The dehydration process is conducted under constant stirring (or any other techniques known in the art) to evenly distribute the temperature in the molasses that is being dehydrated to avoid burning of the dehydrated molasses or foaming of the molasses composition that is being dehydrated. As it is known in the art, the temperature, vacuum and time parameters can be modified to reach the desired temperature. These parameters will also depend on the amount of molasses that is being processed as well as the content of original the liquid molasses (such as its moisture content). For example, for light/fancy molasses (which has the highest sucrose content and the highest water content), it is preferable to use a higher temperature (e.g., increase the temperature of the molasses during the dehydration process to at least 80°C) and a longer dehydration period (e.g., about 70 minutes) to obtain the solid molasses product. In comparison, when a black strap molasses is used, it is preferable to use a lower temperature and a slower increase in temperature (e.g., increase the temperature of the molasses during the dehydration process to at least 70°C) and a shorter dehydration period (e.g., about 65 minutes) to obtain the solid molasses product.”

- 36 This description is supported by three specific examples which list specific time and temperature characteristics in each example. Except for the specific “heating” and “maintaining” steps in claim 20, the only other specific details of the process relate to the duration of the process, the stirring of the molasses to prevent burning or foaming, and the increasing of the temperature during the dehydration process to the desired maximum temperature. Specific time-temperature profiles are disclosed for different molasses products in the three examples. The applicant has argued that prior art processes do not produce the desired dehydrated molasses product, both in terms of moisture content and in terms of organoleptic properties, but only specify the above details for any improved process.
- 37 I note that from the above paragraph the applicant seems to be suggesting that stirring to evenly distribute the temperature, and to avoid burning and foaming, is one of several techniques which would be known in the art. Moreover this paragraph also seems to suggest that a particular selection or modification of temperature, vacuum and time parameters to reach the desired temperature is also known in the art. It is therefore difficult to determine precisely which features of this process would not be at least known in the art, and probably part of the person skilled in the art’s common general knowledge.
- 38 Based on the disclosure above it seems to me that the key elements of the process which result in the claimed product are the selection of the specific temperature, vacuum and time parameters used in the vacuum-drying process. It therefore follows that, if the particular values of these parameters were obvious values for the person skilled in the art to try in the standard vacuum-drying processes that form part of their common general knowledge, they would be able to use their common general knowledge to produce a molasses product with a moisture content of less than or equal to 0.5% (w/w).
- 39 Having considered all the evidence available to me, it is certainly possible that the claimed invention would be obvious to the person skilled in the art based on their common general knowledge. However, overall, I do not believe that I have sufficient evidence to confirm, on the balance of probabilities, that claims 1 and 20 are obvious over the person skilled in the art’s common general knowledge alone. I will therefore go on to consider whether the claimed invention is obvious in the light of the person skilled in the art’s common general knowledge and the cited prior art.

D1: US 1983434 A (BLACK et al)

- 40 The examiner has summarised the relevant disclosure of D1 as follows:

“D1 discloses a process for the manufacture of powdered molasses containing “not more than about 1% of water” (see page 4 lines 22-25). The molasses is subjected to vacuum-drying at 29 inches of mercury and 66 °C in an evaporator such that the water is driven off at “a temperature sufficiently low to avoid danger of caramelization of sugars”. The dehydrated molasses product is then transferred to a steam-jacketed agitation tank for further heating to 93-114 °C and is then sprayed into a drying tower to give a “dry, fine, free-flowing” powder. D1 discusses that the numerous disadvantages associated with liquid molasses would be negated by the provision of a solid molasses product through removal of the moisture (i.e. solid molasses having a low water content has improved handling over the viscous liquid molasses having a higher water content). D1 also discloses that previous attempts to produce powdered molasses using high temperatures have resulted in an impairment of the taste and food value of the molasses (see page 1 lines 43-49).”

