Journal of Food Processing & Technology

Worku et al., J Food Process Technol 2015, 7:1
DOI: 10.4172/2157-7110.1000540

Research Article Open Access

Indigenous Processing Methods of *Cheka*: A Traditional Fermented Beverage in Southwestern Ethiopia

Belay Binitu Worku[1], Ashagrie Zewdu Woldegiorgis[2] and Habtamu Fekadu Gemeda[2,3*]

[1]*Department of Food Process Engineering and Postharvest Technology, Ambo University, Ambo, Ethiopia*
[2]*Centre for Food Science and Nutrition, Addis Ababa University, Addis Ababa, Ethiopia*
[3]*Department of Food Technology and Process Engineering, Wollega University, P.O.Box: 395, Nekemte, Ethiopia*

Abstract

Cheka is a cereal and vegetable-based beverage which is commonly consumed in Southwestern parts of Ethiopia particularly in Dirashe and Konso. In this study, the traditional processing methods, types and proportions of ingredients, equipments, and sources of energy, economic and socio-cultural importance of *cheka* were described. In the study areas, maize, sorghum and vegetables such as cabbage, moringa, decne and taro were reported to be utilized for *cheka* preparation. Informants described the characteristics of quality *cheka* as thick, smooth, effervescent, foamy, and bitter in taste. The processing methods as well as the raw materials utilized and their proportions seem to vary among households, villages and localities. Since the present study was the first of its kind, flow chart which shows the processing operations involved in *cheka* fermentation was constructed that might be used by those who want to scale-up the *cheka* processing in the future. Based on the finding of this survey, it is recommended to carry out further research on the nutritional and alcoholic contents of *cheka* and on optimizing the processes.

Keywords: Cheka; Konso; Dirashe; Indigenous processing method; Fermented beverages

Introduction

Fermented alcoholic beverages have been widely consumed by people in almost all countries for millennia [1]. These fermented beverages are usually prepared from locally available materials using age-old techniques [2], and their art is believed to pass down by cultural and traditional values to subsequent generations with the processing being optimized through trial and error [3]. Owing to the heterogeneity of culture in Ethiopia, diverse indigenous fermented beverages exist in the country with *tella*, *tej* and *arake* being majorly consumed in the northern parts, as reported by Fite et al. [4], *borde*, *shamita* as reported by Alemu *et al.* [5], Ghebrekidan, [6] and *cheka* Abegaz *et al.* being utilized in the southern and central parts.

Traditional fermentation serves many purposes. It can alter the texture of foods, enhance the digestibility of a food, preserve foods by production of acids or alcohol, or produce subtle flavours and aromas which increase the quality and value of raw materials [1,7]. Fermentation which is often considered as a low-input enterprise provides individuals with limited purchasing power, access to safe, inexpensive and nutritious foods [3].

In reality, the fermentation of traditional beverages takes place under uncontrolled conditions and often involve laborious and time consuming activities [8,9]. Rural women produce such beverages with no standardized formulations and also usually in the absence of back-slopping. As a result, the beverage becomes of poor quality with inconsistency and failure in most cases [3]. These necessitate the understanding of the processes and raw materials utilized for preparing the beverages.

Cheka is a cereal and vegetable-based fermented beverages which is consumed in Southwestern parts of Ethiopia mainly in Dirashe and Konso. People of all ages including infants, pregnant and lactating women drink *cheka*. From observation an adult man on average drinks up to 8 litres of cheka per day. The indigenous processing methods and raw materials for the preparation of most Ethiopian fermented beverages had been well documented by many investigators. Several works have been done on traditional fermented alcoholic beverage. The ethanol, methanol and fusel oil contents of Ethiopian alcoholic beverages such as *tella*, *tej* and *arake* were determined by different researchers [14,10-12]. Some native researchers also tried to modify and monitor the fermentation and processing parameters of *tella* (Berza and Wolde [13] and *borde* Abegaz *et al.* [14] Abegaz *et al.* [15] with the aim of improving its sensory properties including shelf-life. *Cheka* had been mentioned in Abegaz *et al.* [14] along with other Ethiopian traditional beverages, but no one has documented about it yet. Therefore, the present study was intended to document the indigenous processing methods and raw materials of *cheka*.

