

Soap from Jatropha – home made but top grade

This report provides a brief explanation of how to make soap from jatropha oil. The report is not just a standard list of 'how to do it', but it also captures questions and problems which came up during a 5 day training workshop for seven members of the the soap making cooperative (KASIKE)¹ in Nyimba District, Eastern Province, Zambia. The trainees were drawn from three villages namely Kamphata, Kesadi and Sikwenda. The training was held from 26 March to 30 March 2012, and it was provided by an experienced trainer (Mrs Mary Mupando) who used to live in the area.

There are many jatropha bushes in these three villages. In the past villagers had collected jatropha seed and sold it for 500-700 kwacha/kg (10-14 dollar cent/kg) to biofuel companies. But this market has dried up, so farmers are looking for other ways to utilize their jatropha seed. By turning jatropha seed into soap, the value of the seed can become up to 10 times higher; Using locally available Yenga presses, 10 kg of jatropha seed can produce about 2.5 litres of oil, which can be converted into to 4.5 kg of soap. 4kg of soap (for bathing or for clothes washing) will cost 15.000-20.000 kwacha in the local shop (3-4 US dollar). This calculation does not include the labour, the hiring of the yenga press, or the cost of caustic soda. In Lusaka caustic soda costs 12.500 kwacha/kg.

Home-made Jatropha soap has other benefits too. It has anti-bacterial properties, and it is softer for the hands because the glycerine is not removed.

The trainer started with the theory of soap making before getting into the practical steps. To make village soap, she listed the following requirements:

1. Oil expeller (Yenga press or any equivalent expeller) for crushing jatropha seed
2. Jatropha oil
3. Caustic soda
4. Three plastic basins
5. Two plastic cups
6. Card board boxes which are used as moulds
7. Plastics for laying in the moulds

¹ KASIKE comes from the word 'Kusika' which means something from above to the ground. "It has come from God".

Method for preparing the mixture for making the Jatropha soap

1. Pour 8 cups of Jatropha oil into one of the plastic basins
2. Pour 8 cups of water in a different plastic basin (Not where the oil has been poured)
3. Pour 1 cup of caustic soda into the plastic basin containing water

The mixture of caustic soda and water should be stirred thoroughly. When the caustic soda is added to the water the mixture becomes hot and it should be handled with caution since caustic soda is corrosive and the mixture is equally corrosive. The mixture should be stirred until it gets cold.

Once the mixture has gotten cold it should be poured into the plastic basin which has Jatropha oil in it. The mixture should be stirred in one direction in order for the water and oil to blend and make a good soap. If the stirring is not done in one direction the oil separates from the water and the soap will not settle. The stirring should be done for one hour and thirty minutes. After which the thick mixture that results should be poured into the moulds.

Once the mixture has been poured into the moulds, they should be placed in a very cool place in order for the soap to start the hardening process. The soap should be left in the moulds overnight. Then it is removed from the moulds and sliced into the desired sizes and left to harden for the next 4 days.

The soap made from Jatropha oil is white in colour and has a mild scent. It is possible to experiment with adding different colours and scents to the soap. This should be done when the mixing of Jatropha oil and caustic soda is almost coming to an end (mixture is getting thick).



Pictures: The trainees are preparing card board boxes to use as moulds (left). Mrs Mupande is measuring the caustic soda (right).

Practical session

The trainer inspected the oil before the practical could proceed. She said that it's best to sieve the oil with a sack. She also ensured that all the necessary requirements (apparatus and materials) were in place before she could start measuring out the oil, water and caustic soda.

The trainer poured out 8 cups of clear oil (approximately 500 mls) from the container which she planned to use for the practical lesson.



Pictures (from top left to bottom right): jatropha oil; the mixing of water + caustic soda and oil; mixture is thickening (colour pink was added); mixture is poured into a mould so it can set.

She then poured 8 cups (approximately 500 mls) of water into a different basin into which she poured 1 cup of caustic soda and started mixing it until it got cold. It took approximately 30 minutes for the mixture to get cold.

Observation: When the caustic soda was added to the water it produced a very strong pungent smell which was choking. The trainer and the participants did not have dust masks and goggles to wear as a safety measure. However, one of the participants provided rubber gloves. She had gotten them from the hospital since she works in the community as a traditional birth attendant in the community.

The cold mixture of caustic soda and water was then poured into the basin which contained oil and this was stirred. The stirring was done only in one direction in order for the oil and water to blend. The mixture should continue without interruption, and should last for one and a half hours. When the mixture is sufficiently thickened, it can be poured out into the moulds. Colour can be added just before it is poured into the moulds.