41 This seems to me to be a reasonable summary of the disclosure. The applicant describes the latter step as an atomization step as the molasses is drawn through atomizers which atomize and spray the molasses into the drying tower. Both D1 and the present invention relate to dehydrating molasses products. The differences between D1 and the inventive concept of claim 1 is that D1 does not explicitly disclose a moisture content of 0.5% w/w or less. Moreover the vacuum-drying is at 29 inches of mercury and 66°C and the document does not specify at least 28 inches and at least 70°C. Finally, the vacuum-drying step is one part of the process of producing dehydrated molasses in powder form. An atomization step is also present.

42 The applicant has made the following arguments in relation to D1:

- a. As mentioned on page 2 of the present description, that person skilled in the art would be aware of dehydrating molasses compositions to a water content of around 5%. However, they would further be aware that further dehydrating molasses, e.g. below 1% is extremely challenging and generally results in damage to the product.
- b. D1 does not teach how to dehydrate molasses, without the aid of additives, to obtain a solid molasses product having a moisture content of 0.5% or less.
- c. D1 concerns a two-step process for dehydrating molasses: a first step using vacuum drying to reduce the moisture content of a molasses composition to an undisclosed moisture content (page 2, lines 14 to 48) and a second step of using atomization to produce a molasses powder (page 3, lines 37 to 67). Both dehydration steps (e.g., vacuum and atomization) are considered essential in D1. Both need to be performed to obtain the final product. As such, it would not be conceivable for the person skilled in the art to exclude the step of atomization from the process of D1 to arrive at the single step dehydration process of the present invention.
- d. D1 specifies that "The temperature of the molasses within the evaporator does not exceed 150 °F." (page 2, lines 24-26), which corresponds to around 66 °C. D1 therefore actively teaches away from using a temperature of at least 70 °C, as required by present claim 20. Thus, the person skilled in the art would have no motivation to modify the process described in D1 to exclude the step of atomization and to increase the temperature in order to arrive at a process according to present claim 20.
- e. D1 indicates that the product after the vacuum dehydration step is only partially dehydrated (to around 1.5%, according to the applicant). The presence of this excess water in the partially dehydrated molasses product obtained after the vacuum dehydration step is mandatory in the context of D1 as it allows downstream operations such as translocating the partially dehydrated molasses product to the atomization tower. The applicant has carried out an experiment to indicate that the moisture content present in the partially dehydrated product of D1 is necessarily above 1%.
- f. Accordingly, the person skilled in the art would not obtain the solid molasses product having an exceptionally low moisture content according to present claim 1. Instead, the process of D1 was only reported to provide a molasses

composition having around 1% moisture, rather than 0.5 % or less as required by claim 1. There is no indication in D1 that further dehydrating molasses to this extent would be possible, or even desirable.