Materials and Methods

Description of the study areas and survey data collection

A survey of traditional processing methods and raw materials used for the production of *cheka* was conducted using in-depth interviews and focus group discussions with 90 cheka producers at two districts in southwestern Ethiopia, namely Konso and Dirashe. Dirashe and Konso are one of the five districts in Segen and its Surrounding Peoples Zone and are located in the South-western part of the Southern Nations, Nationalities and People's Region at a distance of about 550 and 590 kilometers from Addis Ababa, respectively. The interview was administered in Amharic language in the villages of each locality. Three kebeles which are known for consumption and vending of cheka were selected from each locality. A total of 60 brewers (10 women from

***Corresponding author:** Habtamu Fekadu Gemeda, Centre for Food Science and Nutrition, Addis Ababa University, Addis Ababa, Ethiopia, Tel: +251917036924; E-mail: fekadu_habtamu@yahoo.com

Received November 16, 2015; **Accepted** December 09, 2015; **Published** December 17, 2015

Citation: Worku BB, Woldegiorgis AZ, Gemeda HF (2015) Indigenous Processing Methods of *Cheka:* A Traditional Fermented Beverage in Southwestern Ethiopia. J Food Process Technol 7: 540. doi:10.4172/2157-7110.1000540

each kebele) were selected randomly for interview after preliminary screening. In order to obtain an insight into the processing operations, ingredient proportions, consumption patterns and undisclosed things, focus group discussions were carried out in three kebeles with 30 women who were selected based on availability. Data were collected on the preparation techniques, types and proportions of ingredients, sources of energy, types of equipment, sensory properties, shelf-life and economic importance of *cheka* as well as constraints in its production, marketing and consumption [8]. Cooking temperatures were recorded during on the spot interviews at Karat, Gato and Gidole where people use warm water for diluting *cheka*.

Result and Discussion

Raw materials utilized for the preparation of *cheka*

In the study areas, *cheka* is mainly prepared from cereals such as sorghum (*Sorghum bicolor*) and maize (*Zea mays*) and vegetables such as leaf cabbage (*Brassica spp*.), moringa, (*Moringa stenoptella*), and decne (*Leptadenia hastata).* In addition, brewers in Dirashe use the root part of taro, whereas producers in Konso rarely use the leaf part of taro. In some localities, few households also use dried edible leftovers of *injera*, *kitta* or *kurkufa*. The informants of this study also disclosed that few brewers use hop to make *cheka* taste bitter as consumers judge this sort of *cheka* as of good quality.

Actually, most *cheka* producers (48.9%) use a mixture of cereals for *cheka* preparation since they have more than one farm and therefore, can produce different cereal crops during one production season. They also believe that the quality and sensory properties of cheka is determined by the type and combination of cereals utilized. For instance, brewers in most localities reported that if maize is exclusively utilized, the prepared *cheka* become sour before expected time and on the other hand, if only red sorghum is used, the *cheka* takes much time to become mature. However, maize is frequently utilized for producing Konso *cheka* which needs short fermentation period (usually 4 days). The ingredients utilized and their possible combinations were found to vary within and between households regardless of localities and processing methods employed. The proportion of malt to unmalted ingredients varies with the processing method, climatic conditions and strength of the product of second phase of *cheka* fermentation. The proportion of the malt used during the whole phases of *cheka* fermentation varies between 20 and 25% of the total unmalted ingredients. The raw materials utilized for *cheka* preparation are selected based on availability, price, purpose of production (e.g. for home consumption, social events, etc.), processing activities involved and preferences of the brewers. Seasonal variations in the price of various cereals also affect the choice of ingredients in both localities.

Preparation of malt

Malt used for *cheka* preparation can be prepared from a single or mixture of cereals. The cereals utilized for this purpose include maize, sorghum, barley (*Hordeum vulgare*) and finger millet (*Eleusine coracana*). The latter two cereals always are not utilized alone and barley could be utilized as malted or unmalted ingredient. About 38% of the respondents reported maize was the most appropriate raw materials for malt. According to the brewers barley is utilized to make the *cheka* more alcoholic and it is often used in small quantities (10-15% of the malted ingredient). Cereals stored in silos if not damaged by pests such as weevils are appropriate for malt preparation. In some instances, grains stored underground for few weeks to a year might be used for malt.

Brewers always begin malt preparation by cleaning the grains through winnowing and the floatation method during soaking. The grains are steeped in water overnight for sorghum, barley and finger millet but it requires 24 hours for maize. In case, maize is mixed with other cereals for malt preparation, the soaking time is reduced from the usual 24 hours. This is because other cereals absorb excess water and become spoiled instead of sprouting. The steep water is poured out and/or drained off when storing in a sack. Historically, the swollen grains were allowed to germinate in a basket while covered with leafs of castor oil or ensete. The duration of germination varies with the type of cereal used and the interest of the brewer. In most areas, the germination takes 2-3 days for all cereals. However, some producers in Konso allow the grains to germinate for more than 4 days at ambient temperatures so that mold could develop which is desired for foam formation. In this case, the sack is tightly wrapped in order not to allow excess air to enter into the sack. After four days, the sack is opened for about 2 minute and again wrapped for extra 3-4 days. The germinated grains are then spread out on an animal hide, a sheet of plastic material or mat made of leaves of *Phoenix reclinata* and let to dry in the sun for 2-5 days depending on weather conditions and stored in a dry place until required.

