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Soybeans utilization for improved household nutrition in Tanzania

Compendium of popular soybean recipes

**Hossana Ngonyani, Augustine Okoruwa, Lunna Kyungu, Audifas Gaspar,
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Compendium of popular soybean recipes

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The Enhancing partnership among Africa RISING, NAFKA, and TUBORESHE CHAKULA Programs for fast tracking delivery and scaling of agricultural technologies in Tanzania is an interdisciplinary and inter-institutional project that aims to address smallholder farmers' needs in the semi-arid and sub-humid zones of Tanzania. The 3-year project is funded by the USAID Mission in Tanzania as part of the U.S. Government's Feed the Future initiative.

Through participatory and on-farm approaches, candidate technologies are being identified and evaluated for scaling by the project team. This is being achieved through the already established networks by Tanzania Staples Value Chain (NAFAKA), Tuboreshe Chakula (TUBOCHA), and other institutional grassroots organizations, creating an opportunity for mainstreaming into wider rural development programs, beyond Africa RISING's current zones of influence.

The project is led by the International Institute of Tropical Agriculture (IITA) and the USAID Tanzania mission-funded 'Feed the Future' programs NAFKA and TUBOCHA. Developmental activities addressing the project objectives are being implemented in Manyara, Dodoma, Morogoro, Iringa, and Mbeya Regions in Tanzania.

The Project partners appreciate support from the American people delivered through the USAID Feed the Future initiative. We also thank farmers and local partners at all sites for their contributions to the project and the CGIAR system.

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Overview

Soybean is a legume and oil seed that is rich in protein. The protein content is 36 - 56% on dry weight basis depending on variety. As an oil seed, the oil content is about 18% on dry weight basis depending on the variety and growing conditions. Soybeans are also rich sources of minerals (Iron, zinc, molybdenum, copper, phosphorus, magnesium, manganese) and vitamins (folic acid, riboflavin, vitamin K). The mineral composition of soybeans is a reflection of the composition of the soil. Soybeans also are a rich source of various bioactive compounds – some of these are antioxidants with a variety of health benefits while others are anti-nutrients. Examples are phytic acid, and enzyme inhibitors. Phytic acid limits the absorption of essential minerals. Enzyme inhibitors such as trypsin inhibitor cause impaired growth e.g. when consumed in poorly cooked soybeans. Soybeans also contain enzymes that cause beany flavour or poor palatability. These anti-nutrients are addressed through proper processing.

The levels of malnutrition in Tanzania are unacceptably high. Protein-energy malnutrition (PEM) and micronutrient deficiencies are main nutritional disorders of public health significance. Children below 5 years of age, pregnant women, and lactating mothers are the most affected. Soybean production has been promoted as a technology that can improve soil fertility and crop productivity, but also be a source of food and income. Soybean consumption can alleviate both protein-energy and micronutrient malnutrition in communities. However, household consumption of soy products in Tanzania is very low because of the lack of knowledge of how to process them into products that are acceptable and nutritious, especially at household level.

Scope

This recipe book is intended for community frontline nutrition workers. It is designed to help them in demonstrating and providing hands-on-training on how to process and prepare acceptable products so as to improve and diversify family feeding practices and nutrition through utilization of soy beans. The recipe book has two parts: the first part presents preparatory processing of soybeans to produce the ready ingredients for use in preparation of various dishes. These ready ingredients can be preserved for use over and over again. The second part presents some selected recipes that have been pretested with farmers in Tanzania.

Part 1

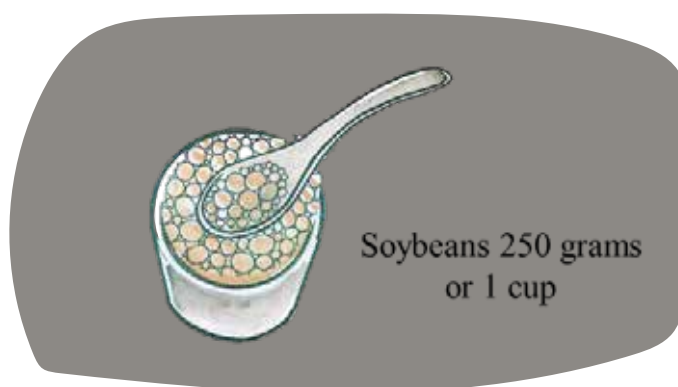
Preliminary preparation of soybeans

There are various ways of processing soybeans in readiness for preparation of various dishes. The processing could be done as a separate step, and the products preserved or stored in sufficient quantities as raw materials until needed. Recipes for preparations of some typical dishes are presented in the second part of this book.

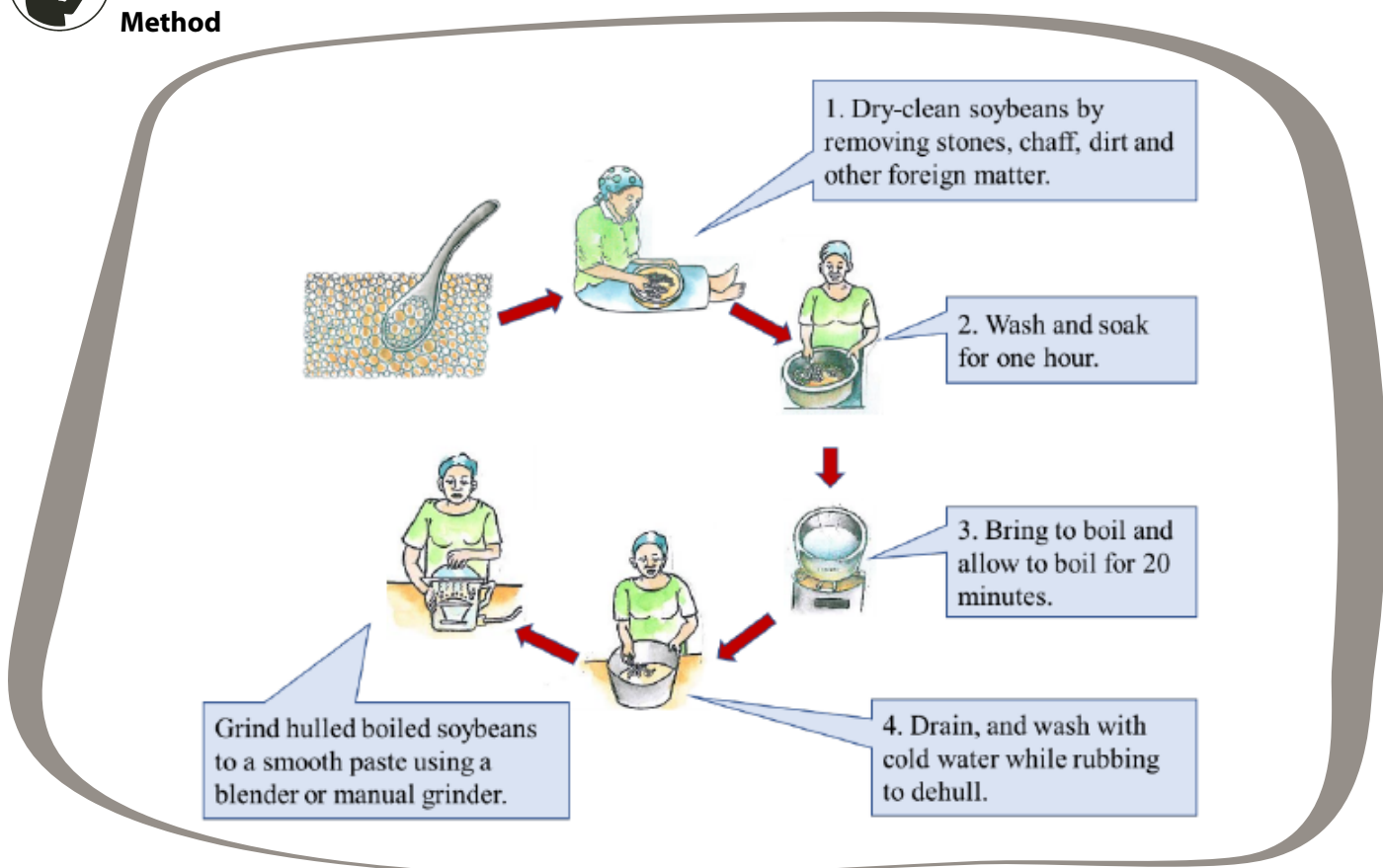
Soy paste



Ingredients



Method

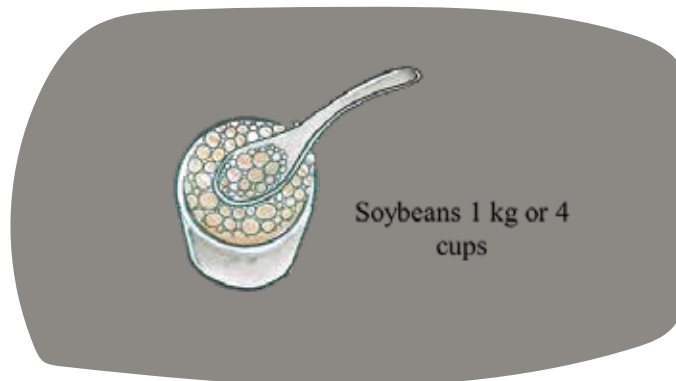


*This is an intermediate soy product for use in other recipes.

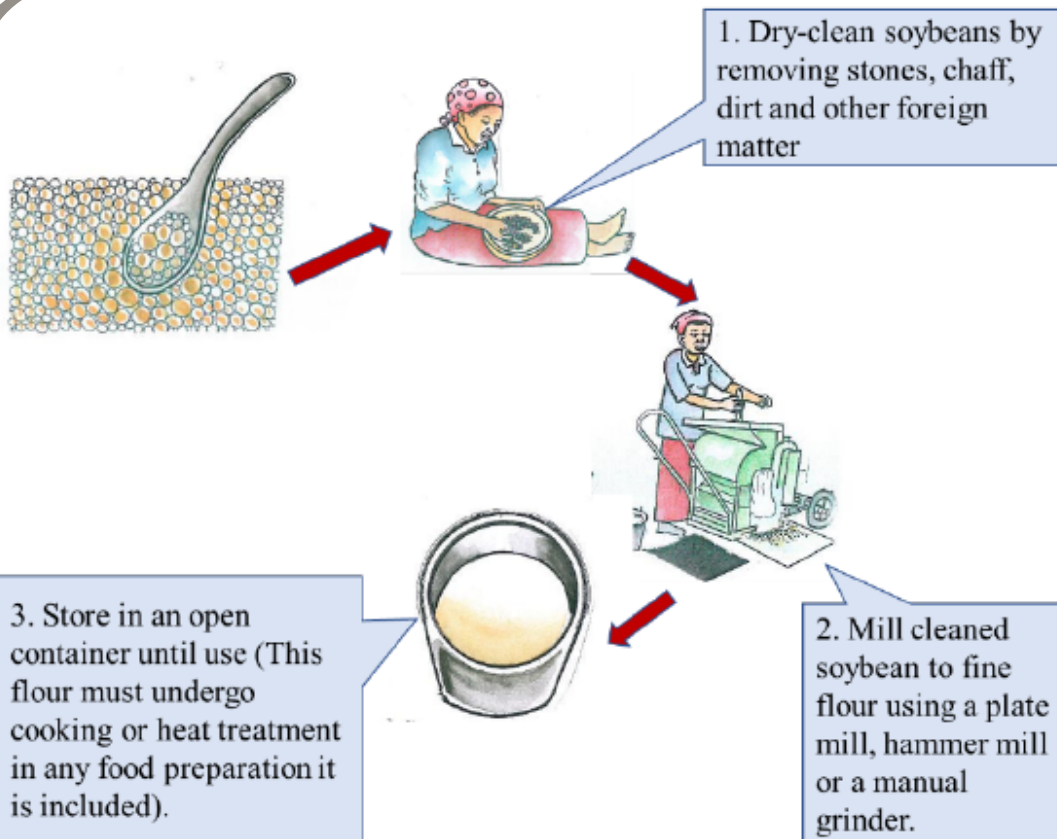
Raw full-fat soy flour



Ingredients



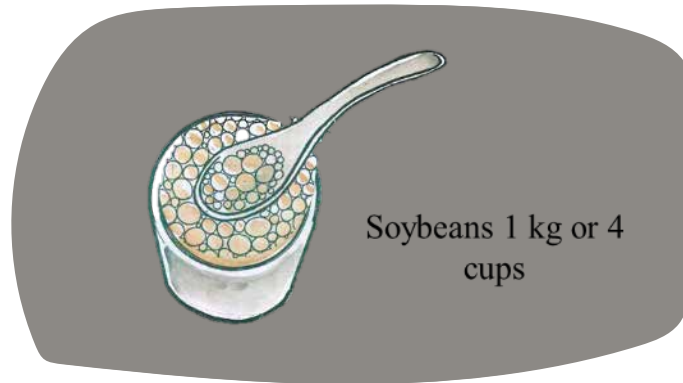
Method



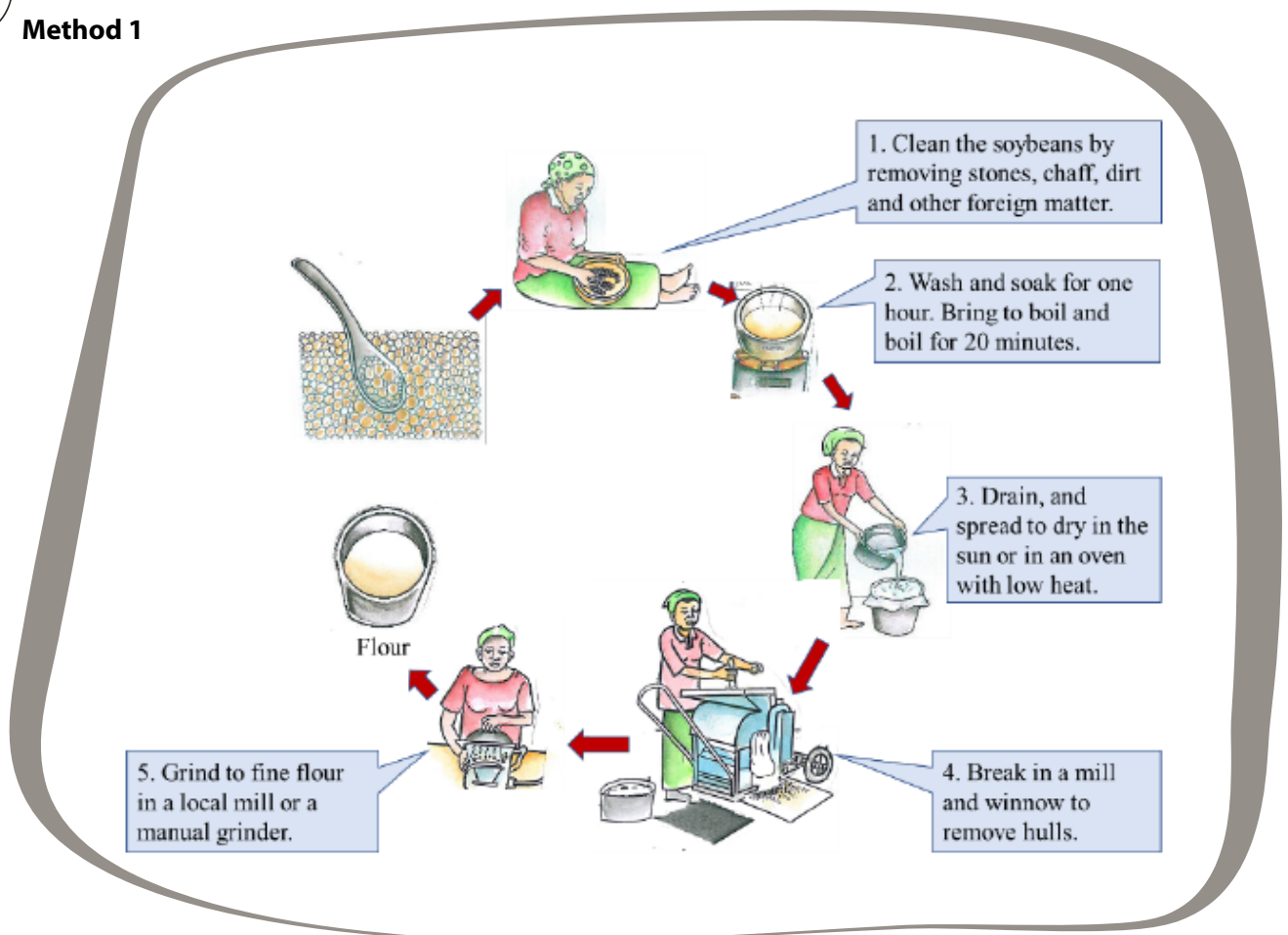
Full-fat soy flour (cooked)



Ingredients



Method 1

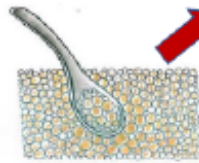


Note: This is an intermediate soy product for fortification of other foods as described later.