- 43 I note initially that D1 discloses a process for the manufacture of powdered molasses containing “not more than about 1% of water”. The document emphasises the benefits of a dehydrated solid molasses product in comparison to a liquid molasses product. I disagree with the applicant’s view that there is no indication in D1 that further dehydrating molasses to this extent would be possible, or even desirable. In my view D1 teaches that a molasses product with as low a moisture content as possible is desirable (see for example page 1 lines 5-49) and indeed I have found this to be part of the person skilled in the art’s common general knowledge. Moreover, as these paragraphs demonstrate, D1 clearly has in mind the need to prevent impairment of the taste and food value of the molasses. D1 does not however explicitly disclose a molasses product with a moisture content “equal to or less than about 0.5% (w/w)” as in claim 1 of the present invention. I note that the reason given in D1 for limiting the temperature in the vacuum-drying step is to avoid burning the molasses, which would impact on their taste.
- 44 In my view D1 teaches that a balance of values for vacuum and temperature is needed to get the best results. I believe that the skilled person, namely the process chemist being advised by the food scientist, would make routine workshop adjustments to the parameters disclosed in the first step of D1 to achieve the best results, and, in my view, experimenting with a temperature above 70°C and a vacuum of at least 28 inches is well within the scope of routine workshop adjustments to the values disclosed in D1, which are in the same ballpark. Moreover it is apparent that the method of D1 teaches maintaining these conditions (see for example page 2 lines 37-40).
- 45 The question that now arises is, following such workshop adjustments, could a molasses product be produced based on the teaching of D1 and the skilled person’s common general knowledge that results in a product with no more than 0.5% (w/w) moisture content? I think the answer must be yes. The reason for this is based on the disclosure in the present application and on my consideration of the person skilled in the art above. I believe that, armed with this disclosure of the vacuum and temperature parameters and processes disclosed and their knowledge of vacuum-drying processes, the skilled person would think to adapt the vacuum-drying process in D1 to produce a molasses product in accordance with claim 1, particularly given the desirability of reducing the moisture content as much as possible. This is further supported by the fact that the description does not disclose any details of any process for vacuum-drying except in specifying the temperature, vacuum and time variables, plus one or two other points such as stirring to prevent burning and foaming, as I have discussed above.
- 46 Another way of looking at this is that D1 gives the skilled person guidance as to the sort of temperature and vacuum values that can be used in the vacuum-drying processes which form part of their common general knowledge in order to effectively reduce the moisture content in molasses products whilst maintaining organoleptic properties. As I have already said, the desirability of reducing moisture content in molasses products as much as possible whilst maintaining organoleptic properties would be well understood by the person skilled in the art and they would therefore be

motivated to try the temperature and vacuum values disclosed in D1 and make routine workshop adjustments to such parameters, thereby arriving at the inventive concepts of claim 1 and claim 20.

- 47 Given this success in the first step of the method of D1, I consider it entirely likely that the skilled person would realise that they can achieve low-moisture molasses without needing the atomization step. The applicant argues that the need to retain some moisture in order for the second step to be effective would motivate the person skilled in the art not to reduce the moisture content in the molasses any further during the first step, but equally it could be argued that, because the second step is dependent on a certain level of moisture remaining present in the molasses in order for it to be effective, it would motivate the person skilled in the art to omit the atomization step if they have achieved the desired level of dehydration of the molasses in the first step. Furthermore, I note that a function of the atomization step is to produce the molasses product in powder form. The skilled person would also consider producing such molasses in other forms, which would provide further motivation for omitting the atomization step.
- 48 The applicant has emphasised the need to preserve the organoleptic properties of the molasses. D1 also emphasises this need and I have found that the person skilled in the art would also understand the necessity of this, particularly if the molasses product is for human consumption or even for animal feed. Given the lack of any specific disclosure in relation to how this would be achieved in the description of the present invention, the clear objectives of preserving these properties in D1, and the person skilled in the art's general knowledge in this area, I conclude that this would not dissuade the skilled person's investigations as I have set out above.
- 49 I am not convinced of the argument that example IV in the present application, the example whereby certain prior art techniques are used to dehydrate the molasses, demonstrates that the invention makes an inventive step. As I have said, the person skilled in the art is well aware of vacuum-drying processes, as is demonstrated by the absence of any specific disclosure of specific processes in the present application. I am therefore satisfied that, armed with the teaching of D1 and their common general knowledge, the person skilled in the art would arrive at the molasses product of claim 1 and that it would be obvious to try the specific details set out in claim 20, namely the selection of temperature and vacuum parameters. In brief D1 provides teaching for the skilled person as to the sorts of parameters which they could use in the vacuum-drying process of which they are aware, and the parameters specified in the present invention are close to these parameters and would fall within the definition of routine workshop modifications.
- 50 I therefore conclude that the invention claimed in claims 1 and 20 does not involve an inventive step over D1 when considered in the light of the person skilled in the art's common general knowledge.
- 51 I will briefly discuss a couple of further points. Firstly, as I have commented, claim 1 claims a solid molasses product "consisting essentially" of a molasses and I have taken this to mean that the raw product is largely free from additives, although additives may later be added to form a composition. The applicant hasn't specifically referred to whether D1 discloses an additive-free product. I note that the embodiment in D1 involves adding a mineral filter aid such as a filter-cell to some of

the tanks used in the process and that the purpose of this is to clarify the molasses, removing all foreign substances, such as cane fibres, gums and other solid matter likely to prove injurious to cattle or the like. It seems to me that the molasses produced by D1 would be largely additive-free and, even if they were not, it would be obvious to produce such molasses.