Depending on the volume of cheka to be produced, the entire malt or its portion can be milled for immediate use. Some brewers mix the malt with unmalted barley when they need to mill it. None of the respondents utilize wet malt that was reported to be used in borde preparation [8].

Sources of fuel and equipment utilized for *cheka* preparation

Cheka producers depend on firewood and dry crop residues such as maize or sorghum stalks, straw and corncob. Locally available rudimentary equipment is used by producers for traditional preparation of *cheka*. Large clay pots (*gan or insira*), plastic containers or metal barrels (whose capacity varies from 50 litres to 200 litres), plastic buckets, plates and bowls made from woods (*Gebete*) and car tires are utilized for cheka fermentation. Baskets of varying shapes and sizes made from bamboo and sieves made from leaf of *Phoenix reclinata* (*Yezembaba kitel*) and circular flat metal mesh are used. Traditional pestle and mortar made from wood and circular flat trays made by interweaving bamboo splints are utilized when cleaning grains. Modern flour mills are available for milling purpose but grinding stones are still used for milling fermented vegetables and malt in some villages. Metal and clay pots of different size are used for cooking fermented products and boiling water during *cheka* preparation and consumption. Large gourd bottles with long necks (10-15 litres), plastic jars and clay pots (10-25 litres) are used for transporting *cheka* to farm for workers as well as in case of social events such as wedding and funeral ceremonies. Depending on age a single person may use small screw-cap plastic bottles and gourd bottles or jars (2-5 litres) when going to farm or looking after livestock. At villages and market places *cheka* is served in plastic or metal containers (cans) and gourd bottles (not long necked) whose capacity is approximately 1 litre (Table 1).

Description of the methods and steps in *cheka* preparation

The processes of *cheka* preparation are very complex and vary among households, villages and localities. The duration of *cheka* fermentation varies from 12 hours (½ day) for *menna* to months for *parshota*. Processes which involve short fermentation time are followed by those brewers producing *cheka* for sale. The variation among respondents opinion concerning proportions of raw materials utilized for *cheka* preparation makes the estimation of the amount of

Operations	Equipment
Drying of grains and malt	Plastic sheets, animal hide, mats, mosquito net, blanket
Malt preparation	Metal pots, bucket, bowl, sack, baskets
Cleaning of grains	Traditional flat trays (*sefed*), mortar and pestle
Milling	Flour mill, grinding stones
Filtering and sieving	Traditional sieve (*wonfit*)
Fermentation of leafy vegetables	Small traditional bowl, buckets, plastic plates, broken clay pots or jars
Cooking and boiling	Metal pots, barrel, insira
Crashing of dough balls	Beer bottle, cylindrical stone, pestle-like wood (*tomambyta* or *korya kabotat*)
Main fermentation and storage of cheka	Large bowl, plastic container, barrel
Serving utensils	Small metal or plastic containers, gourd bottles

Table 1: *Cheka* processing operations and equipment utilized for the purpose.

the ingredients and water used problematic. The type and proportion of ingredients depend on the volume of *cheka* to be produced, the availability of the ingredient and type of the *cheka* being produced. Three types of cheka are produced in the study districts such as *hiba* (*parshota*), *chaqa* (*fasha*) and *menna* (*poh-kedha or madhot*). Most cheka preparation methods involve three major phases that are marked by cooking. *Menna* is prepared in a similar way to konso cheka. The only difference is that in the case of *menna*, the initial fermentation lasts within 12-14 hours and leafy vegetables are not used at all. *Menna* fermentation may also involve single phase of fermentation. In this case, only malted porridge is allowed to ferment overnight which results in cheka that tastes sweet.

Phase I: In phase I, grain flour is thoroughly kneaded with water in *gebete* and allowed to ferment for 14 hours (for *menna* preparation in both localities) to over a month (in low-land rural areas of Dirashe). For home consumption and occasionally for sale, brewers in Konso use the leaves of taro to produce *cheka*. In this case, taro leaves are chopped and cooked in a metal or clay pot. The overcooked taro leaves are allowed to ferment for about 6 days in a gebete. The fourth day, the fermented product is mixed with a handful of malt and left to ferment for extra 2 days. Brewers believe that the added malt facilitate the decomposition of the leaves. After that the fermented taro is mixed with fresh flour as usual and is kneaded with water which also ferments for 36-40 hours. This fermenting material is commonly referred to as *pulota*.