Method 2

1. Dry-clean soybeans by removing stones, chaff, dirt and other foreign matter.



2. Roast in a pan on fire or in an oven for 10-25 minutes.



3. Grind the hulled roasted/toasted soybean to flour in a mechanized mill or a manual grinder and sieve.



5. Use as a drink by adding hot water and sugar to taste or add to other foods.



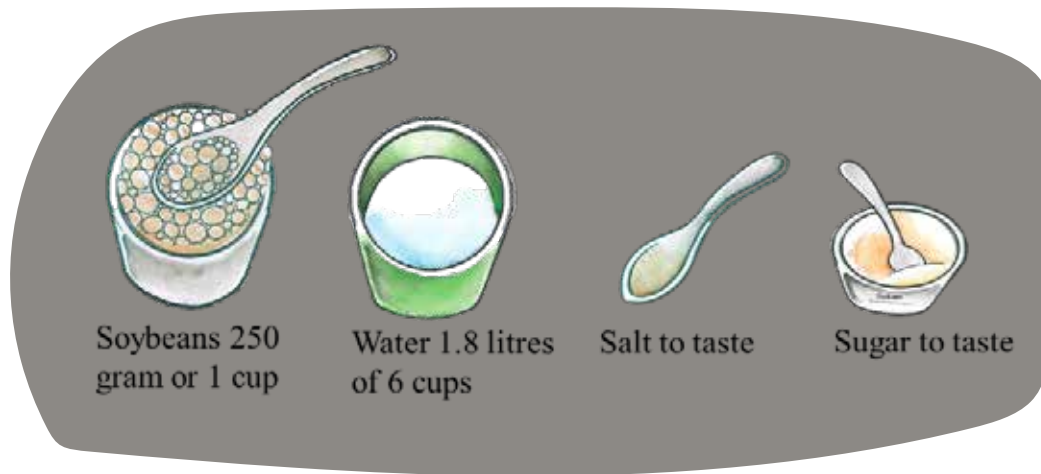
4. Pack in a polythene bag and store in a cool dry place.



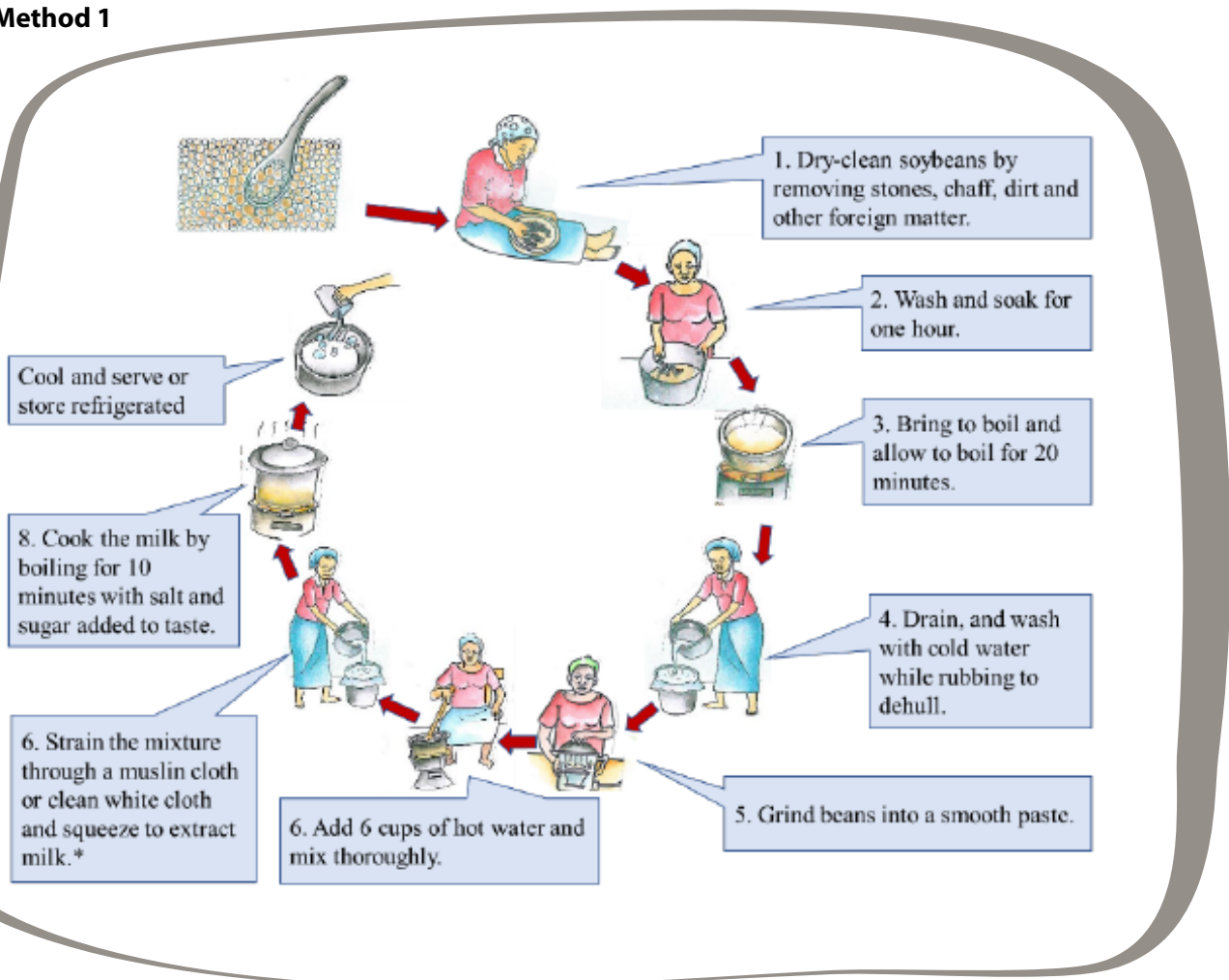
Soy milk



Ingredients

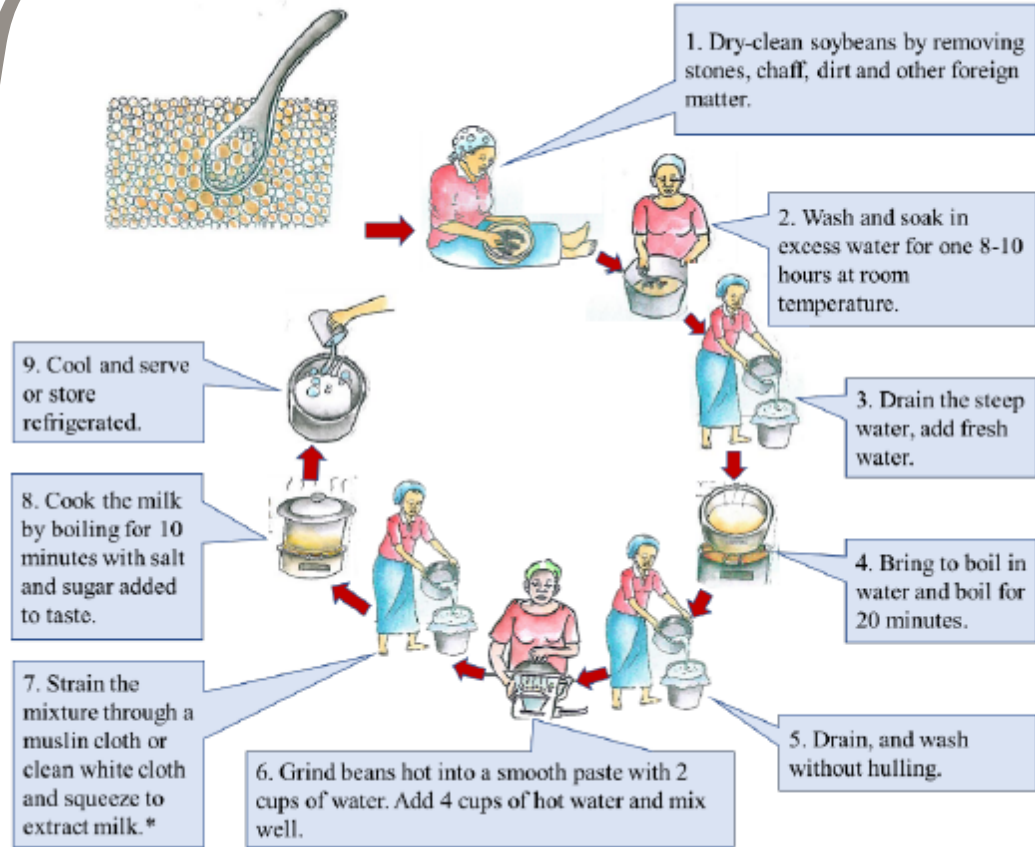


Method 1



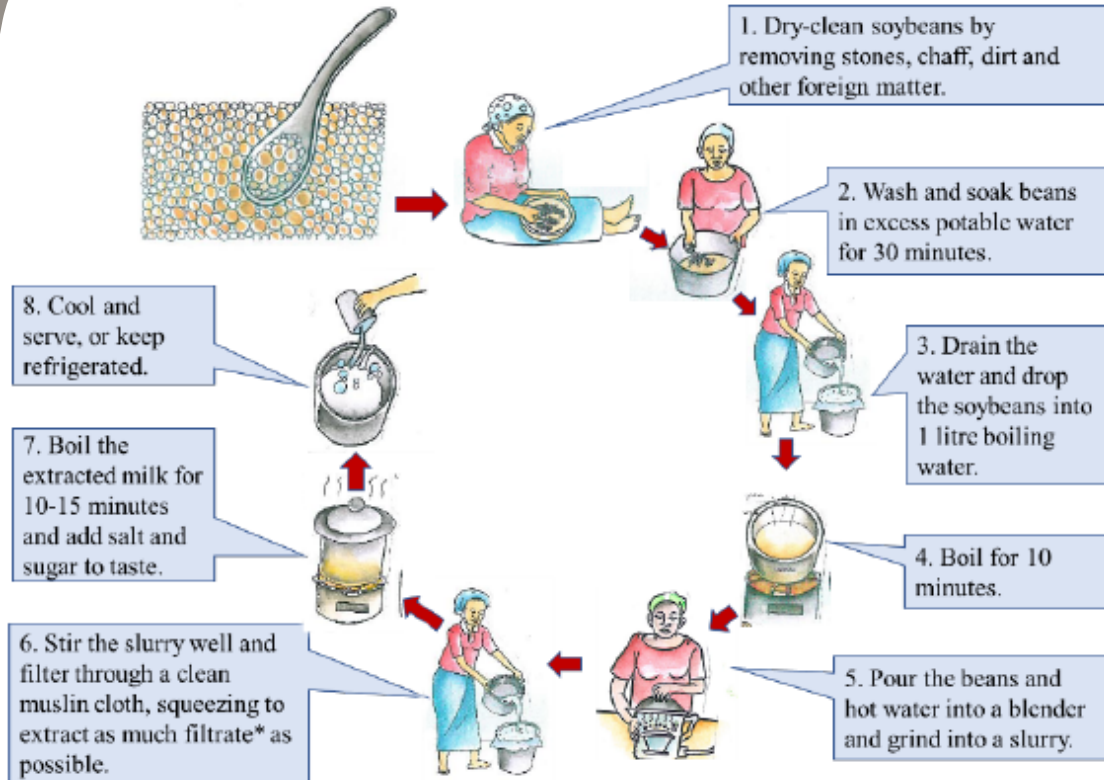


Method 2





Method 3



*The resulting residue may be used in other recipes.

Part 2

Various soybean dishes

Soy milk from raw soy flour



Ingredients



Raw soy flour
1 cup



Boiling water 3
cups



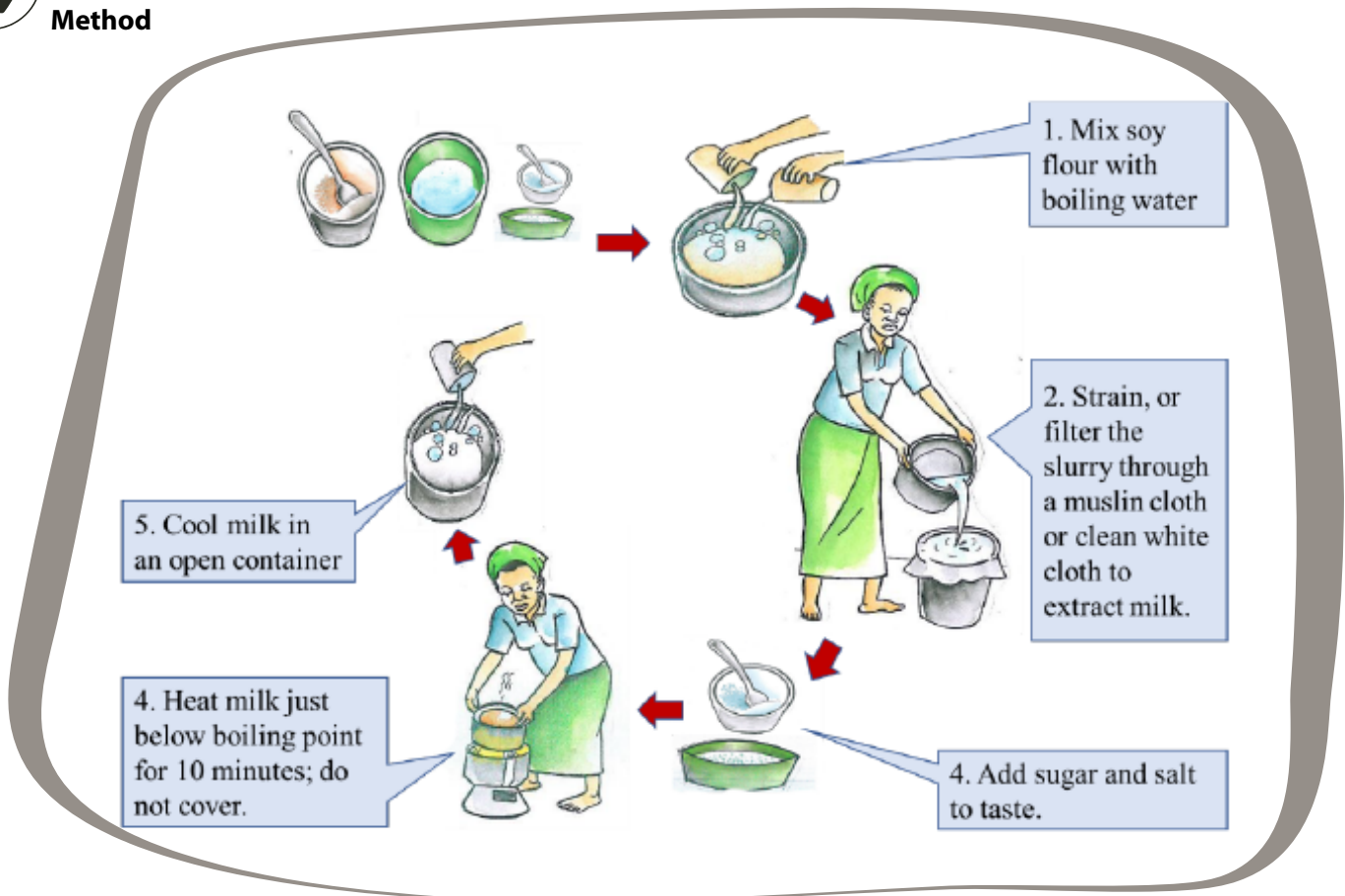
Sugar to taste



Salt to taste



Method



Notes

1. Soy milk can be kept for 12 hours without a refrigerator.
2. The residue can be kept in a cool place for 24 hours or dried to keep longer.
3. Residue can be used in other recipes e.g. soup among others.