- 52 As I have mentioned previously, the application includes three examples with various time, temperature and pressure characteristics for dehydrating light molasses, black strap molasses and medium molasses respectively. In my view the selection of the specific parameters for dehydrating these three types of molasses is all clearly within the ambit of the person skilled in the art making routine workshop modifications.

D2: CA 1007152 A (WESTERN CONSUMERS INDS); D3: US 3880668 A (MILLER)

- 53 The examiner has summarised the disclosure of D2 and D3 as follows:

"D2 and D3 disclose an apparatus and process for dehydrating molasses to give a solid molasses product containing 2.5-3.5% water (see page 14 lines 2-3 of D2 and column 7 lines 40-41 of D3). The molasses is initially heated in an evaporator unit and then transferred to a vacuum chamber at a partial vacuum of 20-22 inches of mercury. The internal walls of the vacuum chamber are maintained at a temperature of 60-82 °C. Once the water content has been lowered the molasses product is cooled to ambient temperature to give a solid which is then ground/crushed into particles. D2 and D3 detail that solid molasses products, obtained by reducing the water content, have advantages in handling and reduced spoilage/fermentation of the end-product over liquid molasses products. D2 and D3 also disclose that previous approaches to drying molasses have encountered difficulties with degradation when excessive temperatures are used."

- 54 This would seem to be a reasonable summary of each of these documents, which have the same disclosure. The differences between each of D2 and D3 and the inventive concept is that these documents do not explicitly disclose a molasses product with a moisture content of no more than 0.5% (w/w). Moreover the values selected for the vacuum-drying step are 60-82°C temperature and 20-22 inches of mercury. Whilst the temperature range at least overlaps that of the inventive concept of the present invention, the process uses a vacuum of 20-22 inches instead of at least 28 inches. Finally, the process disclosed in D2 and D3 has a step of heating in an evaporator before the molasses are transferred to a vacuum chamber.

- 55 The applicant's arguments in relation to D2 and D3 are essentially similar to those made in relation to D1. Firstly, the applicant argues that D2 and D3 disclose a two-step process, namely a first evaporation step to reduce the moisture content to 5-6% and a second step of vacuum dehydration. They submit that it is not possible to directly dehydrate a product only using only the vacuum-drying step, as the apparatuses presented have a tendency to accumulate moisture on the walls (D1, page 13, second full paragraph; D2, column 7, lines 18 to 25). Both dehydration steps (e.g. evaporation and vacuum) are considered essential in D2 and D3 as both need to be performed to obtain the final product. As such, it would not be conceivable for the person skilled in the art to exclude the preliminary step of evaporation from the process of D2 and D3.