In Dirashe, leaf cabbage is chopped into pieces with traditional double-bladed knife prepared only for this purpose. The chopped cabbage is put in a bowl or bath and little quantity of water is sprayed on it. Then, it is tightly covered with leaves of ensete or plastic sheet. Some producers spread small quantity of flour on the surface of cabbage. These prevent the entry of air that otherwise causes the fermenting cabbage develop bad odor which could be sensed by consumers during consumption. The cabbage is allowed to ferment for 4 to 6 days and is then blended with small quantity of flour. In the past, people used to use grain grits for the same purpose. After fermenting for additional 2-3 days, the fermented cabbage is milled with a grinding stone. The milled product is blended with excess water in a bath and is sieved through *wonfit* (traditional sieve). The filtrate is mixed with fresh flour, exhaustively kneaded and is allowed to ferment overnight. Some brewers may blend cooked and smashed taro roots kneaded with little flour and the fermented product. However, several brewers in the low land areas of Dirashe allow the chopped cabbage, leaves of moringa or decne to dry and then mill them with some grain (15-20 kilograms) and dried food leftovers, if any. Then, the flour is kneaded with water and allowed to ferment for at least 1 month while being uncovered and the fermenting product is kneaded with little amount of water with an interval of 2-3 days. Respondents reported that if it is neglected even for about five days, larvae appears on the product because after four days insects including flies start to settle on it and lay their eggs in the cracks formed as it is dehydrating. In addition, the product may develop undesirable odor. When leafy vegetables are unavailable, only flour can be used and the fermentation time becomes relatively short. The fermented product is then blended with fresh flour one day earlier before the day it is desired to cook.

Phase II: The fermented product (*pulota*) is kneaded with little or no water and then made into dough balls called *qabot* (*gafuma*). The dough balls shouldn't be less or much moistened. If the balls are less moistened, they become uncooked at the centre and if too moistened they are too tiresome for kneading. During cooking, pieces of dried hop wood or peeled barks of some plants are placed at the bottom of the pot or barrel and excess water is added to prevent the dough balls from burning. If a lot of balls are prepared, most brewers add the dough balls thrice at an interval of 10-15 minutes. The balls are added when the water is boiled (93-95.5°C) and the barrel or pot is covered with a lid or a gourd that fits the pot. The dough balls are cooked for about 45 minutes to 1½ hours depending on the amount of balls and intensity of the fire. Cooking of the dough balls in water would be expected to gelatinize cereal starch granules and thereby increase the efficiency of starch degradation by amylase. The process of gelatinization occurs over a temperature range depending on the type and size of granules and starch to water ratio. Leaching of amylose occurs during gelatinization and thus create available carbohydrate for the proliferation of fermentation microorganisms [16]. Brewers often insert stick into the balls to check whether they are cooked well or not. When the dough balls are cooked well producers take one ball at a time and dip their hands quickly into water in a container handled by the other hand to avoid damage to them. Then, the *qabot* is smashed in *gebete* using a beer bottle or a round-headed (pestle-like) material made from wood called *tomambayt*. Once the dough balls are broken down into pieces, they are kneaded with little water and spread on a plastic sheet, large sized gebete or a bed made from wood to cool for few minutes to 7 hours. However, the time of cooling not only depends on the amount of the product, but also the thickness of the product spread on the plastic sheet or gebete. After cooling, it is mixed with adequate milled malt, thoroughly kneaded and allowed to ferment overnight in a *gebete*. However, most brewers in Dirashe allow this product to ferment for 36-40 hours to enhance the bitterness of the product. Most brewers spread a handful of malt on the surface of the kneaded product. The proportion of malt added during this phase can be as high as 25% of the unmalted ingredient. Next day early in the morning, the product is transferred into large fermentation vessel (barrel or *rotto*); water is added and is then well mixed together. This actively fermenting material is commonly referred to as *sokatet* (*difdif*). *Sokatet* can be stored for more than a week and so brewers may utilize a portion of

it for preparing *cheka* for home consumption. Some consumers would like to use this product and it is usually given to respectable people such as hard-workers and close relatives.

Phase III: On the same day the *Sokatet* is transferred into large containers and mixed with water, a very thick porridge (*koldhumat or hanshalt*) is prepared by pouring boiling water (94.5-97°C) on to flour in *gebete* and thorough mixing using a material made from wood for this purpose or a flat cattle bone (Scapula). The porridge is allowed to cool to room temperature for 5-7 hours and malt is kneaded with the cooled porridge. The respondents indicated that the amount of malt added at this stage depends on the strength of the *sokatet* and amount of *cheka* being produced. If the *sokatet* tastes much bitter, small quantity of malt is added or otherwise it would increase. Then, the *koldhumat* (equivalent term in Dirashe is *hanshalt*) is added into the vessel containing the *sokatet*; sufficient water is added and is thoroughly mixed together using a thick stick with flat end. In some cases, brewers use their hands to mix the two products and also to adjust the consistency of the mixed product. The *cheka* is ready for consumption after 4-12 hours of fermentation (Table 2). As the duration of fermentation in the preparation of *hiba* (Dirashe *cheka*)is too long, the *sokatet* becomes much bitter and as a result the amount of malt added into *hanshalt* in the preparation of *fasha* (Konso *cheka*) is slightly larger than for *hiba* and also the proportion of the *sokatet* in the final product is much greater than *hanshalt* in *fasha*. The amount of malt used during *menna* preparation is smaller than amount utilized during both hiba and fasha production (Figure 1).