Hot soy drink



Ingredients



Raw soy flour
4 table spoons



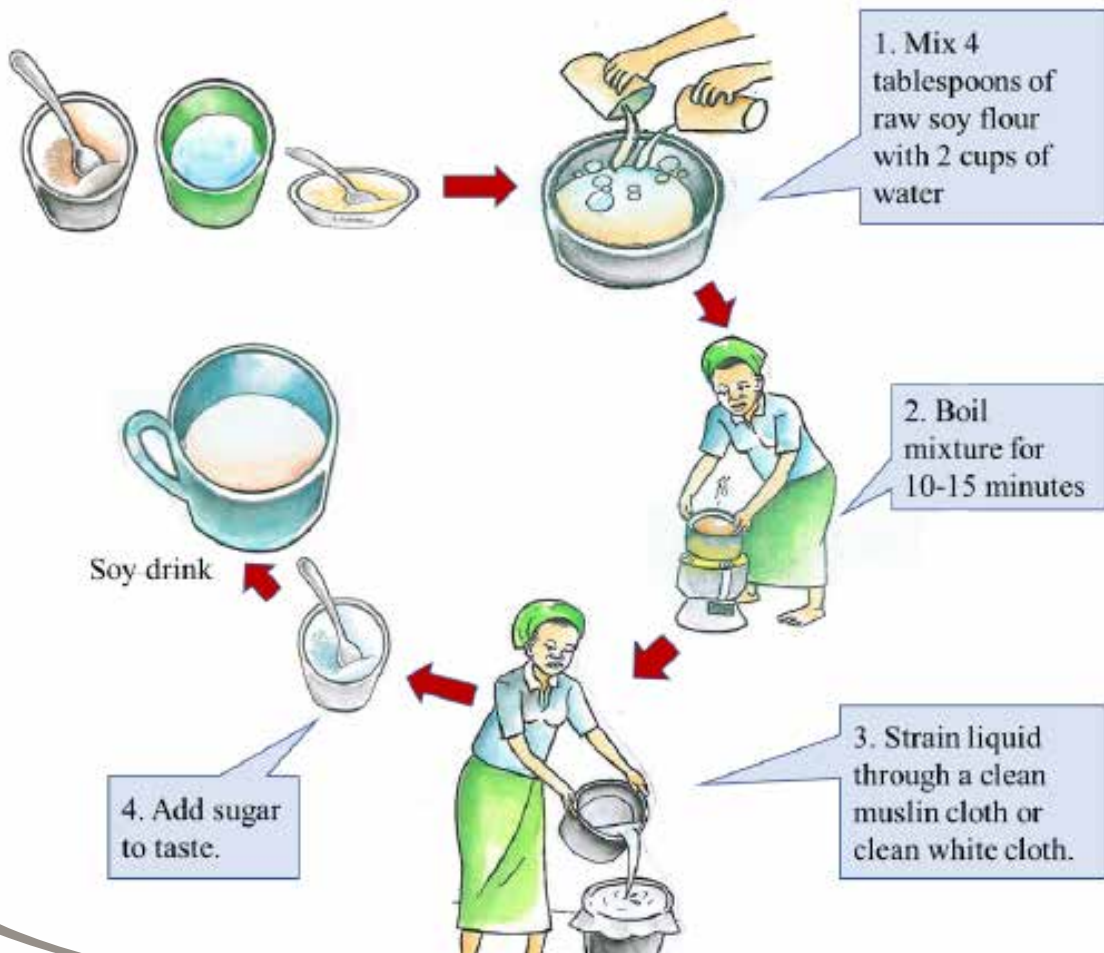
Water 2 cups



Sugar to taste



Method



Soy milk shake



Ingredients



Soy milk
(chilled) 600
mL or 2 cups



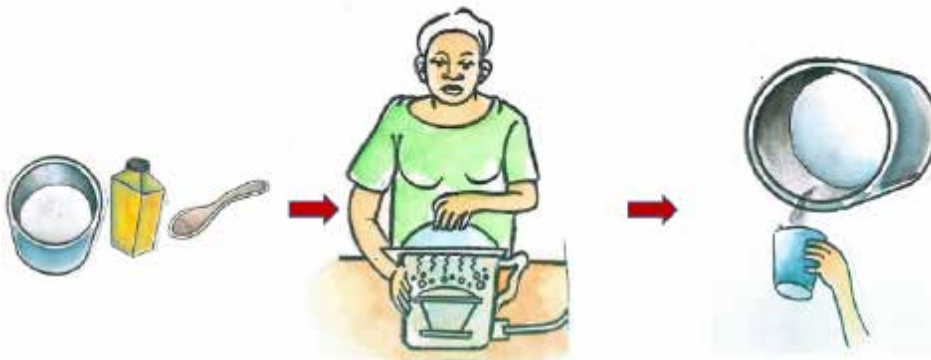
Honey 75
mL or ¼
cup



Vanilla 5 mL or
1 tea spoon



Method



1. Put all ingredients in a
blender jar and mix well.

2. Pour into a glass and serve. It
may also be chilled before serving.

Choco-soymilk



Ingredients



Soybeans 500 grams or 2 cups



Cocoa powder 45 grams or 1 Tablespoon



Water 1.8 litres or 6 cups



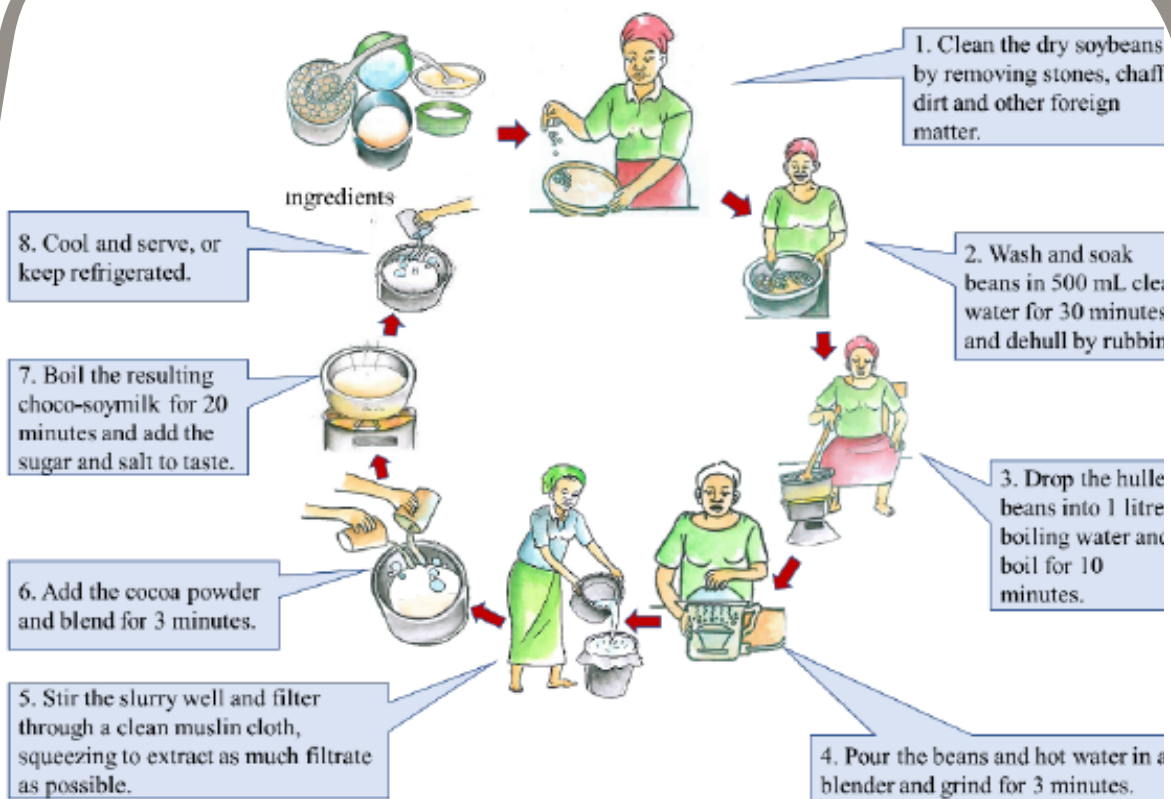
Salt to taste



Sugar 50 grams or 2 Tablespoons



Method



Soy cheese (tofu)



Ingredients



Soy milk 2 litres



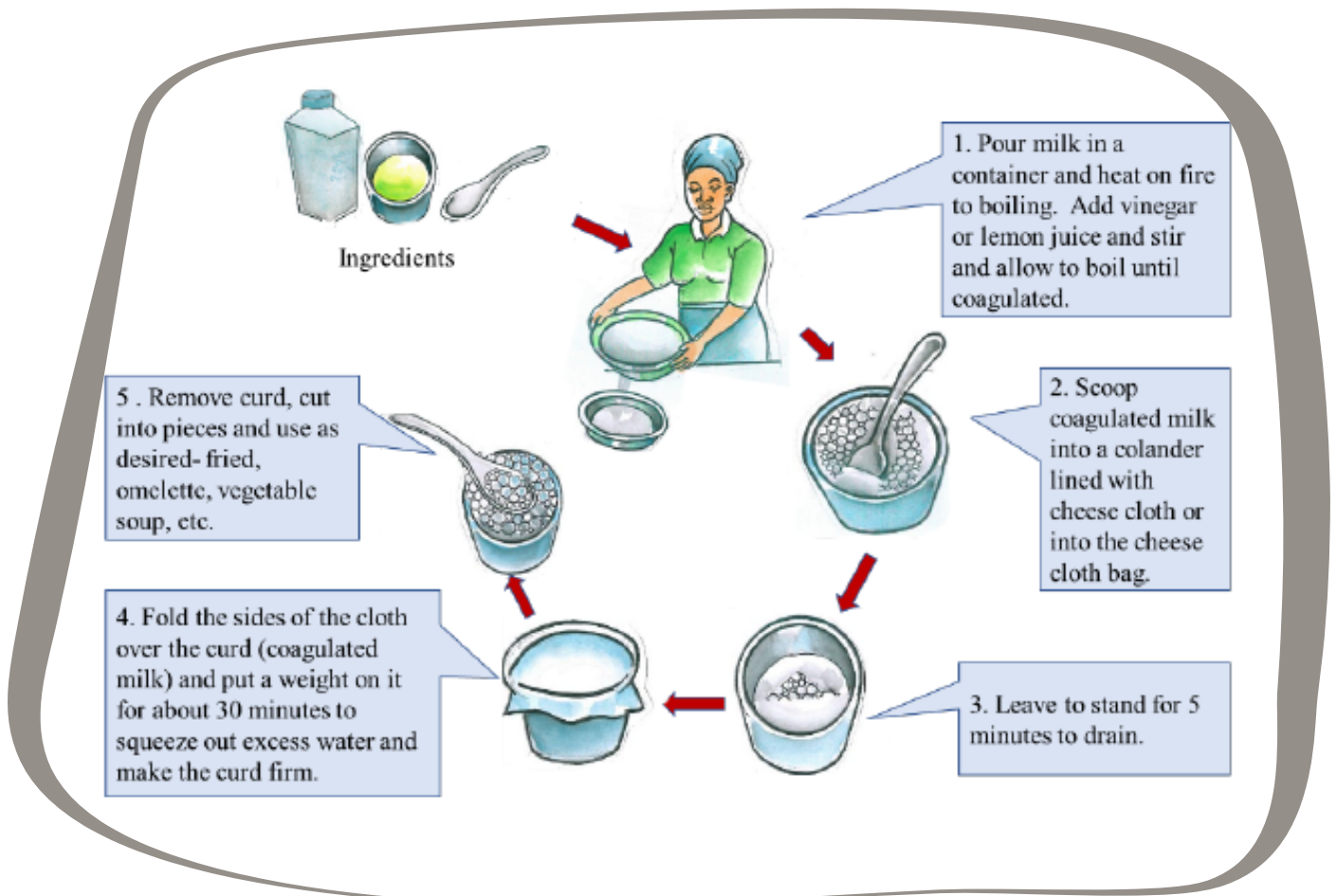
Lemon/ lime juice



Vinegar 120 mL or 6 Tablespoons

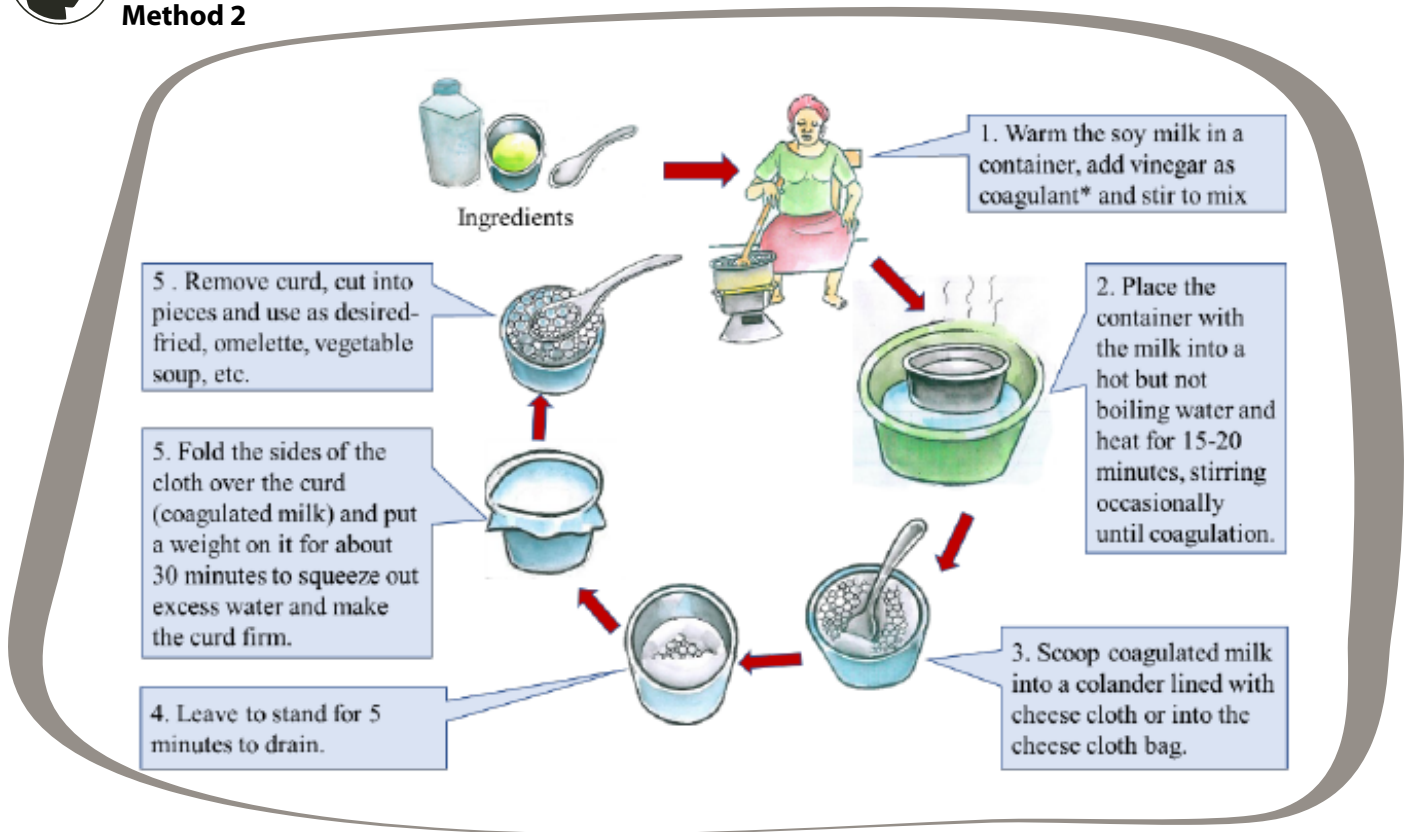


Method 1





Method 2



* Other coagulants are calcium sulphate (0.35 - 0.4% milk volume), lime/lemon juice, tamarind water extract, Epsom salt.

Soy cheese omelette



Ingredients



Soy cheese 100 gram or
½ cup



Margarine or
vegetable oil
40 gram or 1
tablespoon



One
medium-
sized onion



One
medium-
sized
tomato



2 eggs



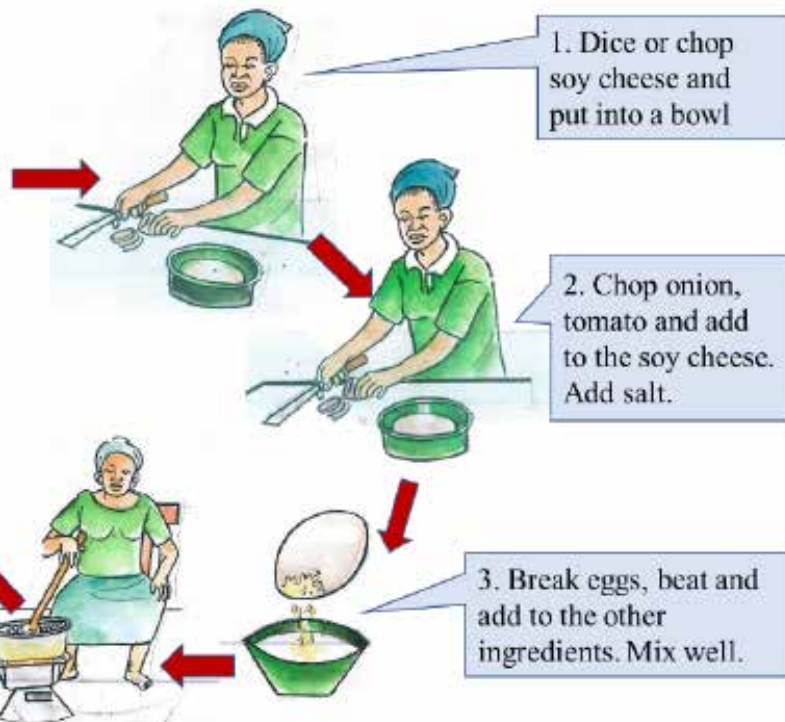
Salt 4 gram
or ¼ teaspoon



Method



Ingredients



Fried tofu



Ingredients



Soy cheese 400 g or 2 cups



Vegetable oil enough for frying



Water 100 mL or 1/3 cup



Seasoning (Maggi or others) to taste



Salt to taste



Method 1 (Plain)