- 56 The applicant also argues that D2 and D3 teach the person skilled in the art that a dehydrated molasses product having more than 2.5% moisture can form a solid at room temperature but only if carefully and uniformly cooled using “a highly novel and unique cooling system” (D2, section starting at the end of the last paragraph of 14 and ending in the first paragraph of page 16; D3, section starting on column 7, line 61 and ending on column 8, line 67). Failure to use this “highly novel and unique cooling system” will prevent the proper handling of the dehydrated molasses product. No such step is required by present claim 20.
- 57 Furthermore, the applicant submits, The person skilled in the art, would have no motivation to modify the methods described in D2 and D3 to arrive at an advantageous molasses dehydration process according to present claim 20, wherein molasses is heated to a temperature of at least 70 °C and under a vacuum of at least 711 mmHg (28 inHg) until the moisture content of the treated molasses reaches at least 0.5% (w/w).
- 58 Finally, D2 and D3 only discuss dehydrating molasses to 2.5-3.5% moisture, rather than 0.5 % or less as required by claim 1. There is no indication in these documents that further dehydrating molasses to this extent would be possible, or even desirable. Furthermore, if the skilled person were to try to further dehydrate molasses using the techniques of D2 and D3 they would run into difficulties with the handling, and organoleptic properties, as discussed in the section on the present invention above.
- 59 In my view my analysis of D1 applies equally to D2 and D3. The vacuum-drying is carried out at a temperature range which substantially overlaps with that of the present invention, but the drying is carried out under a vacuum of 20-22 inches rather than at least 28 inches. I consider that the skilled person, as part of routine workshop modifications, would consider a vacuum of at least 28 inches and therefore arrive at the process claimed in steps (a) and (b) of claim 20. As I have said, in doing this they would therefore be able to produce a molasses product with a moisture content of less than 0.5% (w/w), as in claim 1 of the present application.
- 60 The various steps of D2 and D3 are not the same as those of D1. Both however make use of a vacuum-drying step and, as I have said above, given that there does not seem to be any specific features of this process in the present application except those I have referred to above which result in the required dehydration level of the molasses, I conclude that the skilled person would realise that they could achieve the required dehydration through a vacuum-drying step alone, and would therefore be motivated to include only a vacuum-drying step. Given that the present invention does not need to use any special cooling system, and that, if the moisture content was reduced below the 2.5%-3.5% levels in D2 and D3 to about 0.5%, such a cooling system would be unlikely to be required in D2 and D3, in my view the skilled person would be able to produce the required molasses without requiring such a step.
- 61 Taking into account all these matters, and my arguments made above in relation to D1, I conclude that the inventive concepts of present claims 1 and 20 also do not involve an inventive step over each of D2 and D3 when considered with the person skilled in the art’s common general knowledge.

Dependent claims

- 62 I will briefly consider the dependent claim and the optional features of claim 20.
- 63 Claims 2-5 claim progressively greater levels of dehydration up to a moisture content of less than or equal to about 0.01% in claim 5. My analysis above applies equally to these claims.
- 64 Claims 6 and 7 specify that the molasses is a sugar cane molasses and a light or fancy molasses respectively, as do claims 24 and 25. Claim 29 specifies that the sugar cane molasses is a medium molasses. In my view the skilled person would be aware that they could apply the process to these types of molasses and tweak the temperature, time and vacuum parameters accordingly. Claims 8-12 specify some details in relation to these parameters which correspond to the examples laid out in the description. As I have already said, such examples would well be within the remit of workshop modifications for the person skilled in the art.
- 65 Claims 13 and 21 relates to the solid molasses being glossy at room temperature and claim 22 to depositing this product in a mold. Claim 23 relates to processing this product into a powder and claim 30 to processing the product into a granular form, crushed form or ground form. Claim 34 relates to coating the molasses product with a solution. These are entirely obvious features to the person skilled in the art.
- 66 Claims 14 to 19, 31 and 32 relate to applications of the molasses and to molasses compositions containing the product of claim 1, all of which seem to me to be obvious applications and compositions.
- 67 Claims 26 and 28 relate to limiting the invention to higher temperatures, namely at least 80°C, and 75°C respectively. I believe such modifications would be within the realm of workshop modifications for the person skilled in the art.
- 68 Finally, I note that the optional features of steps (c) to (h) are all features included in the other dependent claims. It is also therefore the case that these steps would be obvious to the person skilled in the art.