The trainer said that if the mixture of caustic soda and water is not sufficiently cool when you add it to the oil, you will not get the desired results.

She also told the participants that they need to have a cold room in order for the soap to harden completely; it should not have a spongy texture when completely dry.

The trainer noted that Jatropha soap can be used for both bathing and washing. There is no special mixture for making bath and washing soap.

The trainer said that if you add too much caustic soda when making soap, the soap will be itchy when using. This MUST be avoided; it would also be bad for clothes.



Pictures: soap has hardened enough to be cut. Soap on the left has colour added to it (pink). Soap on the right contains jatropha sediment (and no added colour).

Further Observations:

1. There were a lot of questions and enquiries from participants over the practical procedures. Such as why should we only stir for 1hour 30 minutes and not more or less? Why should we the put the moulds in a cool place and not in a warm place?
2. One batch of soap was made from freshly pressed jatropha oil that had not yet settled (the sediments had not yet sunk to the bottom). This soap was very brown in colour (see

picture – soap bar lying on paper). However, it was very good to use for washing clothes as observed by the participants who noted that it easily removed dirt when it was used for washing, though it had not hardened very much.

3. The soap mixture to which the green colour was added did not harden because the person who was stirring the mixture was varying the speed at which he was stirring, so the oil separated from the water. The participants said that it will be better to have one person to do the stirring for the entire one and a half hours in order to have consistency.
4. If the caustic soda and oil has not mixed well you can feel it as you are stirring, because the mixture is supposed to start hardening as you mix. Participants took turns in stirring of the soap so that they could have a feel of how the mixture hardens. Some of the soap that was made by the participants did not harden overnight because the oil and caustic soda mixture did not blend well. It formed some kind of a paste which was still good to use as a washing paste.
5. When you place the soap mixture directly into the box without placing a plastic inside the mould, it will not harden because the water will be absorbed by the box .

Appendix 1: Experiences with using the Yenga press

When Jatropha seed is picked and shelled it should be let to dry on the sun for at least 3 days.

Men did all the seed pressing. When pressing cold jatropha seeds, the oil was coming out like a porridge. But once the seeds were pre-heated, it was coming out properly. In some cases the seed got over-heated / burned and this was bad. Some people commented that women should have been involved here, as they are more experienced with heating things over a fire.

If the spindle was tightened too tight, the oil was backflowing into the funnel. Each time the press jammed, it had to be stripped open and the process would start over again because you could not press since the handle was not able to move downwards. In the process of expelling Jatropha oil the handle of the yenga press broke but got it fixed by a local blacksmith.

Yenga presses are widely spread in the area; in most villages 1 or 2 presses can be found. These presses are under-utilised because oil seeds are only a minor crop in the area. However those people who use their yenga press regularly, are reluctant to use it on jatropha. It is therefore best to use a press that is not in use for edible oil, or to wash the press thoroughly after using it for jatropha.

Observation: The Jatropha oil (30 litres) which was expelled by hand (yenga press) almost 5 days before the training, had settled and was stored at the place where it was being expelled from. It was placed in a 20 litre container and a 10 litre bucket². On the day of the training the oil was transported on a bicycle for a distance of a few hundred metres and this caused the oil to unsettle. On the second day of the workshop, the sediments had settled again and the clear oil was easily scooped off from the top.



Pictures: yenga press with jatropha seed (jatropha hedge is providing shade).

Appendix 2: Dividing the soap

A total of 117 bars of soap were made over the training period. The soap was shared among the participants and the members that had contributed to the facilitation of the training and these included the lady who made her Yenga Press available, the members who contributed jatropha, the people that assisted in pressing the seed, as well as the women who were preparing the food at the training place. The Kamembe cooperative which provided the training place was also among the beneficiaries.

For more information:

This training workshop was held on the request of the Kasike cooperative. They are now making soap by themselves. Their soap has been met with strong interest at local agricultural shows.

This report was written by Mr Terence Chibwe (UNZA) for the ‘bridging knowledge systems’ (BKS) project, which aims to combine science with local knowledge: see <http://bks.bham.ac.uk/>

If you want further information on jatropha soap, or if you know of other/similar rural value added projects, please contact us on: 0976271708 (Terence Chibwe, Lusaka) or d.vanderhorst@bham.ac.uk

² One Meda is equivalent to approximately 3Kgs of seed. When crushed it was giving approximately 750mls of oil. The pulp was not measured to determine the weight but they intend to use it as a manure in the gardens