Ingredients



1. Dice or cut tofu into pieces.



2. Deep fry till colour changes to golden brown.

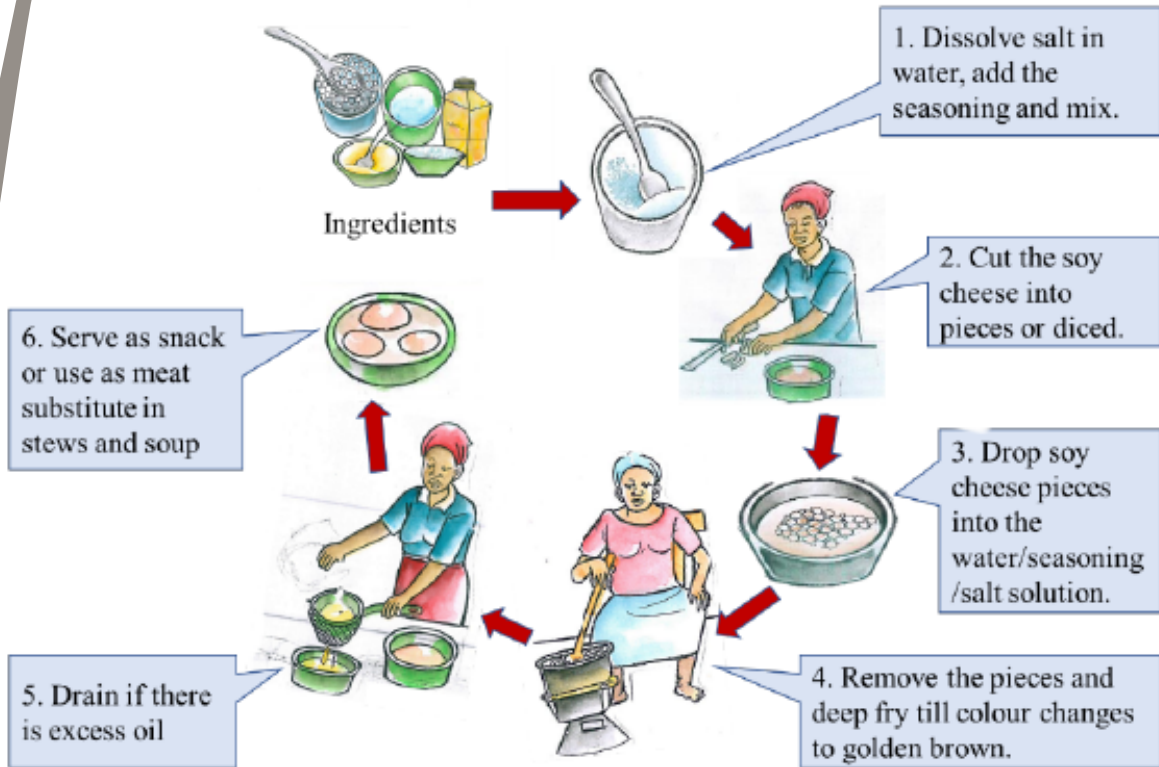


3. Drain if there is excess oil.

4. Serve as snack or use as meat substitute in stews and soup.



Method 2 (Salted)



Soy cheese kebab (steak)



Ingredients



Soy cheese 400 grams or 2 cups



2 medium-sized tomatoes



One medium-sized onion



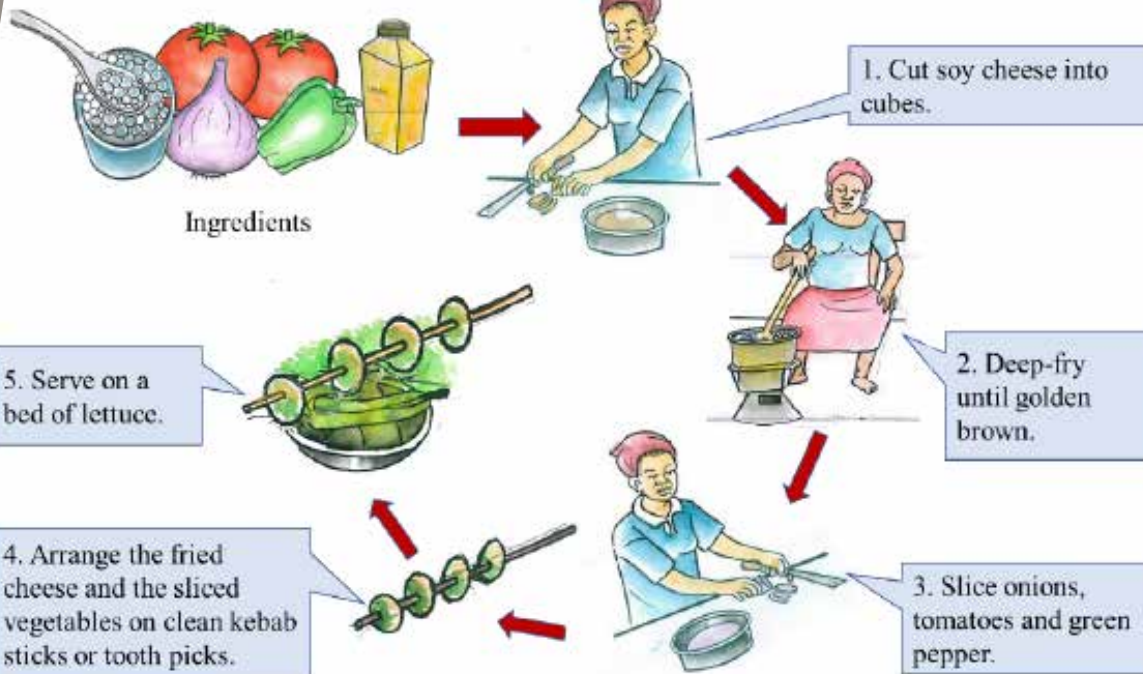
Vegetable oil for frying



One medium-sized green pepper



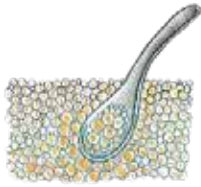
Method



Soy nuts



Ingredients



Soybeans 250 grams or 1 cup



Water 1 litre



Sodium carbonate 0.5 grams or 1/2 teaspoon



Onion to taste



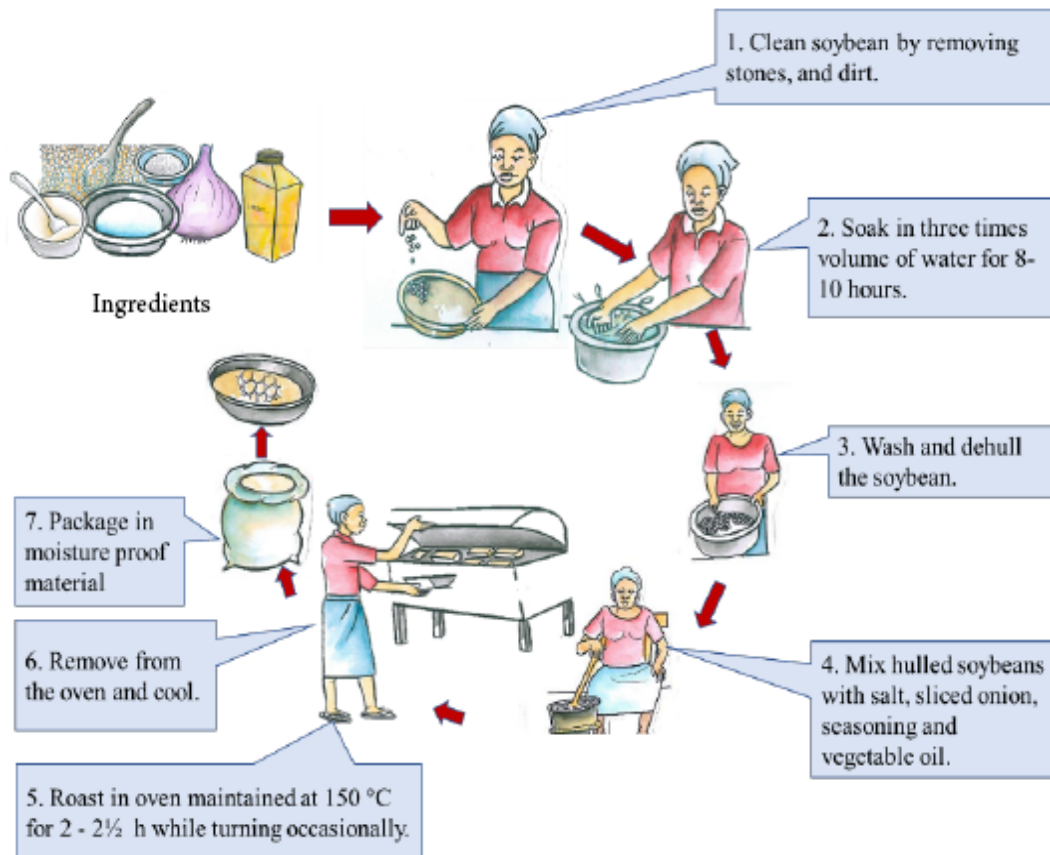
Vegetable oil enough for frying



Salt to taste

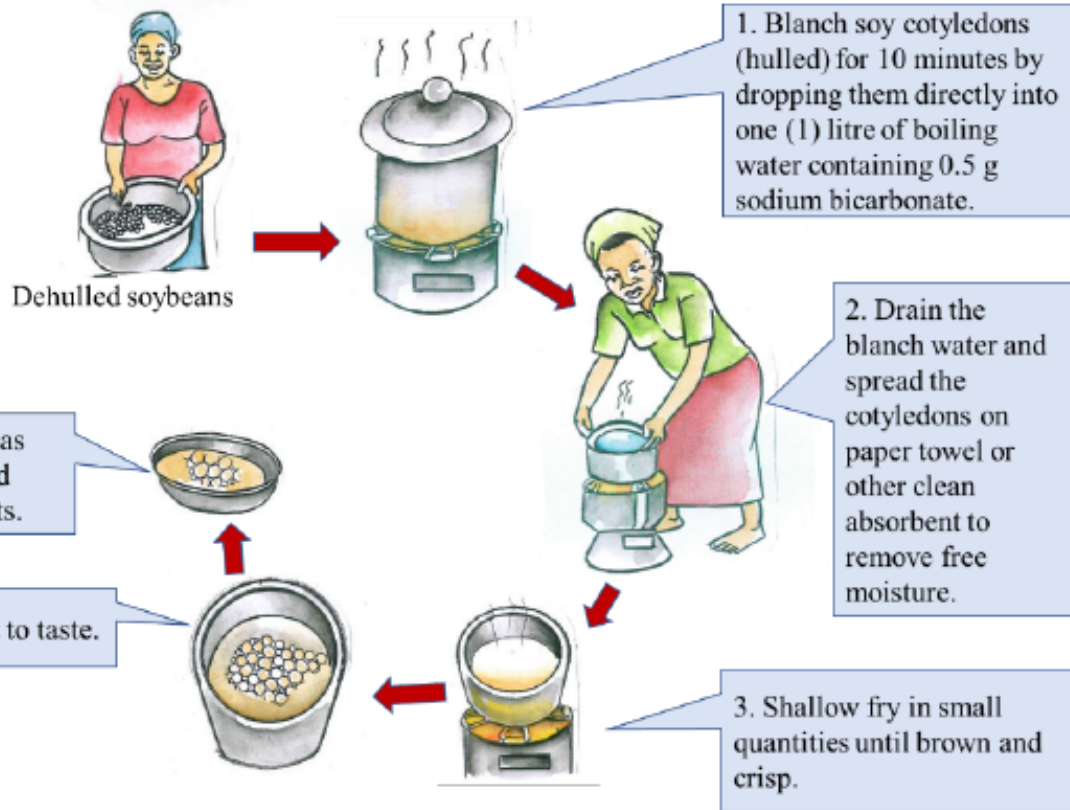


Method 1





Method 2



Soy bread



Ingredients



Wheat flour
200 grams or 2
cups



Soy flour 50
grams or ½
cup



Sugar 60
grams or 3
tablespoons



Yeast 20
grams or 1
tablespoon



Vegetable oil
30 mL or 1½
tablespoon



Salt 15 grams
or 1 teaspoon



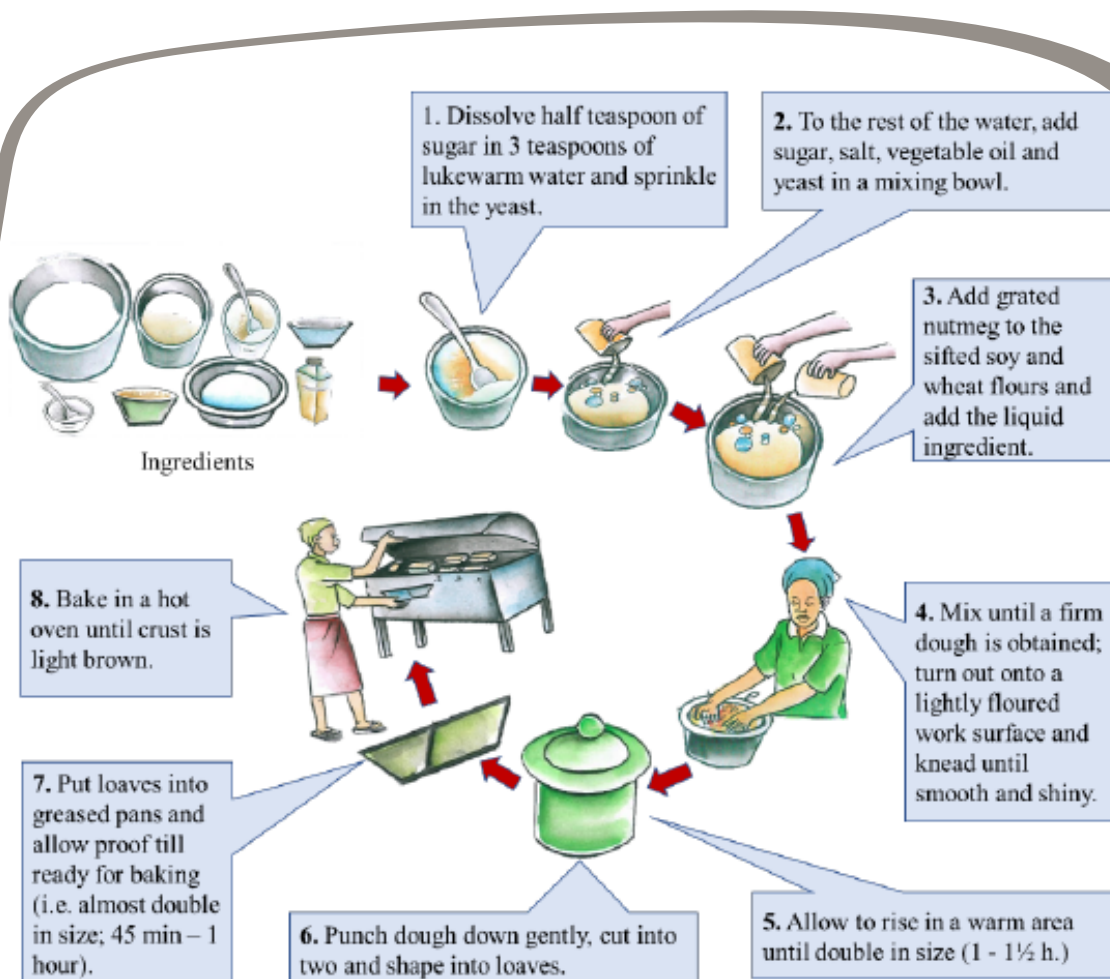
Grated
nutmeg 8
grams or ½
teaspoon



Water 375
mL or 1¼
cups



Method



*This preparation can yield 2 loaves.

Wheat-soy cookies



Ingredients



Wheat flour
175 grams or
1¼ cups



Full fat soy
flour 25
grams or ¼
cup



Sugar 120
grams or ½
cup



One egg



Margarine 120
grams or ½
cup



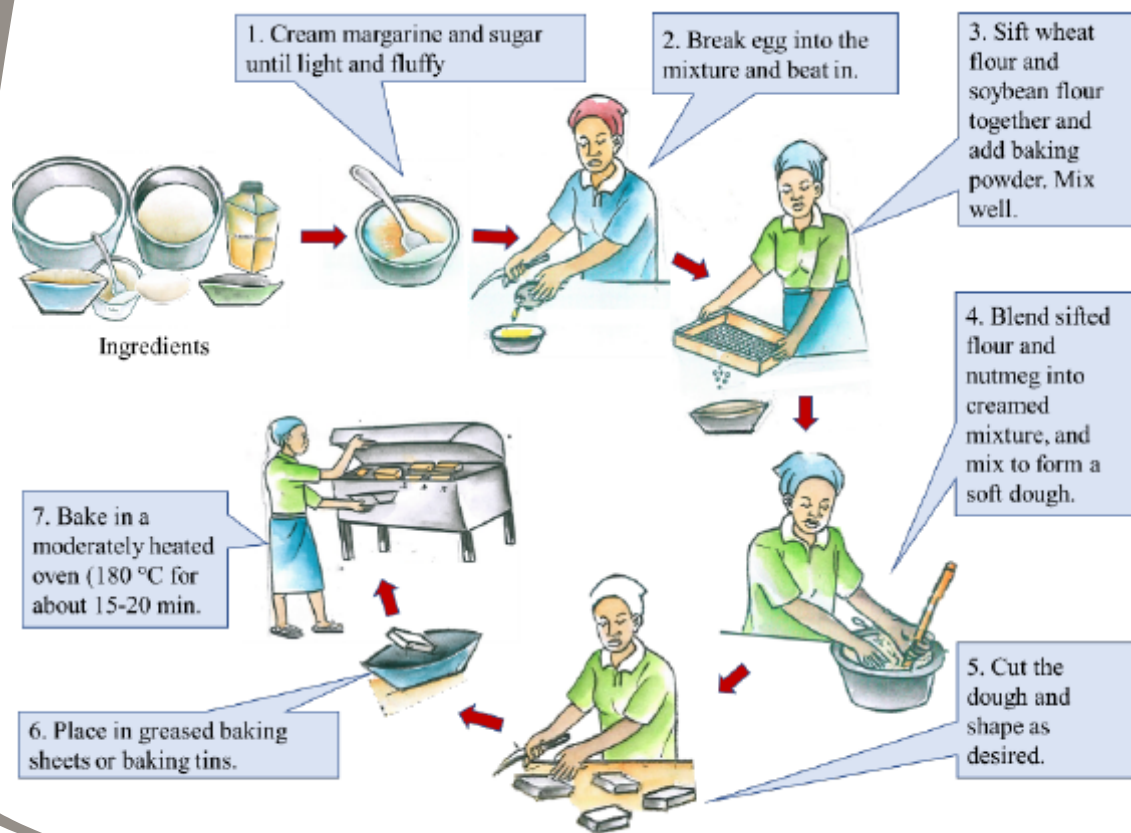
Baking
powder 30
grams or 2
teaspoons



Grated nutmeg 4
grams or ¼
teaspoon



Method



*This preparation yields 40 pieces.