Auxiliary requests

- 69 The applicant has filed three auxiliary requests and has asked that I consider them in the following order: Auxiliary request A, First Auxiliary Request, Second Auxiliary Request.
- 70 Auxiliary Request A introduces a simple restriction of the claims to a molasses product suitable for human consumption. In my analysis above I have not relied on any arguments that the molasses product need not be suitable for human consumption and have addressed the question of maintaining the organoleptic properties of the molasses. My analysis therefore equally applies to Auxiliary Request A and I therefore conclude that these claims are obvious to the person skilled in the art.
- 71 The First Auxiliary Request cancels claims 1 to 19 and introduces a new product-by-process claim, claim 16. This claim claims a product consisting essentially of a molasses having a moisture content equal to or less than about 0.5% (w/w) obtainable by the process of the previous claims. It adds no substantive features to

the claims I have already considered and therefore also does not involve an inventive step.

- 72 The Second Auxiliary Request is the same as the First Auxiliary Request except that the new product-by-process claim has been omitted. These claims also therefore lack an inventive step.

Summary

- 73 In summary, I have found that the claimed invention does not involve an inventive step for the following reasons:
- a. The person skilled in the art is a process chemist although they may receive guidance from a food scientist.
 - b. The person skilled in the art would be aware of the desirability of reducing moisture content in molasses as much as possible and would be aware of vacuum-drying processes which could be used to remove moisture from molasses.
 - c. The application in suit discloses few details of the vacuum-drying processes used to arrive at the product of claim 1, with the exception of the temperature and vacuum parameters specified in claim 20. It also does not disclose any details of how organoleptic properties should be maintained, except in the definition of these parameters and some worked examples of time, temperature and vacuum profiles.
 - d. It follows from this that, if the specific values for these parameters were obvious to the person skilled in the art, they would apply them to their known vacuum-drying processes so as to arrive at the claimed invention.
 - e. The cited prior art documents all disclose processes which involve a vacuum-drying step with temperature and pressure parameters not dissimilar to those specified in claim 20, although not identical, albeit as part of a multi-step process. D1 claims to reduce the moisture content to no more than 1% whereas D2 and D3 claim to reduce the moisture content to 2.5%-3.5%.
 - f. I have found that it would be obvious for a skilled person, carrying out routine modifications to the processes described in the prior art using their knowledge of vacuum-drying processes, and adapting the temperature and vacuum parameters disclosed in these documents using routine workshop modifications, to try the parameter values specified in claim 20. Or, looked at another way, it would be obvious to the skilled person to use the parameters specified in the prior art in the vacuum-drying processes which form part of their common general knowledge, and make routine workshop modifications to these parameters thereby arriving at the invention of claims 1 and 20.
 - g. Given all these factors, I conclude that it would be obvious for the skilled person to try a single-step vacuum-drying process (omitting the other steps specified in the cited prior art documents) with the parameters specified in

claim 20 in a way which would produce a solid dehydrated molasses product with a moisture content within the range specified in claim 1.

- h. The claimed invention is therefore obvious over the cited prior art when considered in the light of the person skilled in the art's common general knowledge.

Final remarks

- 74 I have therefore found that claims 1-34 of what the applicant calls the Main Request is obvious in the light of each of documents D1 to D3 when each document is considered with the person skilled in the art's common general knowledge. I have also found that the claims of each Auxiliary Request do not involve an inventive step.
- 75 I would note finally that, if I am wrong in my consideration of the common general knowledge and the obviousness of the claimed invention over the cited prior art when considered in the light of that common general knowledge, it would raise a question in my mind as to whether the invention has been disclosed clearly and completely enough in the present application so as to be performed by a person skilled in the art. This is a requirement of section 14(3) of the Act. This issue has not been considered by the examiner and, given my finding on inventive step, I do not need to consider it here.

Conclusion

- 76 I conclude that the invention claimed in claims 1-34 does not involve an inventive step over each of prior art documents D1, D2 and D3 when these documents are considered in the light of the common general knowledge of the person skilled in the art. I have also considered the three Auxiliary Requests and have found that these claims also do not involve an inventive step. I therefore refuse the application.

Appeal

- 77 Any appeal must be lodged within 28 days after the date of this decision.

BENJAMIN MICKLEWRIGHT

Deputy Director, acting for the Comptroller