File : ~~WBS~~ TG4

This info
Also found in
Moringa oleifera (Pc 150)
The Miracle Tree
(latest version of
Fuglie's book)

CHURCH WORLD SERVICE
WEST AFRICA REGIONAL OFFICE
B.P. 3822
DAKAR, SENEGAL

PROPERTY OF ECHO

DESIGN FOR A HYDRAULIC PRESS ADAPTED FOR MORINGA SEEDS

BURKINA FASO SHEA NUT PRESS

SENEGAL NEEM PRESS

The Burkina Faso press designed for shea nuts and other seeds has a built-in hydraulic system capable of exerting considerable pressure. Seeds are ground into a powder, steamed, and introduced directly into the press cage. After pressing, the cage is bolted to its frame, the oil pan at the base and the metal block at the top are removed, and then the hydraulic piston is used to force the press cake out the top of the cage. This press is, however, quite expensive and any spare parts or repairs which become necessary can be secured only at the factory where the press is produced.

The press designed in Senegal for extraction of Neem oil is much less expensive, can be locally-made and repaired and uses an ordinary tire jack for hydraulics. Seeds are also ground into a powder and steamed, but are then placed into porous plastic sacks which are introduced into the cage for pressing. The press cage must be removed after each pressing and the compacted press cake manually extracted (with considerable difficulty) from the cage.

The press designed by Church World Service is a combination of the above two presses. The press cage is from the Burkina Faso press and the structure and hydraulic system patterned after the Senegal press.

CWS MORINGA OIL PRESS

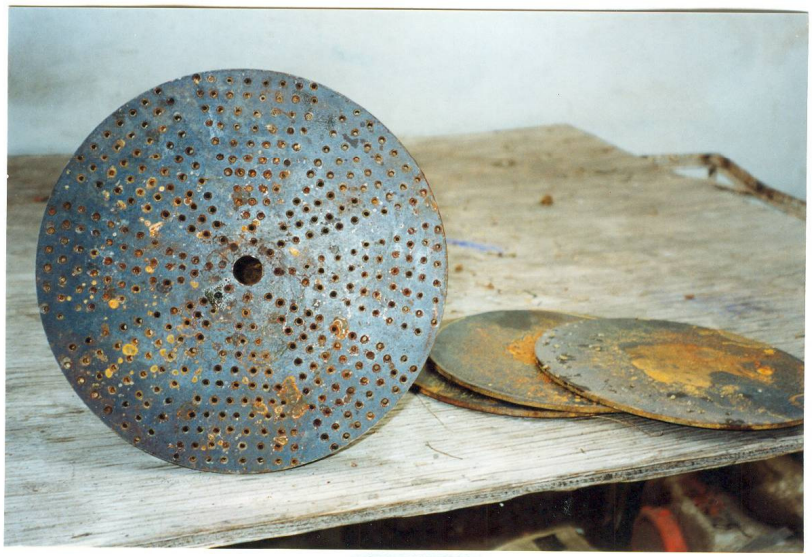
Although designed specifically with Moringa seeds in mind, the CWS press will also work with groundnuts, shea nuts and other oil seeds. A 15-ton tire jack provides hydraulic pressure from the bottom. The press cage is kept aligned by the guides on each side. Note that these guides have a series of holes: this is so the cage can be temporarily bolted to the frame. This is done to make it easier to put tire jack is placed underneath the oil pan, and again when it is time to remove the oil cake from the press cage.

CWS MORINGA OIL PRESS

The guides on each side are bolted at the top and bottom to the press frame. They can be unbolted in order to remove the press cage for cleaning or storage. During the oil pressing, the most pressure is exerted at the top, at the point where the screw shaft is located. The metal plate which holds the screw shaft in place needs to be of very sturdy construction.

OIL PRESS CAGE

This press cage is 35cm high and 23cm in diameter. Pierced with very small holes, it also has a handle welded to the front to make it easier to manually move it up and down within the press. Guides, each pierced with one hole in the middle, are welded to the sides. The holes are where pins are inserted when it is necessary to temporarily bolt the cage in place.



BOTTOM PAN AND PRESS PLATES

The bottom pan, also pierced with small holes, is the same diameter (or larger) as the press cage. It is placed in the oil pan first. The press cage rests on the bottom pan. In this way, oil can be extruded from the bottom as well as from the sides of the press cage. The press plates are placed at intervals within the press cage to more evenly distribute the pressure. One press plate should be placed at the very top of the cage after it has been filled.