Sensory properties and consumption pattern of *cheka*

Cheka is produced in both rural and urban communities of Dirashe and Konso for household consumption, income generation and also for special occasions like *debo*, *waleta* (a group of affluent people who have good contact so that they invite one another to drink cheka together), mahiber, wedding and funeral. The way of preparing *cheka* differs as between households; ethnic groups and depends on tradition, economic situation and consumer preferences. According to the respondents, the sensory properties of cheka vary with the type of *cheka* and raw materials utilized. However, the *cheka* which is often produced for sale and at special occasions should have a bitter taste, yellowish to green foam, refreshing aroma, consistent texture, a very small residue (*atela* which is given to animals) and a fairly longer shelf-life. In addition, it shouldn't contain excess foreign materials such as chaff, dead weevils or other else even though it is consumed unfiltered. Brewers in Konso villages and Gato kebele who produce *fasha* indicated that increasing the proportion of malt during the third phase of fermentation adds to the bitterness and overall quality of *cheka* whereas producers in Dirashe believe that addition of excess malt makes the cheka sourer within a day (Figure 2).

Unlike *borde* which must be consumed within a day [8], *cheka* has a shelf-life of 2 to 4 days. But it is usually produced on a small-scale basis to avoid loss and if it is produced following Konso's processing method, it should preferably be sold within one day because consumers usually wouldn't like to drink *cheka* on the next day once it is ready for consumption. Quality deterioration starts when the active fermentation slows down and the sparkling foam doesn't appear on the surface of *cheka*. In both districts, *cheka* is retailed only at vendors' house and is often consumed locally. At times of scarcity people also consume a very sour *cheka* either by diluting with excess water or mixing it with fine ash separated through sieve. But, some people currently use orange powder to make cheka less sour. Up on addition in both cases (ash and orange powder) the *cheka* starts to form foam and tastes less acidic. The neutralising effect of ash on sour *cheka* would be because wood ashes to some extent may contain the oxides and carbonates which serve as liming agents, raising pH and thereby helping to neutralize acidic *cheka*. Most people in Dirashe like to drink sour cheka and are often suffer from stomach ache and other health problems. Smooth and reddish lower lips and skin lesions which are common among Konso people and some Dirashe people were attributed to sour *cheka* and *arake*.

Cheka drawn from fermentation vessel is very thick and is normally diluted with cold or warm water (boiled at 65-80°C; especially in Konso and some villages in Dirashe like Gato and Gidole) during serving. Depending on the thickness of the *cheka* being served and the desire of an individual, *cheka* can be diluted by 20 to 50% water. For this reason, the amount of nutrients a given person can get per a given amount of *cheka* could greatly vary with the extent to which the *cheka* is being diluted. It is consumed daily by both adults and children as a drink and meal replacement. In the study areas, solid foods are not available during day time at most households and as a result it is *cheka* that is consumed all day long. Most people particularly adult's start drinking it early on an empty stomach and people in Konso on average drink 3-5 litres of *cheka* per day but, in Dirashe adults can drink up to 8 litres per day. Since it can be obtained for free in most villages of Dirashe district, the amount a single individual drinks per day may go beyond 8 litres.

