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PROCESS OF EXTRACTING NUT OIL

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My invention relates to the extraction of oil from nut shells, and especially cashew shells, although it is not necessarily limited to extraction from these particular shells.

The shell of the cashew nut contains a valuable oil, and the kernel is also valuable, and it is desirable to so process the nuts that the tough shell is conditioned for relatively easy removal while the shell oil is at the same time extracted, without injury to the kernel. Methods heretofore used or proposed involve heating, and have various disadvantages, including burning and waste of some of the oil or damage to the kernels, as well as fire risk; and while various apparatus, expedients or precautions have been proposed to prevent or minimize burning or reduce the temperature or duration of heating, these are all more or less unsatisfactory for various reasons known to persons skilled in this art.

The general object of the present invention is to provide an entirely novel method of extracting the shell oil, which practically or entirely eliminates the possibility of burning or other waste of the oil, fire risk, etc., with small or no injury to the kernels, and at the same time properly conditions the shell for ready removal.

To this end the process consists, as briefly described, in submerging the whole nuts in a bath of molten metal or metallic alloy having a relatively low melting point, such, for example, as an alloy of lead and tin in proportions which may be varied considerably to control the melting point and temperature at which the bath must be kept to allow for the cooling effect of the introduction of fresh nuts and avoid solidification of the bath. One suitable alloy is a composition of the stated metals in such proportions that the melting point is approximately 400° F., and the bath may be maintained at a moderately higher temperature, sufficient to prevent solidification upon introduction of the nuts. The time of submersion may vary in accordance with the temperature of the bath, condition of the nuts, and other factors. With a bath of stated composition, and at about the stated temperature the nuts may be submerged for from approximately 50 to 60 seconds. In this time a large proportion of the shell oil is driven off into the bath and rises to the surface thereof, overlying the metal. I have demonstrated by careful weight tests that the oil extracted in the bath amounts to approximately 12% of the weight of the raw nuts, which compares favorably with the percentage of extraction obtained by processes previously known or proposed including the open pan process commonly used in India.

Simultaneously with extraction of oil the shells are rendered brittle and swelled and otherwise conditioned for shelling, so that the shells may be removed from the kennels, after the nuts are removed from the bath, with satisfactory speed and economy. The whole nuts, or the shells, after removal from the kernels, may be treated with a suitable solvent, such as alcohol or other organic solvent, to remove oil adhering to or remaining in the shells, after which the oil is recovered from the solvent in any known or suitable manner, as for example by distillation.

The process may be so conducted, in the manner generally described, that the value of the nut kernels is not impaired.

The extracted oil may be drawn off continuously or intermittently, cooled and stored.

Any suitable apparatus may be employed for carrying out the process, which may be conducted by hand manipulation or by partly or entirely automatic mechanism. For example, the molten bath may be in a trough of sufficient length to contain a suitable number, say three or more, baskets in which the nuts are placed. A track may be provided at the bottom of the trough, over which the baskets are moved to submerge the nuts in the molten bath and advance them through it. At a suitable interval, depending on the time of treatment and the number of baskets in the trough, a freshly charged basket is pushed in at one end and a basket of treated nuts is ejected, at the other end of the trough. Thus, if the trough is arranged to hold three baskets, a fresh basket will be inserted at intervals of from 12 to 15 seconds, under conditions of the process specifically referred to herein above as an example, so that each basket will

remain in the bath from approximately 50 to 60 seconds, one basket of treated nuts being ejected simultaneously with the insertion of each basket of fresh nuts.

When desired a continuously or intermittently moving conveyor may be arranged to move the baskets or trays of nuts through the bath at a proper rate, or the nuts may be submerged and advanced through the bath by cross pieces on a continuous conveyor, without the use of baskets.

Metals or alloys having low melting point, suitable for this process, such for example as lead or its alloys, oxidize rapidly in the presence of air. Such oxidization is, however, largely or almost entirely prevented by the fact that the extracted oil lies above the metal and excludes air therefrom, practically or entirely preventing oxidization.

When a suitable metal or alloy is employed, capable of extracting the oil at reasonable temperature, for example as above described, the oil is not decomposed or evaporated or otherwise wasted or deteriorated to any considerable or prejudicial extent.

The process is not limited to the use of the stated alloy. Any metal or metallic alloy having a sufficiently low melting point may be employed, or other variations may be made in the process, as will be understood by skilled persons from the preceding explanation and specific example, and as contemplated in the scope of the claims appended.

I claim:

1. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metal having a comparatively low melting point.

2. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metal having a comparatively low melting point, the bath being maintained at a temperature moderately above the melting point, sufficient to prevent solidification by the cooling effect of shells introduced.

3. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metal having a melting point not higher than approximately 400° F.

4. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metallic alloy having a melting point not higher than approximately 400° F.

5. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metal maintained at a temperature sufficient to expel from the shells a substantial percentage of their contained oil which rises to the surface of the metal bath.

6. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of a molten metallic alloy having a comparatively low melting point.

7. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metallic alloy maintained at a temperature sufficient to expel from the shells a substantial percentage of their contained oil which rises to the surface of the metal bath.

8. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metallic alloy including lead and having a comparatively low melting point.

9. A process of extracting oil from nut shells, including as a characteristic step the placing the shells in a bath of a molten metallic alloy containing lead and tin and having a comparatively low melting point.

10. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metallic alloy of lead and tin and having a comparatively low melting point.

11. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metallic alloy including lead and having a melting point not higher than approximately 400° F.

12. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metallic alloy containing lead and tin and having a melting point not higher than approximately 400° F.

13. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metal having a comparatively low melting point, the shells being submerged in the bath for a time sufficient to produce extraction of a desired percentage of their contained oil and condition the shells for easy removal, and insufficient to injure the kernels.

14. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of a molten metallic alloy having a comparatively low melting point, the shells being submerged in the bath for a time sufficient to produce extraction of a desired percentage of their contained oil and condition the shells for easy removal and insufficient to substantially injure the kernels.

15. A process of extracting oil from nut shells, including as a characteristic step the placing of the shells in a bath of molten metal having a melting point not higher than approximately 400° F., the shells being retained in the bath for approximately 1 minute.

16. A process of extracting oil from cashew nut shells, including as a characteristic step the placing of the shells in a bath of molten

metal having a comparatively low melting point.

17. A process of extracting oil from cashew nut shells, including as a characteristic step the placing of the whole nuts in a bath of molten metal having a comparatively low melting point.

18. A process of extracting oil from cashew nut shells including as a characteristic step the placing of whole nuts in a bath of a molten metallic alloy having a comparatively low melting point.

In testimony whereof I affix my signature.

THOMAS M. RECTOR.