Wheat-soy cake



Ingredients



Wheat flour
500 grams or 5
cups



Full fat soy
flour 100
grams or 1
cup



Sugar 360
grams or 1½
cup



2 eggs



Margarine 480
grams or 2
cups



Baking
powder 75
grams or 7
teaspoons



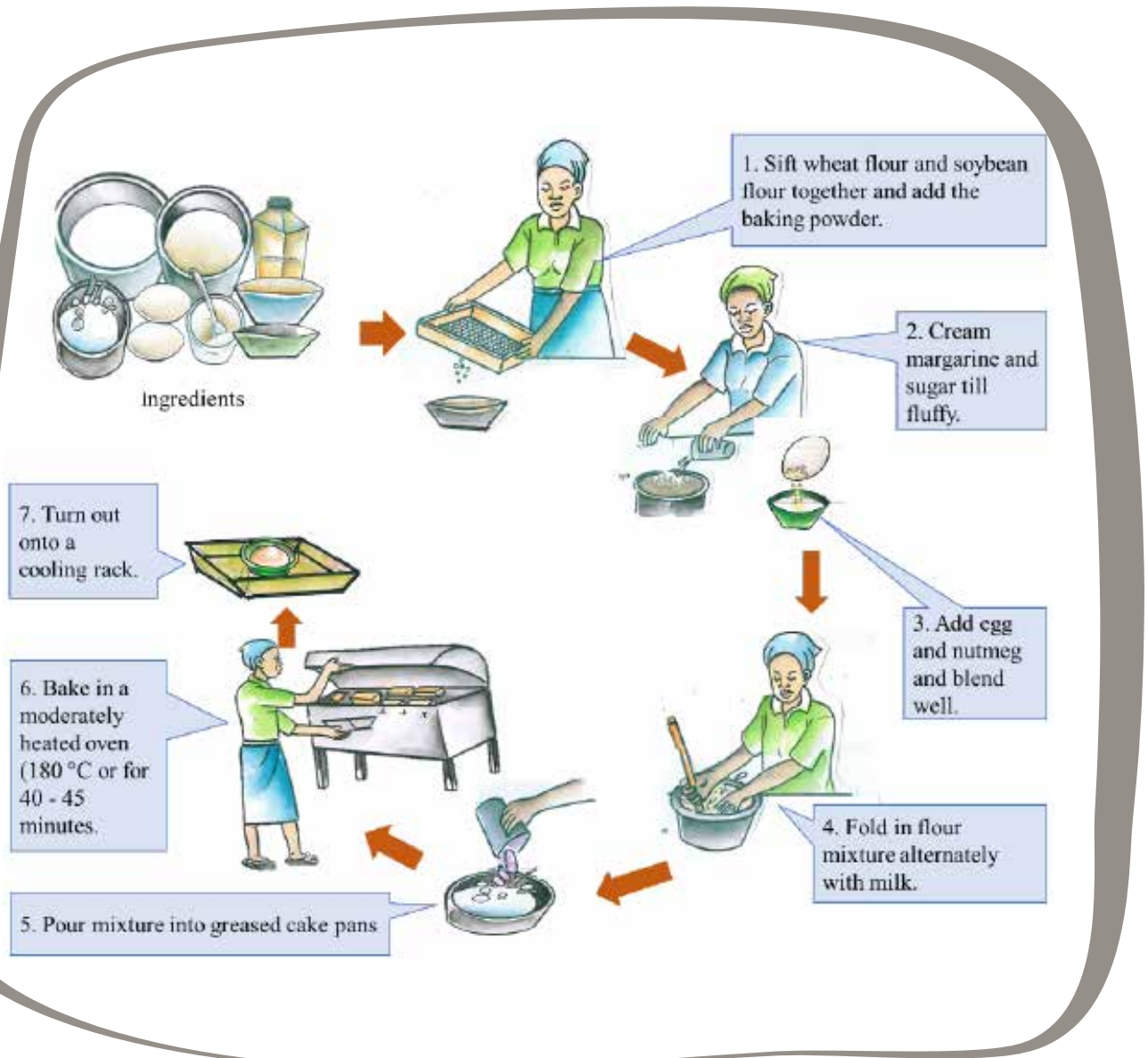
Grated nutmeg or
vanilla 8 grams or
½ teaspoon



Diluted milk
(optional) 300
mL or 1 cup



Method



*This preparation yields 4 - 5 cakes.

Wheat-soy pancake



Ingredients



Wheat flour
200 grams or 2
cups



Soy flour 50
grams or ½
cup



Soy milk 600
mL or 2 cups



2 eggs



Baking
powder 30
grams or 2
teaspoons



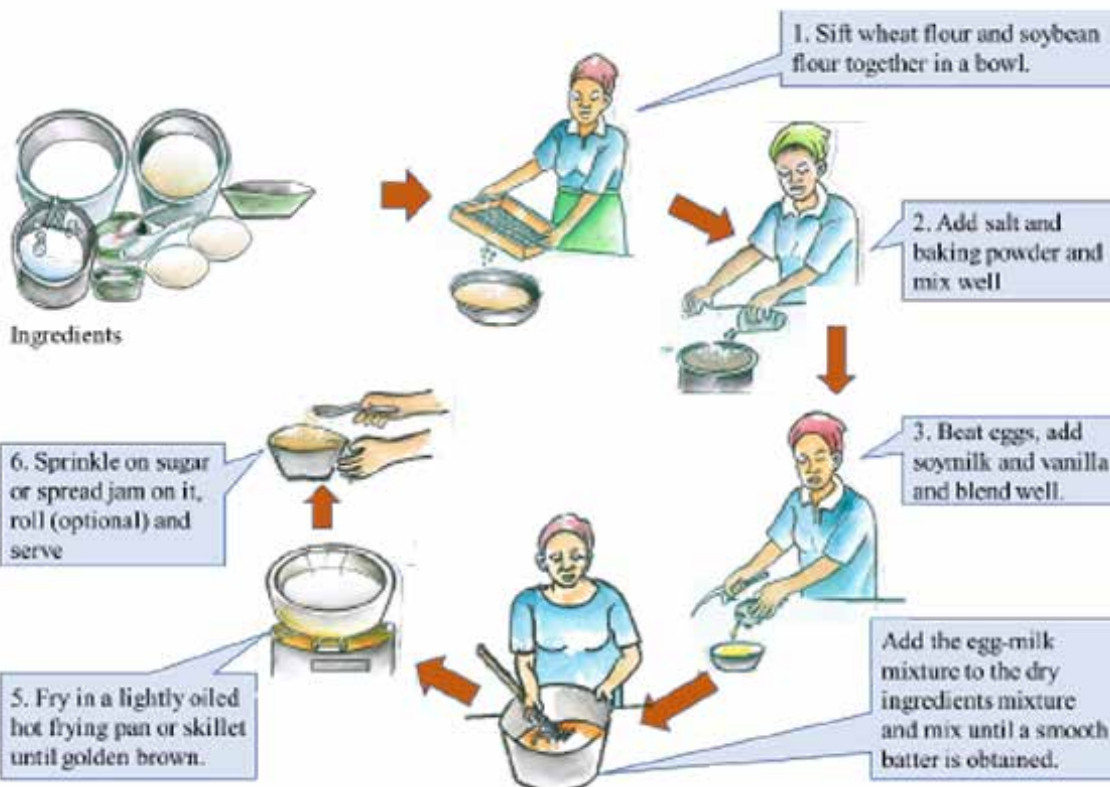
Vanilla 10
mL or 2
teaspoons



Salt ½
teaspoon



Method



*This preparation yields 6 - 8 pieces.

Wheat-soy buns



Ingredients



Wheat flour
200 grams or 2
cups



Soy flour 50
grams ½
cup



Sugar 60
grams or
¼ cup



Salt 4 grams or
¼ teaspoon



Grated
nutmeg 4
grams or ¼
teaspoon



Water 300 mL
or 1 cup



Vegetable
oil for
frying



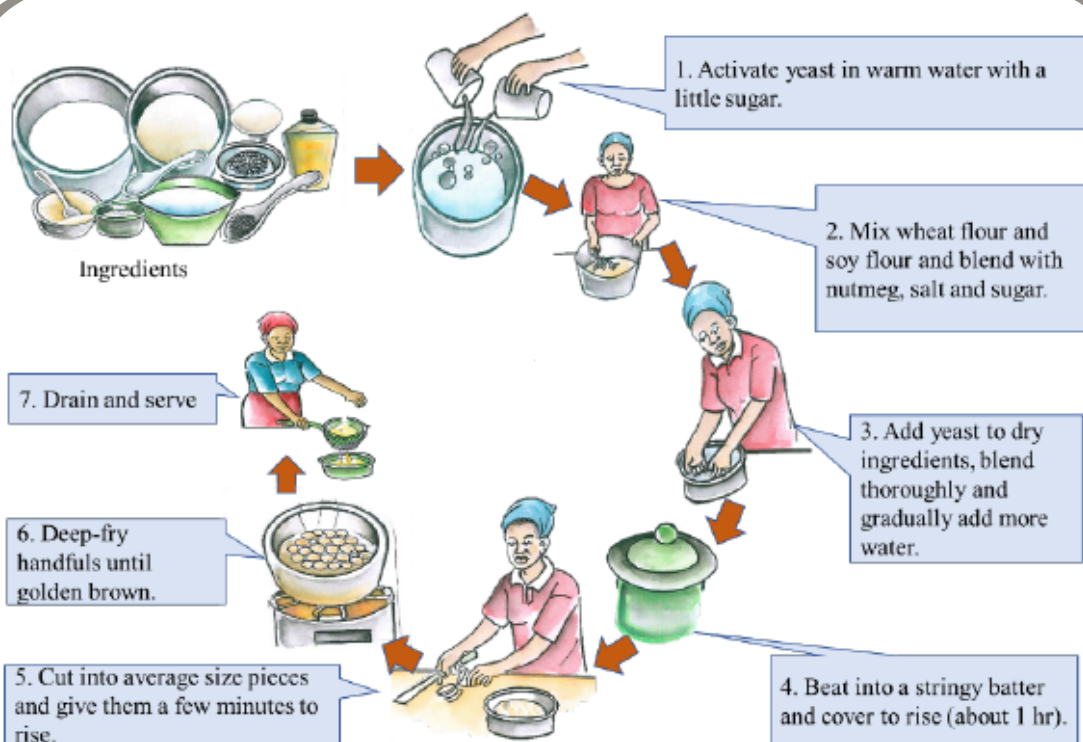
One
egg



Yeast 30
grams or 2
teaspoons



Method



*This preparation yields 10 pieces.

Wheat-soy doughnuts



Ingredients



Wheat flour
200 grams or 2
cups



Full-fat soy
flour 50
grams or ½
cup



Sugar 40
grams or 2
teaspoons



Salt to taste



Grated
nutmeg 8
grams or ½
teaspoon



Diluted milk
150 mL ½ cup



Vegetable oil
enough for
frying



One egg



Margarine
40 grams
or 2
teaspoons



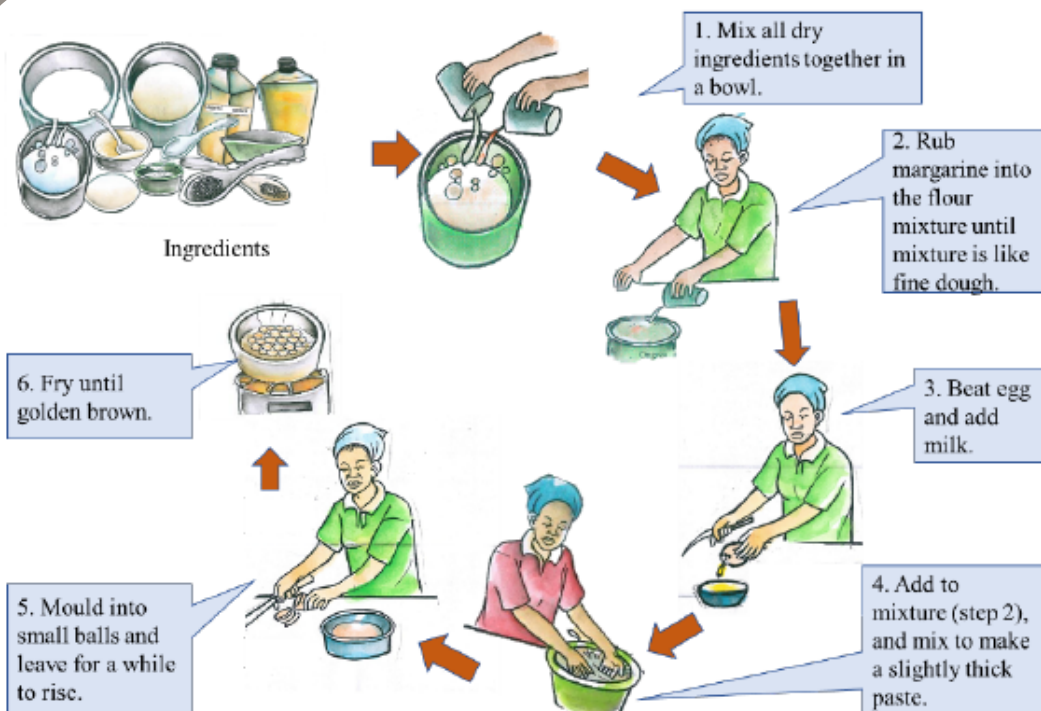
Baking powder
30 g or 2
teaspoon



Method



Ingredients



*This preparation yields 8 – 10 pieces.

Wheat-soy rolls



Ingredients



Wheat flour
400 grams or 4
cups



Soy flour
100 grams
or 1 cup



Sugar 60
grams or
¼ cup



Salt 15 grams
or 1 teaspoon



Grated
nutmeg 8
grams or ½
teaspoon



Diluted milk
150 grams or
½ cup



Water 15 mL
or 3 teaspoons



2 eggs



Margarine
60 grams
or ¼ cup



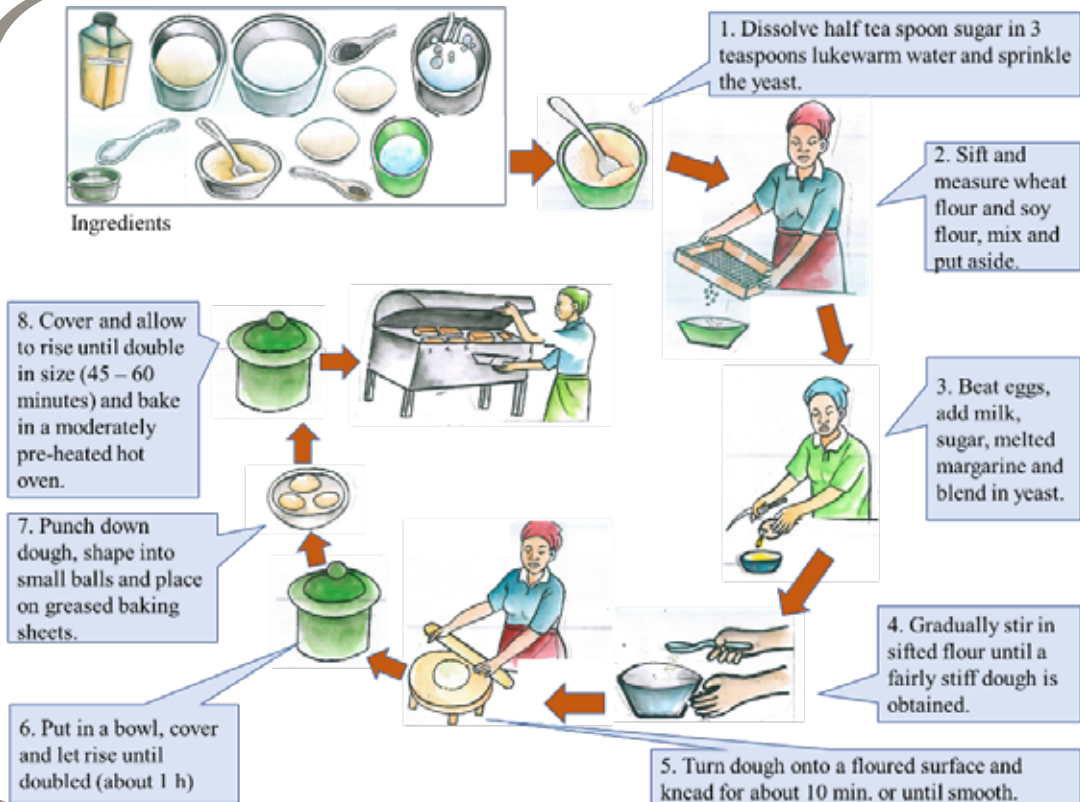
Yeast 20 grams
or 1 tablespoon



Method



Ingredients



*This preparation yields 2 - 3 loaves.