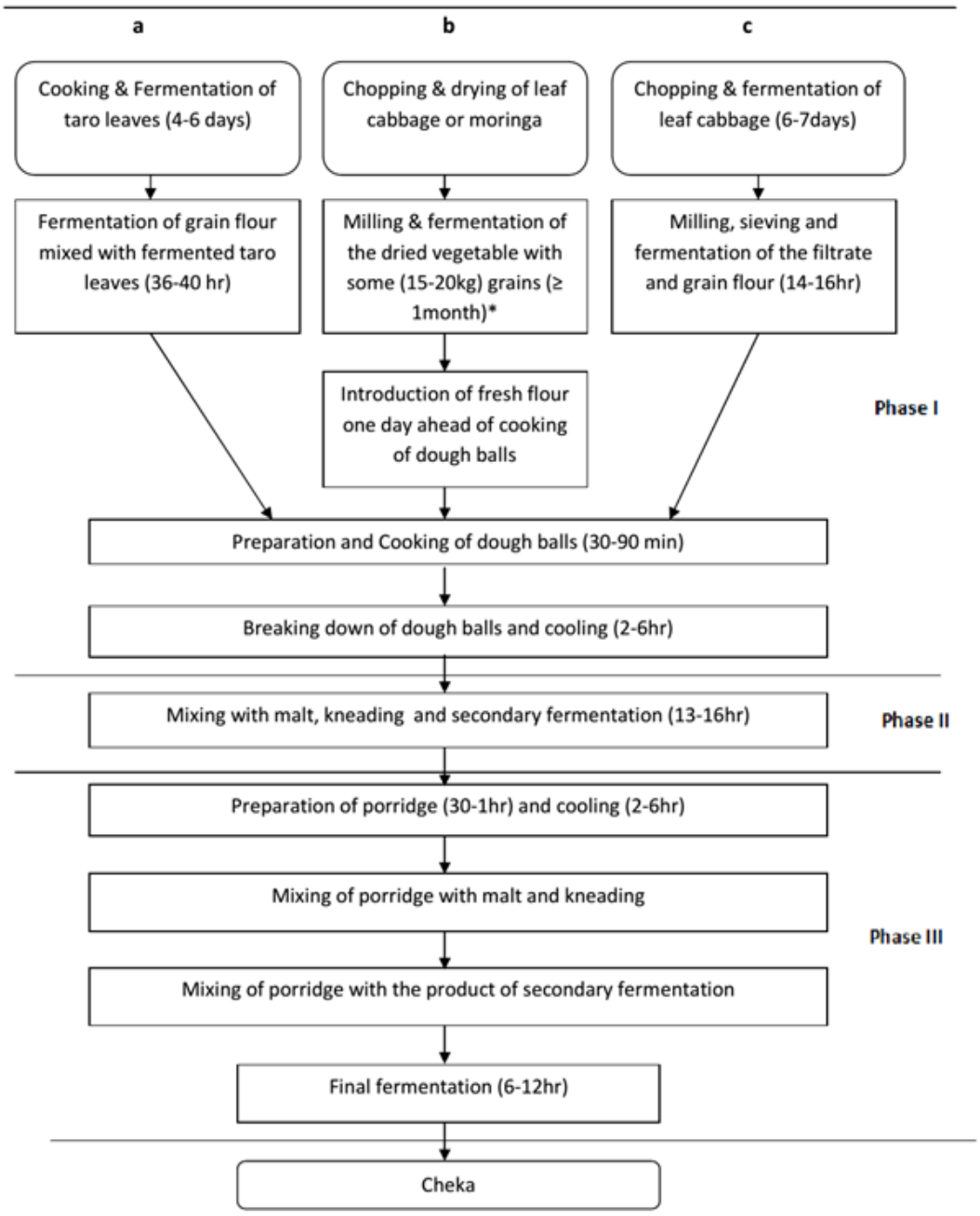
Although most mothers do not give cheka for their under 1 year's infants due to its high alcohol contents, children die due to *cheka* as few care givers try to give it to infants even less than 8 months and usually not on demand. Based on the informants' opinion, what matters is not only giving *cheka* for infants but also the feeding practice. Care givers hold one of their hands beneath the lower lip of the child to contain the

Ingredients	Proportion (w/w or w/v)			
	Fasha	Hiba*	Hiba**	Mena
Chopped cooked taro leaves (cooked) : malt : water	0.5:0.2:0.2	-	-	-
Chopped leaf cabbage : water	-	0.6:0.2	-	-
Flour of dried moringa/ leaf cabbage + grain flour : water	-	-	1.4 :1	-
Grain four: Fermented product : water	5:0.6 :4.0	5:0.8 :4	5:2.4:4	-
Pulota : kneading water : cooking water	7:0.5: 4.0	9 : 0.5:4	10.4:0.5:4	-
Cooled smashed dough balls : malt : kneading water	9:1.4:1	9:1.4:1	9 : 1.4: 1	-
Sokatet: diluting water	9:2.5	9:2.5	9 : 2.5	-
Grain flour : boiling water for porridge preparation	5:3.5	5:3.5	5:3.5	5:3.5
Sokatet : porridge : Malt: Water for mixing	9:1.4:1: 2	9:0.9:1:2	9:0.9:1:2	5:0.1:2.5

*When producing *cheka* following the method used by people in highland areas of Dirashe

**When producing *cheka* following the method used by people in lowland areas of Dirashe

Table 2: The proportion of ingredients during *cheka* fermentation.