The Moringa seeds (or any other oil seed) should first be de-shelled. The kernels should then be pounded into a fine powder (both operations can be done using a mortar and pestle). Sift the powder to ensure a fine consistency. This powder should then be steamed until a rich gold in color. The powder is introduced into the press cage while still hot.

FILLING THE PRESS CAGE

Introduce the steamed kernel powder into the press cage. Put press plates into the cage at intervals of about 15cm. Put one press plate in at the very top of the cage.

When the pressing process begins, the kernel powder quickly becomes compacted inside the press cage. At this point, before oil begins to flow, more kernel powder can be added to the press cage. Release the tire jack and raise the screw shaft to add the additional kernel powder. One press plate should be retained to be placed on the top.

TURNING THE SCREW SHAFT

Turn the screw shaft to press the kernel powder from the top. Continue turning until there is considerable resistance.

HYDRAULIC JACK

When it is no longer easy to turn the screw shaft, switch to using the tire jack to exert pressure from the bottom. Jack up slowly. When oil begins to emerge, pause to let the oil come out and jack again whenever it ceases flowing. In general, more oil will be extracted if the pressing is done slowly.

OIL EXTRACTION

Oil emerges from the sides and the bottom of the press cage to be collected in the oil pan and poured out of the funnel. Keep a basin ready to collect the oil as it comes out.

SEED CAKE

Moringa kernels contain very little fiber and the gummy seed cake will extrude through the holes of the press cage. However, much of the oil will be extracted before this occurs. Keep a large spoon on hand to collect this spaghetti-like cake before it falls to the ground.

The extrusion of the cake will tend to block the holes of the press cage, especially towards the bottom end. It will be necessary to manually unblock these holes (using a small nail for example) before another pressing is done and before the cake gets dry and hard. In the event the cake is allowed to become dry and hard in the holes of the cage, it is possible to dissolve the cake by soaking the cage in water overnight.

SEED CAKE REMOVAL

When the pressing is complete, release and remove the tire jack and raise the screw shaft. Lift the press cage as high as possible and insert pins through the holes on the sides to lock it in place. Then, by turning the screw shaft down again, it is possible to force the compacted press cake out through the bottom of the cage.

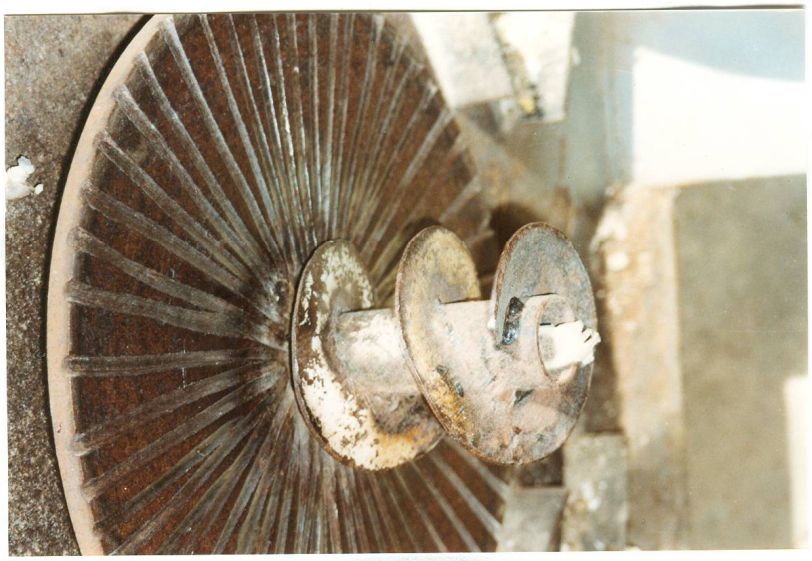
After separating the cake from the press plates, steam the cake for a second pressing. In this manner, Moringa kernels will yield around 20% oil by weight using this press (i.e., 10kg kernel powder will yield 2kg of oil).

SEED DE-HUSKER

A simple machine can be built to make the job of removing the shells easier. This pedal-powered seed de-husker was built by a Senegalese technician in Dakar.

Although a fan was built into the machine for the purpose of separating the chaff from the kernels, this proved to be impractical and the fan is presently not being used.

Inside the machine, a turning screw shaft cracks the shells and the whole kernels and bits of shell drop through the hole at the bottom. The space between the end of the shaft and the machine housing can be adjusted to accommodate different types of seed.



INTERIOR VIEWS OF SEED DE-HUSKER