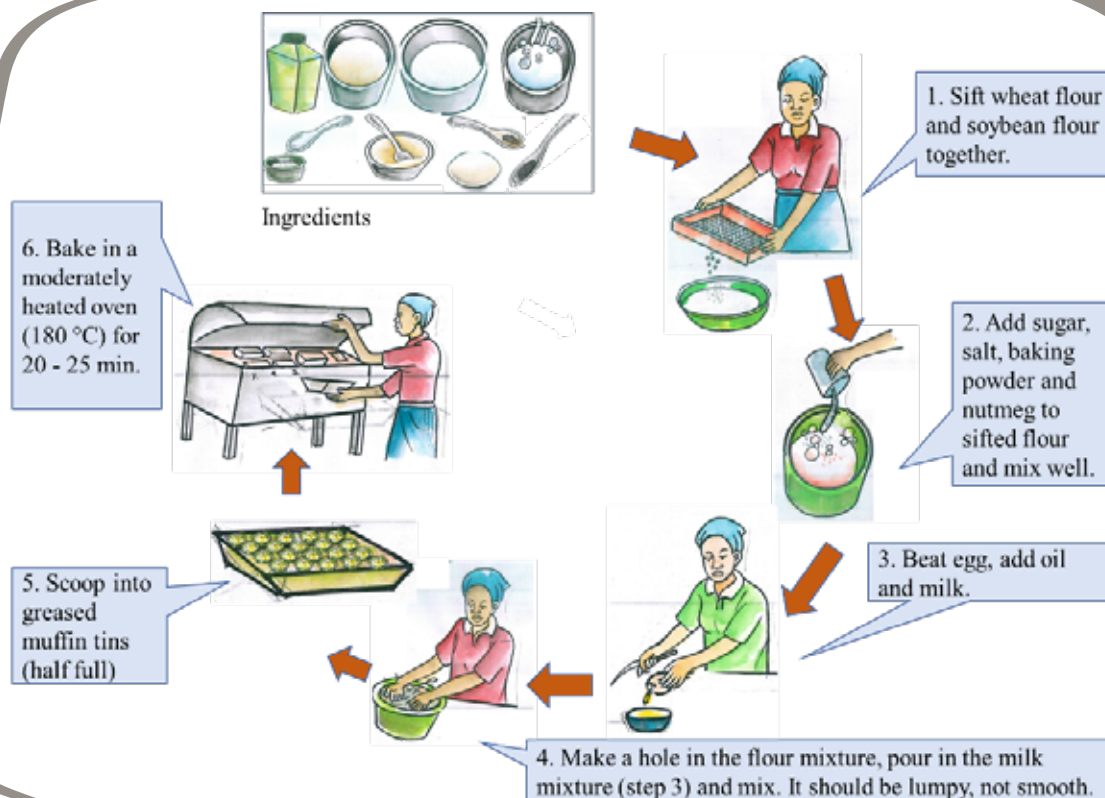
Wheat-soy muffins



Ingredients



Method



*This preparation yields 14 pieces.

Soy - cassava balls



Ingredients



Cooked and
mashed cassava
180 grams or 1
cup



Soy paste 50 g
or ¼ cup



Margarine
(melted) 15
mL or 1
tablespoon



Salt to taste



Wheat flour



One
egg



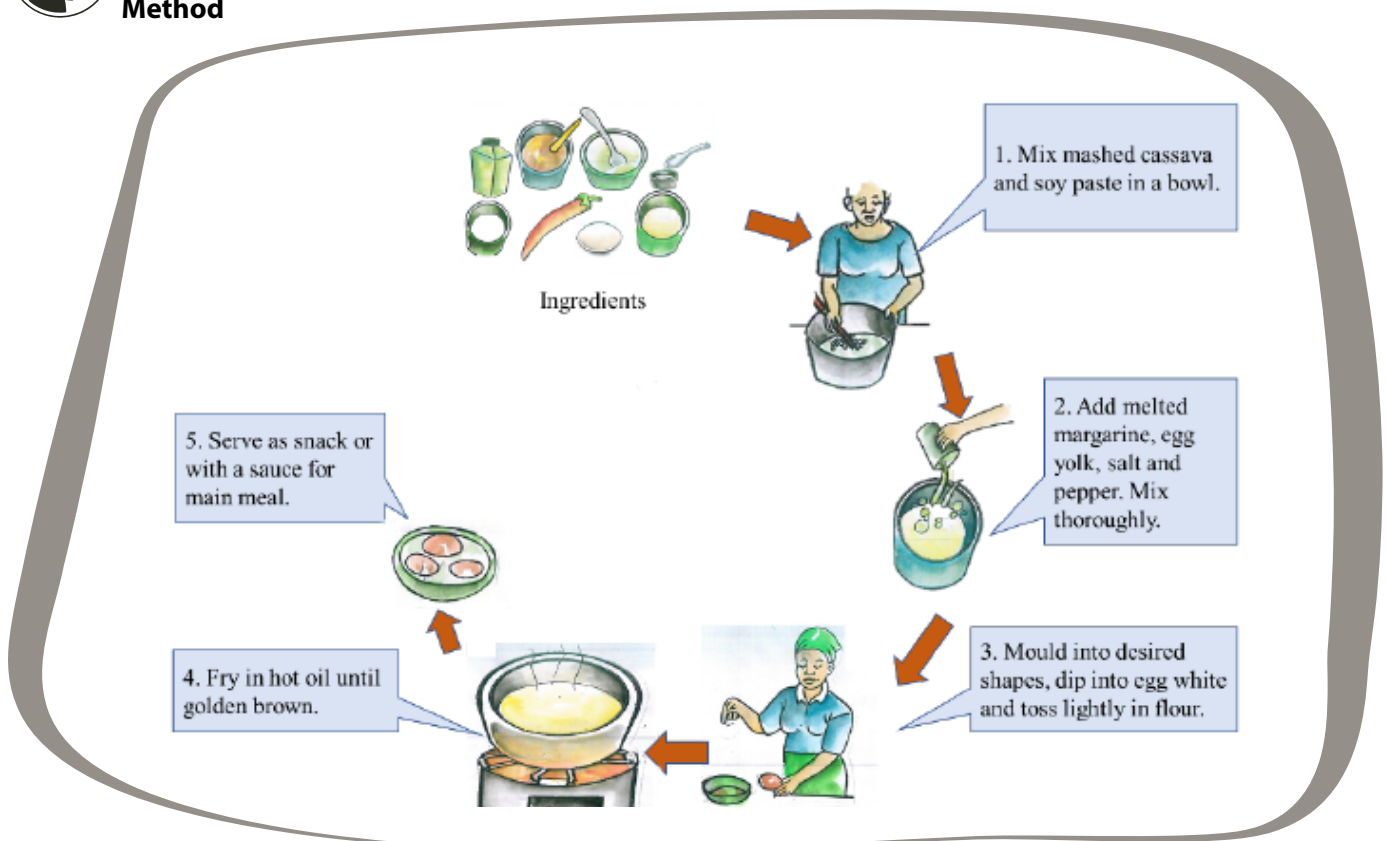
Vegetable
oil for
frying



Pepper to taste



Method



*This preparation gives 1- 2 servings.

Soy-banana fritters



Ingredients



Wheat flour 75 grams or ¼ cup



Soy flour 25 grams or ¼ cup



Diluted milk 150 mL or ½ cup



4 ripe bananas



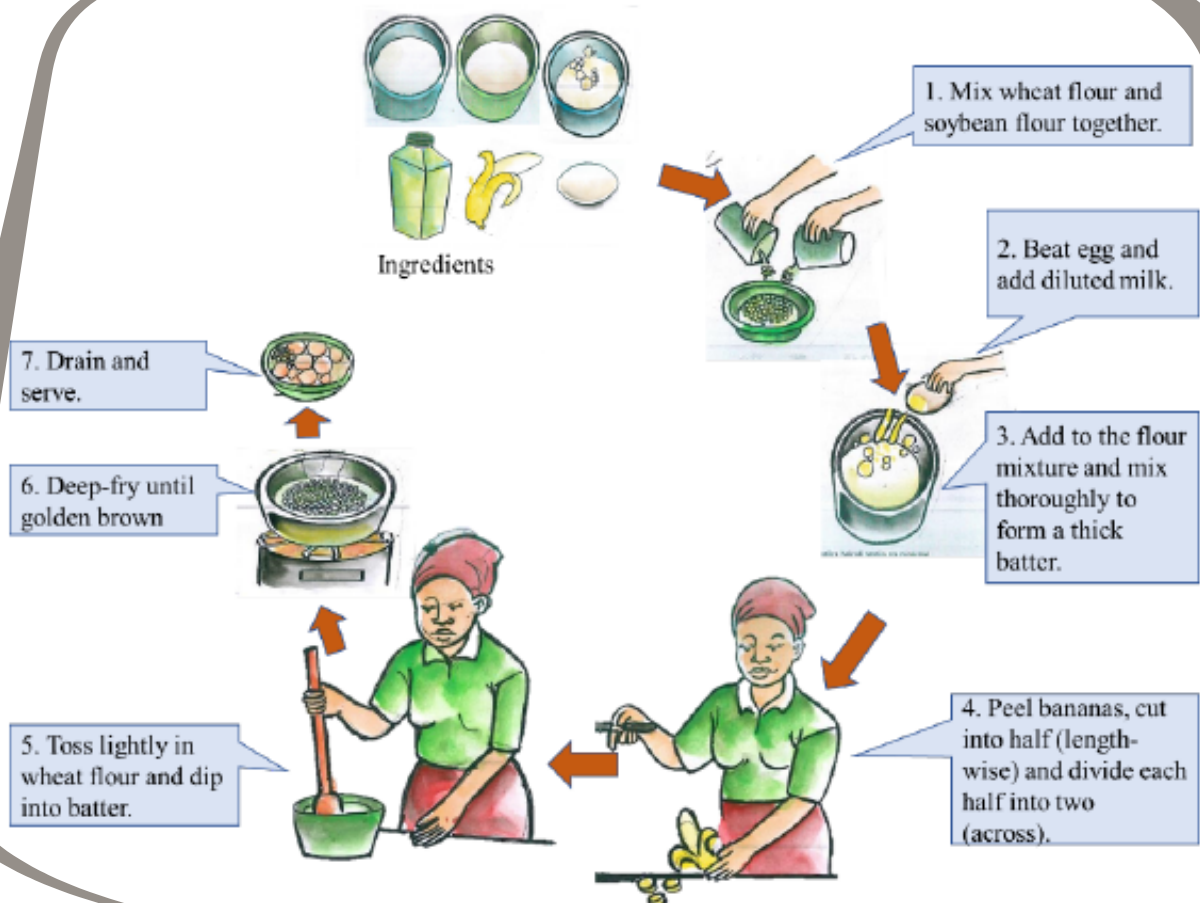
One egg



Vegetable oil for frying



Method



*This preparation gives 8 servings.

Meat-soy stew



Ingredients



Meat 100 grams or 4 small pieces



Soy paste 100 grams or ½ cup



4 tomatoes of medium size



One onion of medium size



Salt to taste



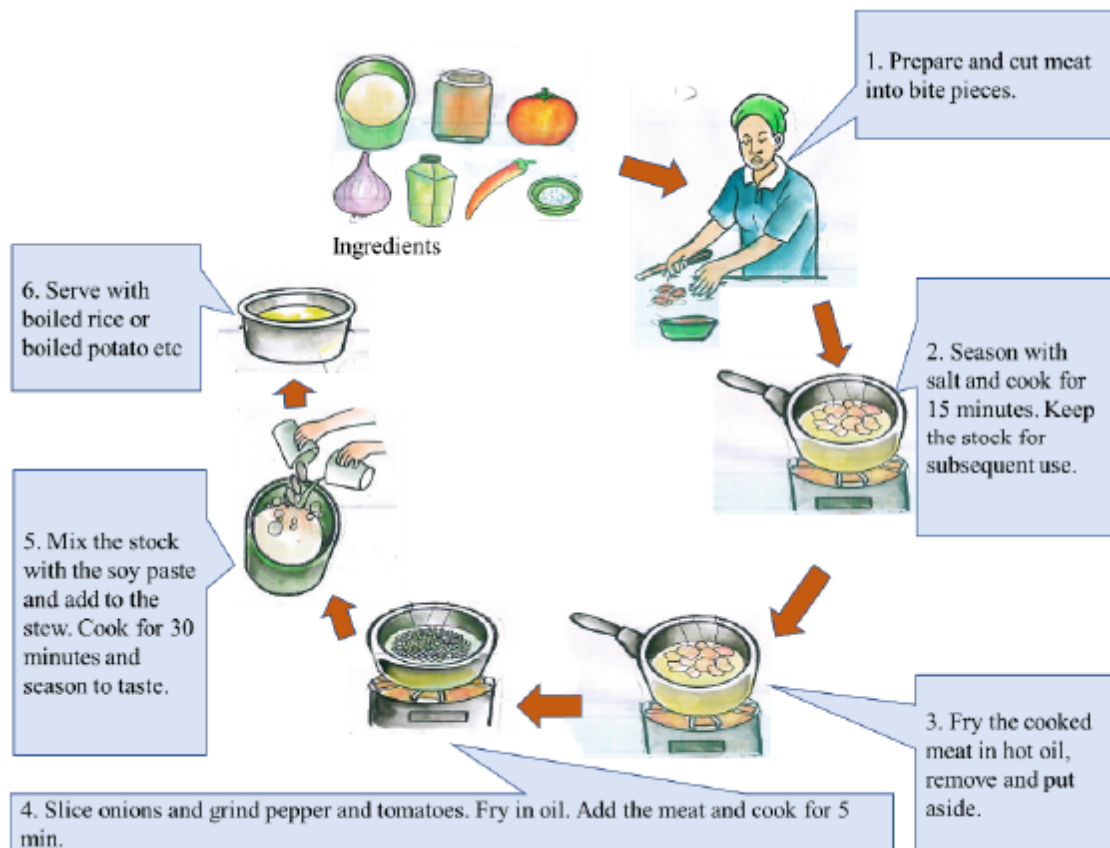
Vegetable oil 75 mL or ¼ cup



Pepper to taste



Method



*This preparation gives 4 servings.