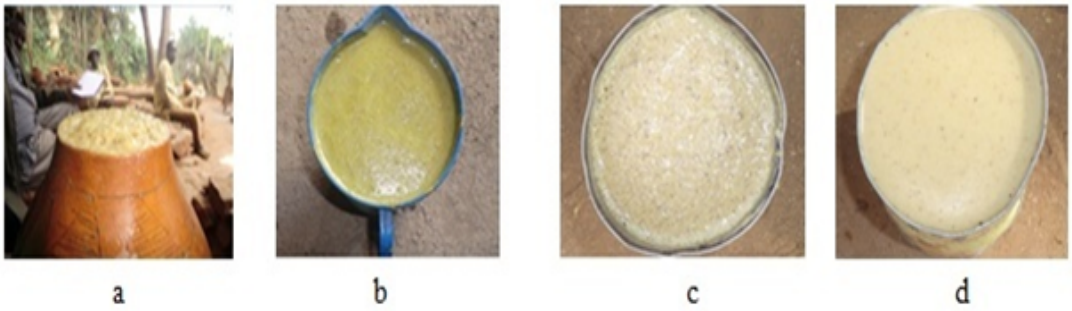


a-When producing cheka following the method used by people in Konso and in few villages of Dirashe
b-When producing cheka following the method used by people in lowland areas of Dirashe
c-When producing cheka following the method used by people in highland areas of Dirashe
*Involves frequent kneading of the fermenting product usually at an interval of 2-3 days

Figure 1: Flow chart for cheka preparation in Konso and Dirashe districts.

cheka and after adding the *cheka*, they close the nose of the child with the other hand in order to prevent the entry of *cheka* via nose. During this moment, the child is struggling to breath and this increases the likelihood of the child being choked. Even during this survey, a child of about 8 months old has lost his life due to this practice in one of the survey areas called *Shelele* kebele.

Both in Dirashe and Konso, drinking *cheka* is a common feature of social gatherings. *Cheka* is consumed in large quantities at collective work gatherings (*debo*), on market days and possibly on weekends and at special occasions. In rural communities of Dirashe, it is common that parents of a marrying man write letters to their close relatives to help them with *cheka* to be served for the invited people on the wedding and accordingly every requested household provides up to 6 jerry cans or clay pots (20-25 litres each) of *cheka*. Some people also willingly supply 1-2 jerry cans of *cheka* on other occasions like funerals. These indicate that cheka plays a vital role in building the social interaction of the society.



a- Fasha or Chaqa
b-Hiba or parshota produced in lowland areas of Dirashe
c- Hiba or parshota produced in highland areas of Dirashe
d-Menna

Figure 2: Cheka (Photos taken by the investigators).

Cheka is considered as a low-cost meal (about ETB 2 per litre) for low-income people including government employees who cannot afford factory produced beverages and restaurant foods. *Cheka* and *kurkufa* (a dish prepared by cooking leafy vegetables particularly moringa and rounded balls of maize, sorghum or wheat flour) are believed to enhance lactation and thus, lactating women are encouraged to use them. Those consumers who drink excess *cheka* and additionally use other alcoholic beverages such as *arake* do not eat other solid foods. These indicates that dependence on *cheka* alone can affect the nutritional well-being and general health of individuals. However, most *cheka* consumers eat other foods like *nufro* or *nufiti* (salted boiled maize and/or haricot bean), *kurkufa, kitta* (unleavened bread) and *kollo* (roasted maize, chickpea, sunflower or their combination). Ground chili pepper spiced with ginger, garlic, coriander, rue, basil and salt and sometimes mixed with raw tomato or cooked vegetables is served with *cheka* as appetizers and to reduce satiation. Usually people in the study areas eat the cooked dough balls and also drink the product of phase II (*sokatet*). Some people also drink a mixture of thin porridge and *cheka* literally called *hoskidha*.

Economic importance of cheka and constraints encountered by brewers

Cheka is a good source of economic opportunity in particular for the women as its preparation is not physically demanding. As the cost of entry to *cheka* vending is minimal, many women in Konso and Dirashe sell *cheka* and earn income for their family and basically for themselves. Some producers in Karat, town in Konso, sell *cheka* on a daily basis and most producers in both districts sell *cheka* twice per week or every other day. On a single day a given woman can produce up to 1000 litres of *cheka* which can generate a profit over ETB. 400. By virtue of *cheka*, she can also sell other foods such as *kollo*, tomato and cooked leafy vegetables and boiled haricot bean (separately or mixed) which help her to get extra income. Since the cost of raw materials and fuel in the study areas is fluctuating with seasons, the profit a brewer gets from cheka sale can be variable. Most informants in rural communities of Dirashe reported that they usually do not get a fair profit from cheka if their labour and cost of fuel is considered.

Atella (residue of *cheka*) is used to enhance the livestock nutrition and is believed to improve their health particularly in times of feed shortage, thereby strengthening the livelihood system. As *cheka* fermentation involves labour intensive activities such as milling fermented vegetables and kneading, it serves as source of both direct and indirect employment for women. In Karat and Gidole (town in Dirashe), two or more women are employed per household that cover the major complex tasks of *cheka* fermentation. These women get paid ETB. 40-50 per day and besides obtain their daily meal from there. In some cases, if the brewer cannot provide solid foods that consumer take while drinking, neighbouring women may help with it and indirectly generate money for her. Moreover, *cheka* fermentation has played a huge role in gender development. In rural communities of Dirashe and Konso, women who produce quality *cheka* are given more status and have a greater say in a family and community.

Although *cheka* serves as source of cash for households, the short keeping quality of *cheka*, lack of clean water, electricity and fire wood, seasonality of *cheka* marketing (particularly in rural communities), inconsistency in the product quality and lack of encouragement from masculine family members are the major challenges which reduce the profitability of *cheka*. In most rural communities of Dirashe especially during harvesting and threshing seasons, people can get *cheka* for free. Consequently, brewers who depend on *cheka* vending cannot get enough customers during such times and become non-profitable. For this reason and others, most women in Dirashe do not engage in *cheka* marketing.

Conclusion

Cheka is a cereal and vegetable-based beverage which serves as source of nutrients for hundreds of thousands of people in South-western Ethiopia. Survey results showed that the preparation of *cheka* involves very complex and tedious operations such as repeated cooking and kneading of the fermentation products. Diverse methods of preparing *cheka* exist in Dirashe and Konso with differences in some ingredients utilized. In this study, it was found that the duration of *cheka* fermentation varies among localities (from a day to months); as a consequence, *cheka* with different sensory properties is produced. *Cheka* is being consumed while it is actively fermenting and has a short shelf-life of two to four days. The investigators believe that *cheka* fermentation has not received the scientific attention that it deserves. Studying the nutritional value, alcoholic content, and microbial dynamics of *cheka* as well as understanding process variables and properties of raw materials during its preparations will help in making it as a commercially viable enterprise.

Acknowledgement

The authors would like to thank the informants in both districts for providing their indigenous knowledge and reliable information which constituted the principal part of this study.

References

1. Fellows P (2000) Food processing technology: Principles and practice, (2nd edition), Baca Raton, CRC press LLC, USA.
2. Rose AH (1997) Alcoholic beverage. In: Economic Microbiology I (Rose, A.H. ed.), Academic Press, UK.
3. FAO (2012) Traditional fermented food and beverage for improved livelihoods. A Global Perspective (Agricultural Services Bulletin No. 21). Rome, Italy.
4. Fite A, Tadesse A, Urga K, Seyoum E (1991) Methanol fusel oil and ethanol contents of some Ethiopian traditional alcoholic beverages. SINET: Ethiop J Sci 14: 19-27.
5. Alemu F, Amha-Selassie T, Kelbessa U, Elias S (1991) Methanol, fuel oil and ethanol contents of some Ethiopian traditional alcoholic beverages. SINET: Ethiop J Sci 14:19-27.
6. Ghebrekidan H (1992) The effect of different chemical and physical agents on the viability of Cysticercus bovis: a preliminary report. Ethiop Med J 30: 23-31.
7. Kohajdova Z, Karovicova J (2007) Fermentation of cereals for specific purpose. J Food Nutr Res 46: 51-57.
8. Abegaz K, Beyene F, Langsrud T, Judith AN (2002a) Indigenous processing methods and raw materials of borde, a Ethiopian traditional fermented beverage. J Food Technology Africa; 7: 59-64.
9. Achi OK (2005) The potential for upgrading traditional fermented foods through biotechnology. African J Biotechnol 4: 375-380.
10. Desta B (1977) A survey of the alcohol content of traditional beverages. Ethiop Med J 15: 65-68.
11. Bahiru B, Mehari T, Ashenafi M (2006) Yeast and lactic acid flora of tej, an indigenous Ethiopian honey wine: variations within and between production units. Food Microbiol 23: 277-282.
12. Yohannes T, Fekadu M, Khalid S (2013) Preparation and physiochemical analysis of some Ethiopian traditional alcoholic beverages. African J Food Sci 7: 399-403.
13. Berza B, Wolde A (2014) Fermenter technology modification changes microbiological and physicochemical parameters, improves sensory characteristics in the fermentation of tella: An Ethiopian traditional fermented alcoholic beverage. J Food Process Technol 5: 316.
14. Abegaz K, Beyene F, Langsrud T, Judith AN (2002b) Parameters of processing and microbial changes during fermentation of borde, a traditional Ethiopian beverage. J Food Technol Africa 7: 85-92.
15. Abegaz K, Beyene F, Langsrud T, Judith AN (2004) The effect of technological modifications on the fermentation of borde, an Ethiopian traditional fermented cereal beverage. J Food Technol Africa 9: 3-12.
16. Liu H, Corke H, Ramsden L (1999) Functional properties and enzymatic digestibility of cationic and cross-linked cationic ae, wx, and normal maize starch. J Agric Food Chem 47: 2523-2528.