Fish-soy gravy



Ingredients



Smoked fish
50 g



Full fat soy
flour 50 grams
or ½ cup



4 tomatoes
of medium
size



One onion
of medium
size



Salt to
taste



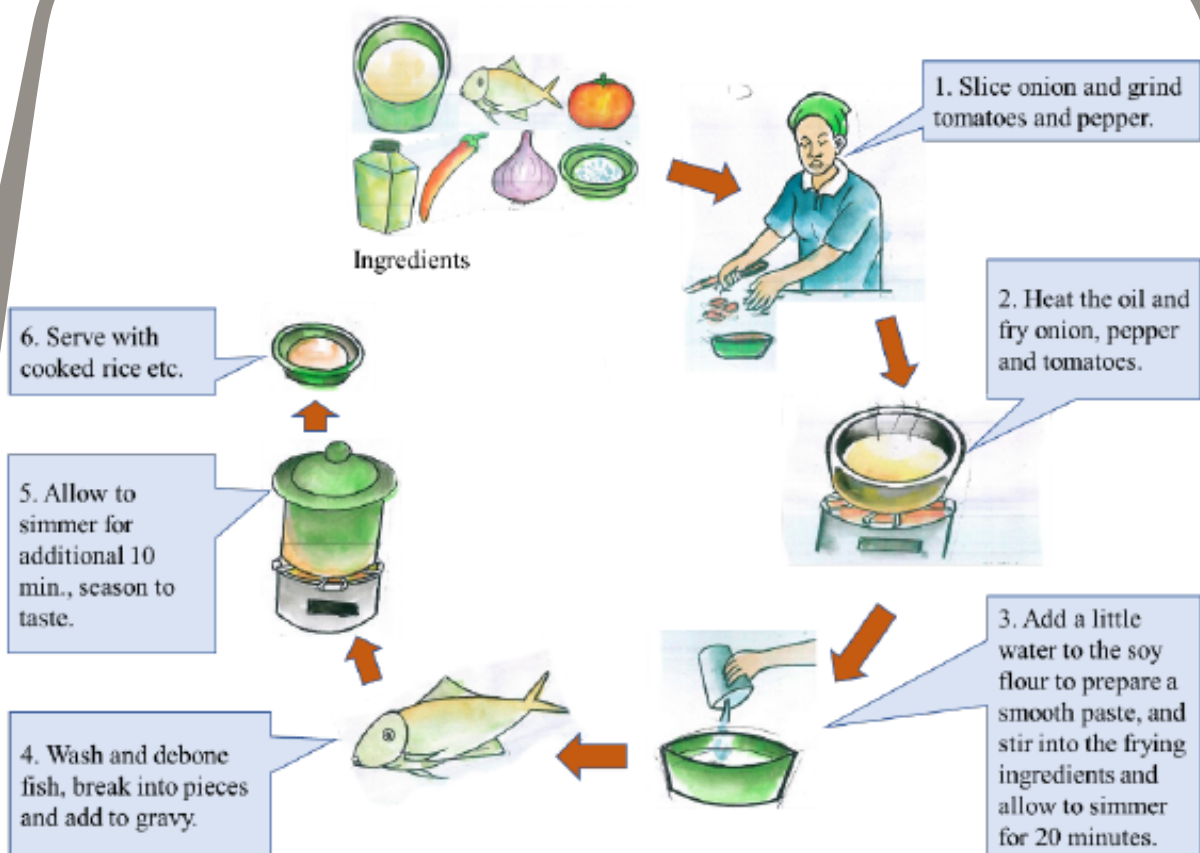
Vegetable
oil 75 mL
or ¼ cup



Pepper to
taste



Method

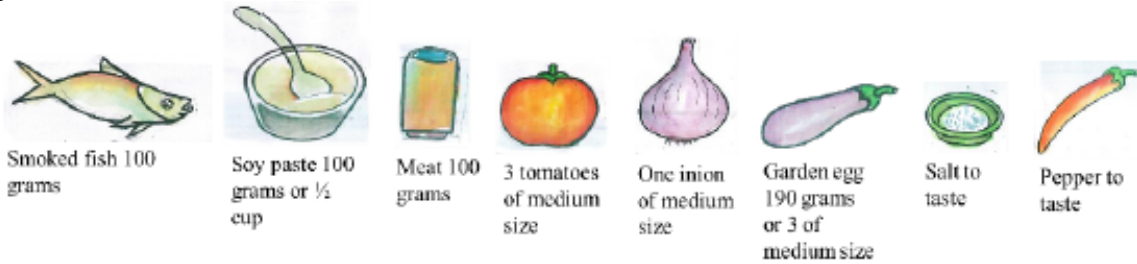


*This preparation gives 4 servings.

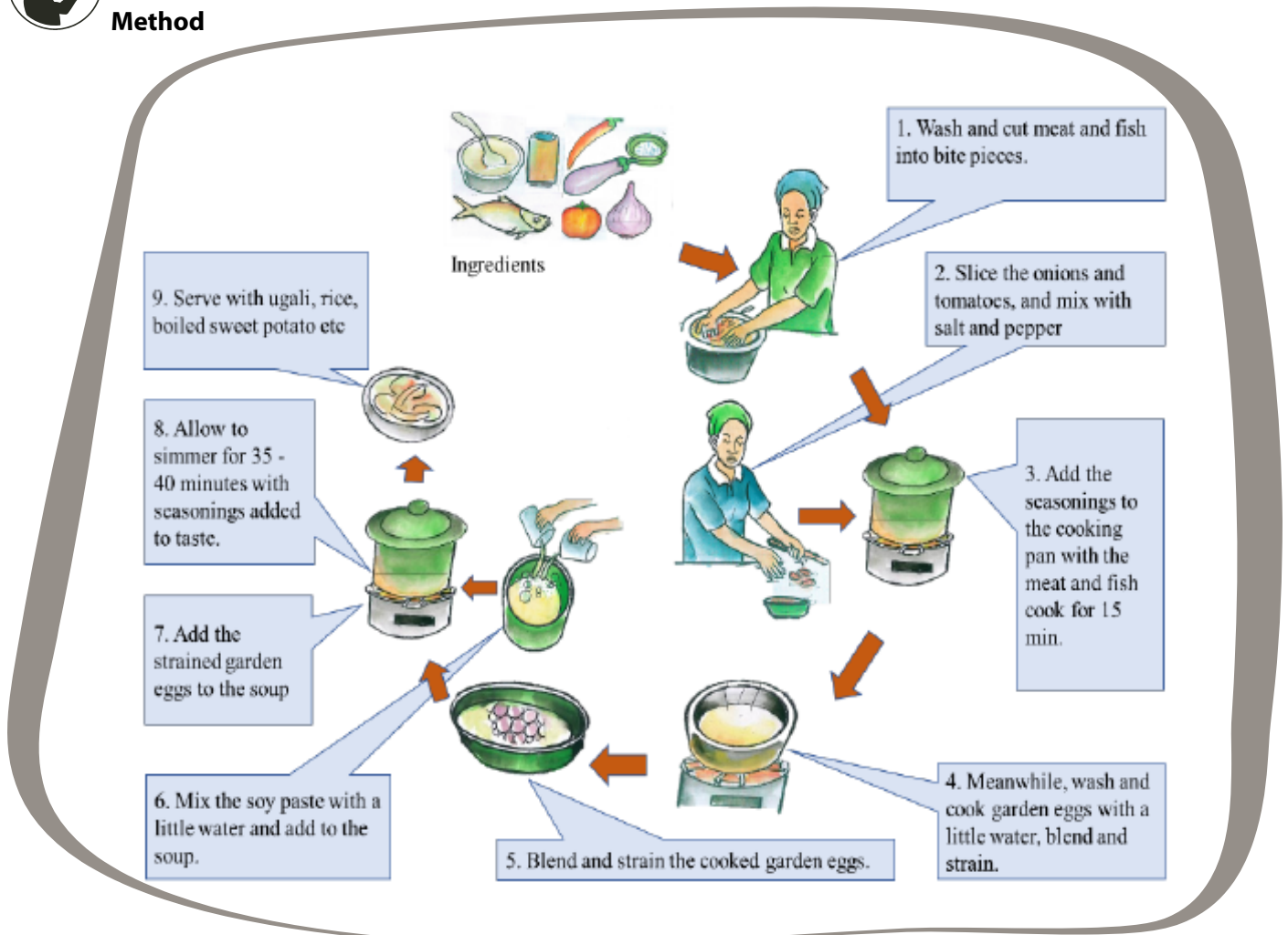
Soy vegetable soup



Ingredients



Method



*This preparation gives 4 servings.

Tofu salad dressing



Ingredients



Drained soy
cheese 500
grams



Vegetable
oil 2
tablespoons



Soy sauce
1 teaspoon



One
medium-
size onion;
sliced



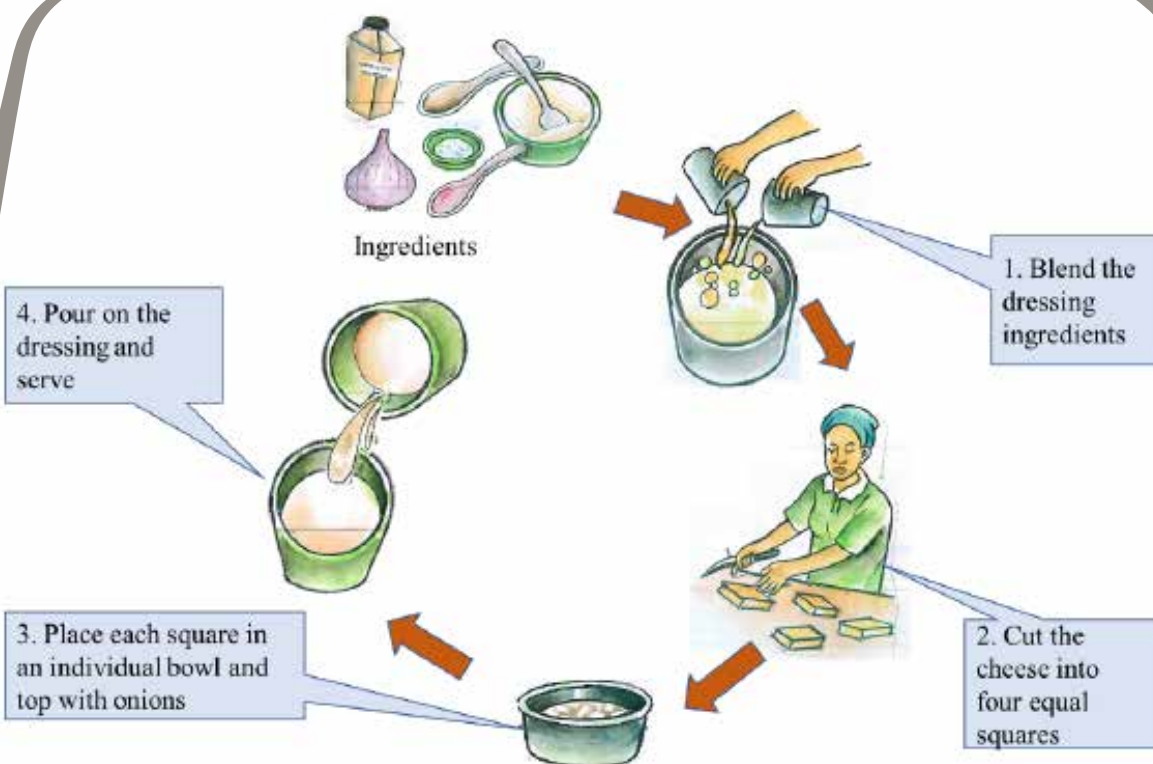
Salt ½
teaspoon



Vinegar 6
table spoons



Method 1





Ingredients



Soft soy
cheese 1
kilogram



Vegetable
oil 130
mL



Water



Sugar 50
grams



Salt 10
grams



Vinegar 130
mL



Method 2



Ingredients

1. Blend or
manually mash
the ingredients
until smooth

2. Add a little water if
necessary and blend
again until the
consistency is similar to
that of salad dressing

Soy yoghurt



Ingredients



Soy milk 1 litre



Sugar 30 grams



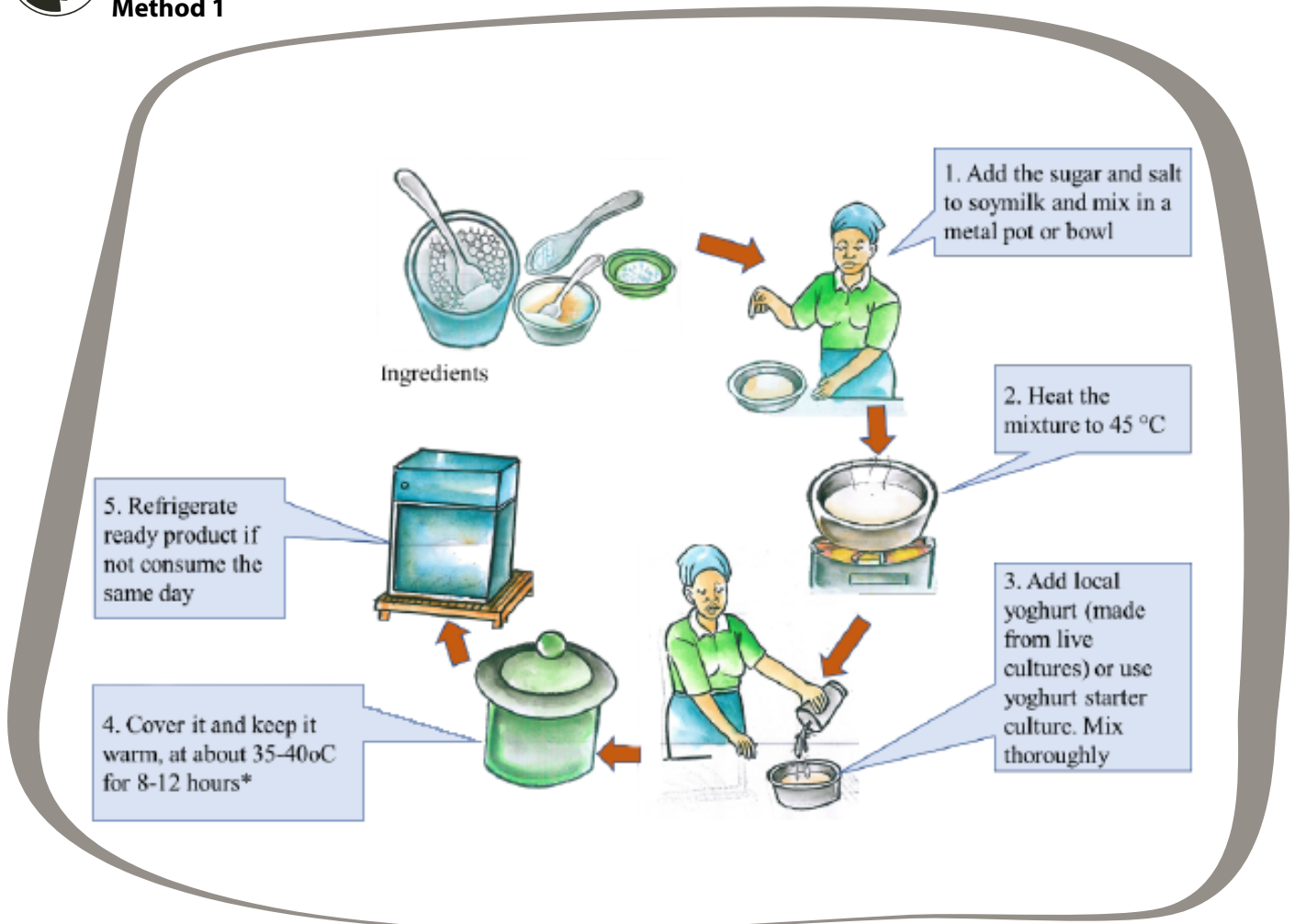
Salt 1 gram



Starter culture of existing yoghurt



Method 1

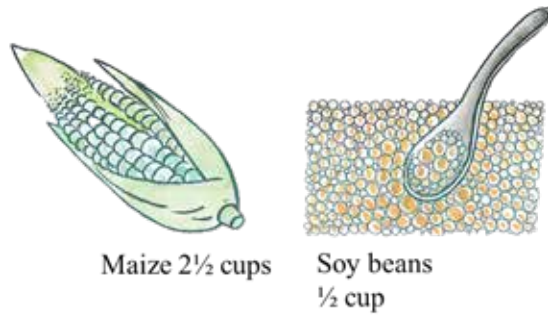


*It can be kept warm by carefully insulating closed pot with heavy blankets. This is not necessary in a hot climate of over 35 centigrade. However, at below 35 on a warm sunny day, the closed pot can simply be placed outside the direct sun for 8-12 hours. Adjust incubation time for desired taste and consistency.

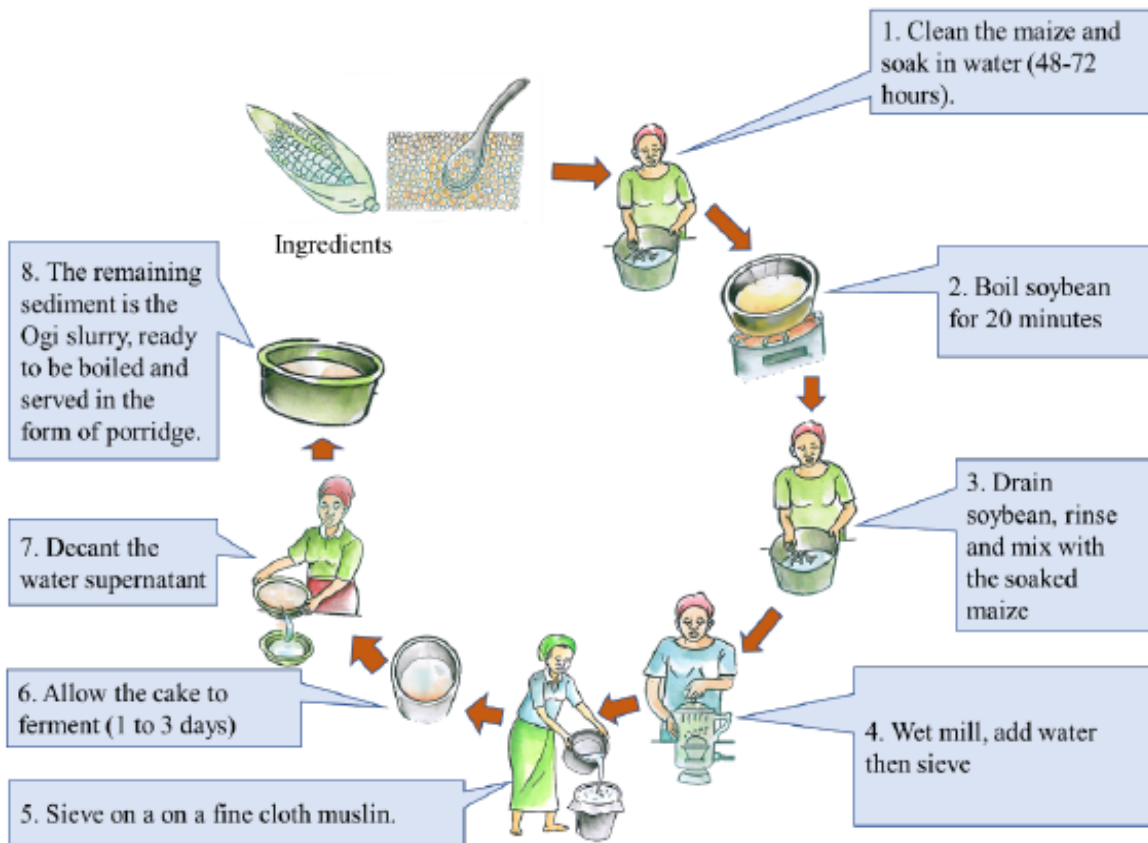
Soy ogi



Ingredients

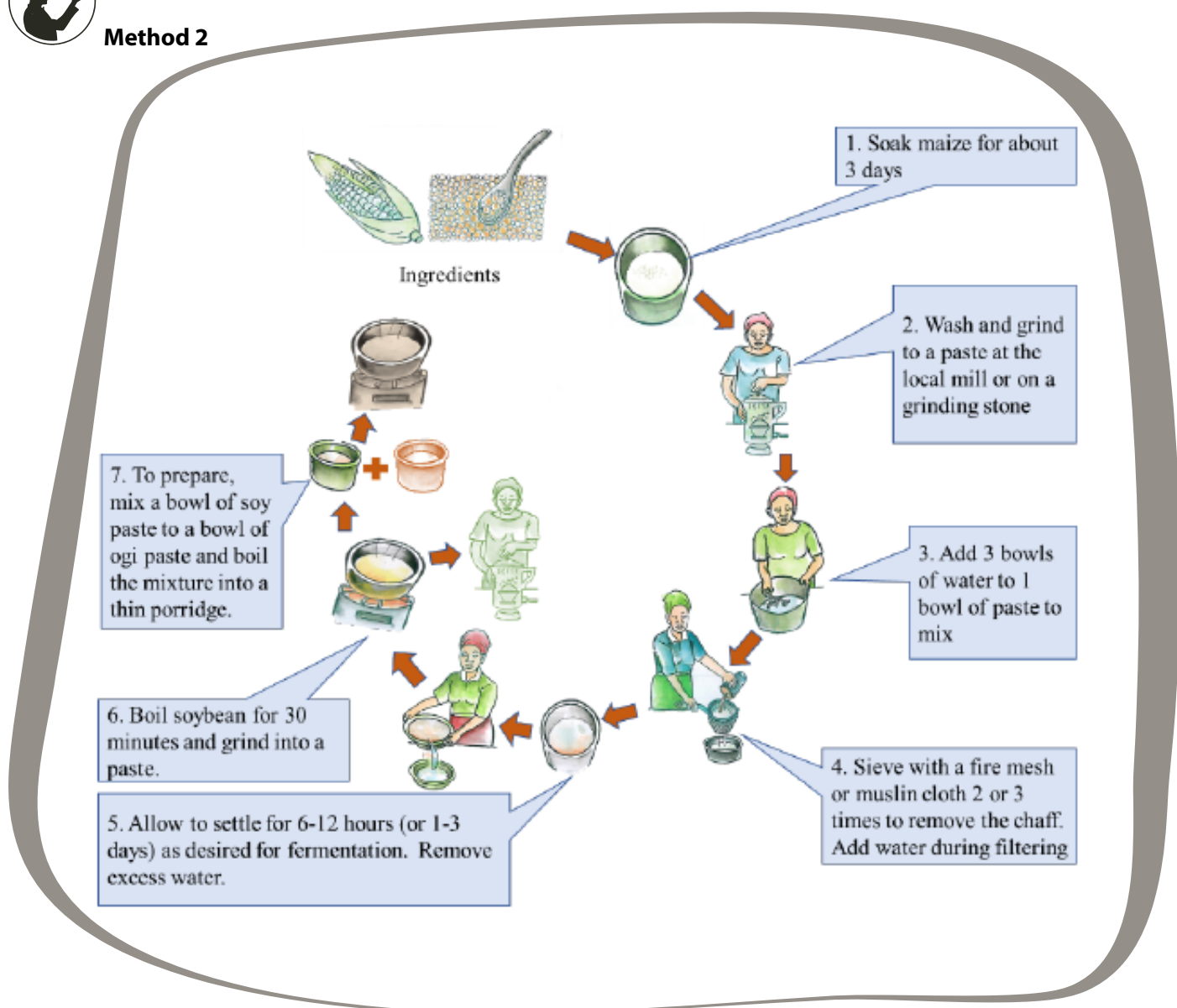


Method 1





Method 2

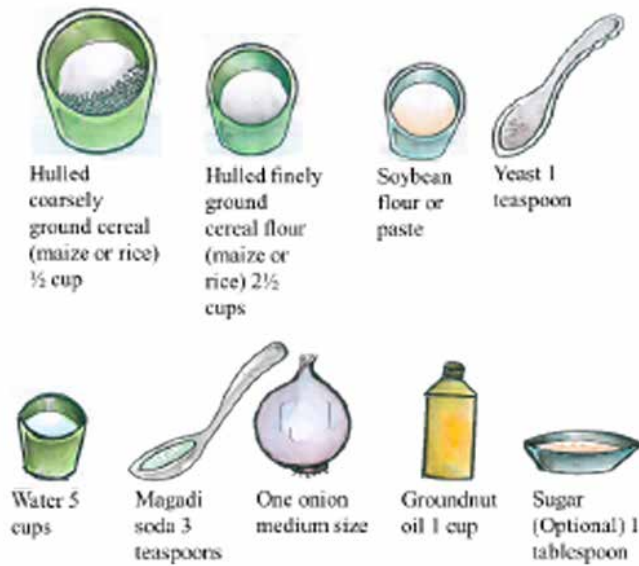


*Soy ogi can also be made using soymilk residue or soy flour instead of soy paste. When using raw soy flour, cook the mixed raw soy flour and the paste ogi for 15 minutes, adding more water as necessary.

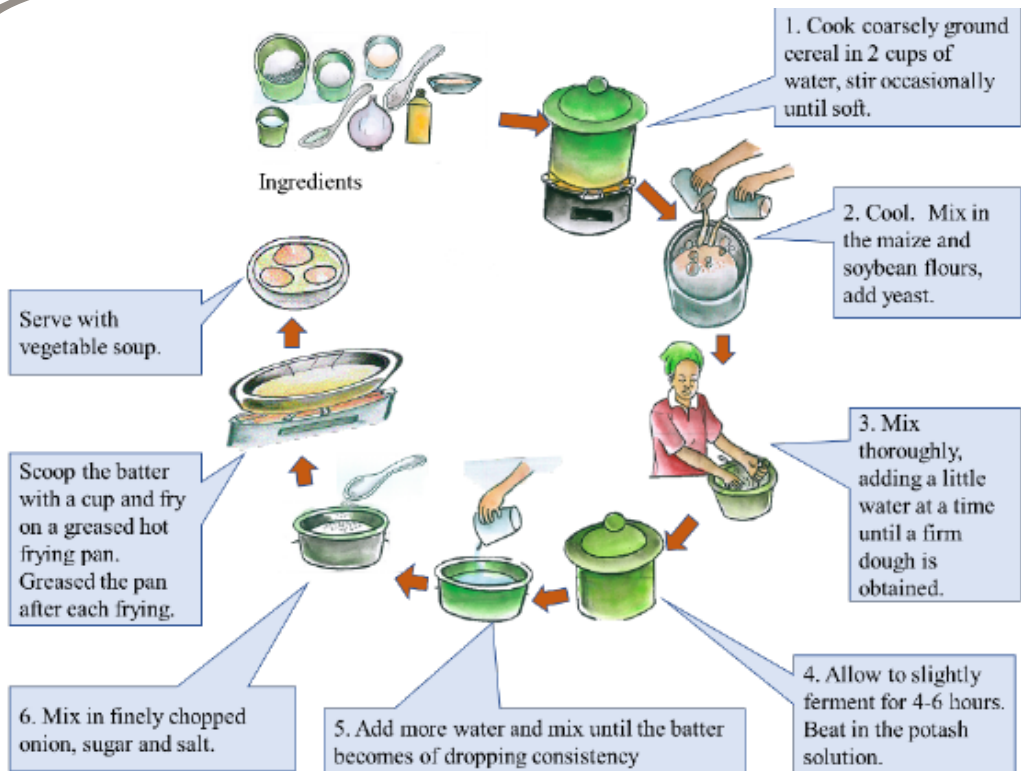
Soybean waina



Ingredients



Method



Soy tuwo



Ingredients



Cereal flour (maize, millet, sorghum or rice) 3 cups



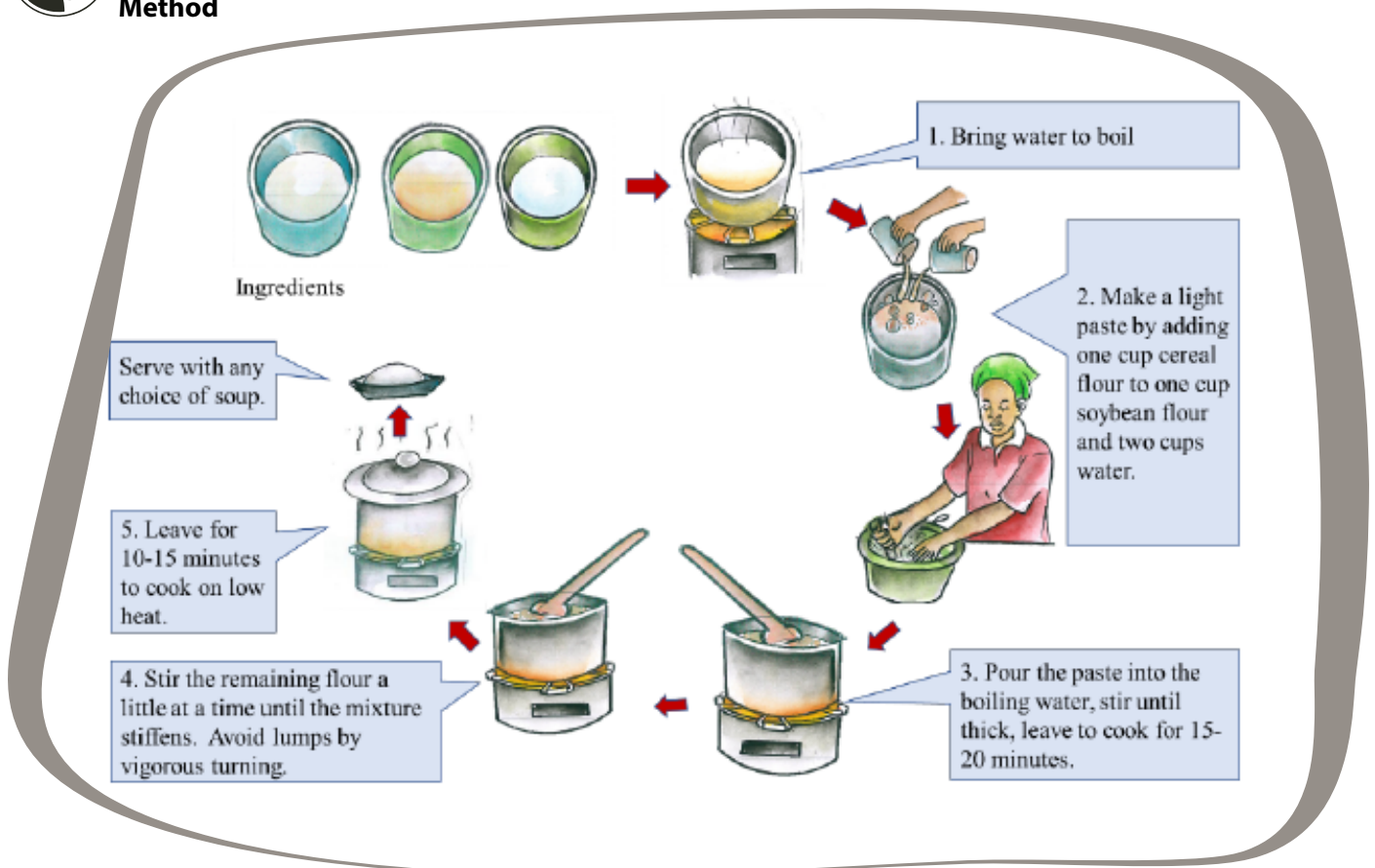
Soybean flour 1 cup



Water 7 to 8 cups depending on the type of flour and taste



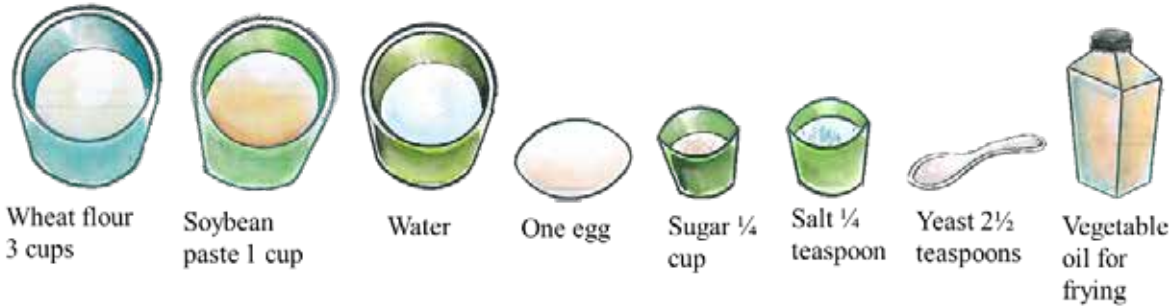
Method



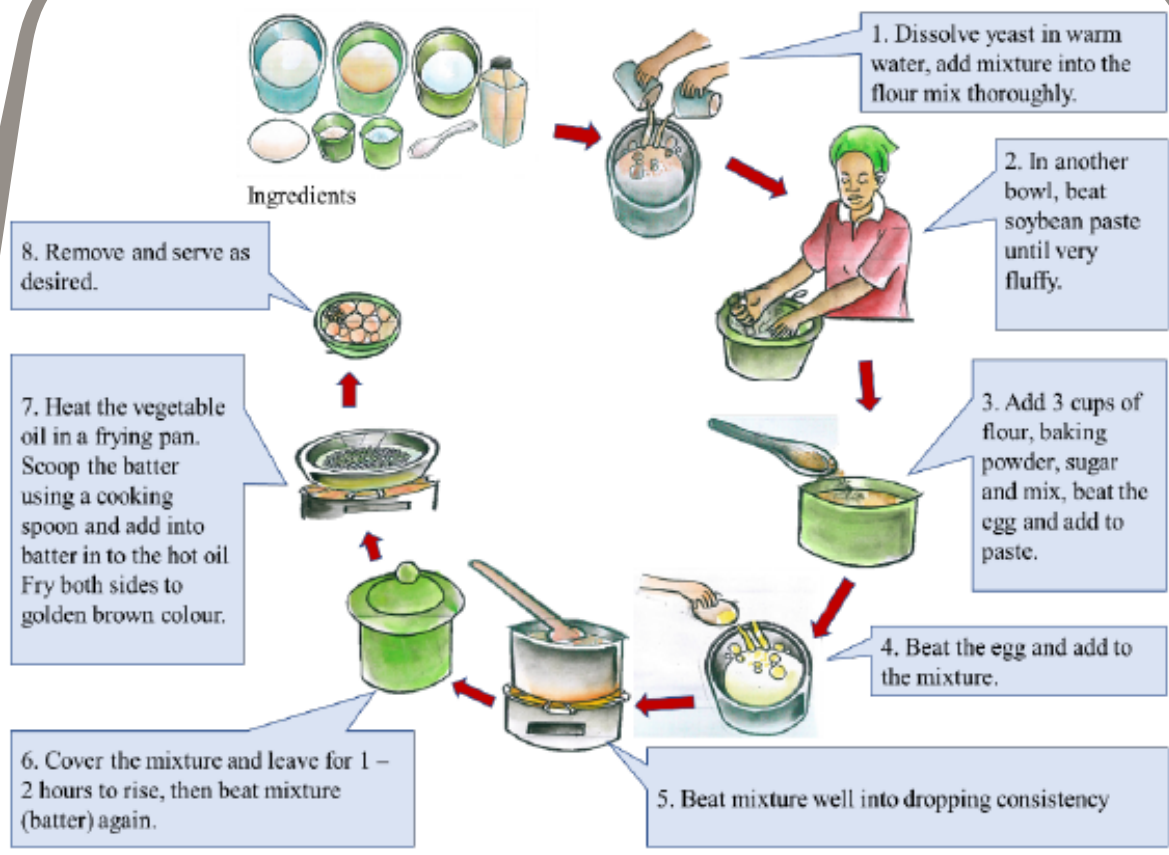
Soy puff-puff



Ingredients



Method



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