1.0 INTRODUCTION

In the 21st century, climate changes, water scarcity, increasing world population, rising food prices, and other socioeconomic impacts are expected to generate a great threat to agriculture and food security worldwide, especially for the poorest people who live in arid and semi-arid regions. These impacts present a challenge to scientists and nutritionists to investigate the possibilities of producing, processing, and utilizing other potential food sources to end hunger and poverty. Cereal grains are the most important source of the world's food and have a significant role in the human daily diet in various forms across the world. However, the bioactive phytochemicals present in them have not received attention as that of fruits and vegetables, despite the presence of unique blends of bioactive phytochemicals in them. As one of the most important drought-resistant crops, millet is widely grown in the semiarid tropics of Africa and Asia and constitutes a major source of carbohydrates and proteins for people living in these areas. In addition, because of their important contribution to national food security and potential health benefits, millet grain is now receiving increasing interest from food scientists, technologists, and nutritionists (Ahmad *et al.,* 2013).

The total food grain production in India in the year 2008-2009 was 264.38 million tonnes, out of which coarse cereal contributed 42.68 million tonnes (mt) (Agricultural statistics Division, 2014). The world total production of millet grain was 762712 metric tonnes and India and ranks top with a production of 334500 tonnes in 2010 (FAO, 2012). Millets as a group were differentiated as major millets and minor millets. Sorghum (*Sorghum bicolor* (L.) Moench) andPearl millet (*Pennisetum americanum* (L.) Leeke), form major millets while minor millets include Finger millet (*Eleusine coracana* Gaertn), Foxtail millet (Setaria italica (L.) Beauv), Kodo millet (*Paspalum scrobiculatum* L.), Proso millet (*Panicum miliaceum L.*), Little millet (*Panicum sumatrense* Roth ex Roem. and Schultz) and Barnyard millet (*Echinocloa frumentacea* (Roxb.) Link) (Sertharama and Rao, 2004; Asharani *et al.,* 2010).

Nutritional quality of food is a key element in maintaining human overall physical well-being because nutritional well-being is a sustainable force for health and development and maximization of human genetic potential. Therefore, for solving the deep-rooted problem of food insecurity and malnutrition, dietary quality should be taken into consideration (Singh and Raghuvanshi, 2012). In addition to their cultivating advantages, millets are found to have high nutritive value and comparable to that of major cereals such as wheat and rice (Parameswaran and Sadasivam, 1994). It has also been reported that millet proteins are good sources of essential amino acids except lysine and threonine but are relatively high in methionine. Millets are also rich sources of phytochemicals and micronutrients (Mal *et al.,* 2010; Singh *et al.,* 2012).

Millets contain minerals such as calcium, iron, zinc, magnesium and phosphorous, vitamins, bioactive phytochemicals such as Phenolics (Shashi *et al.,* 2007; Rao *et al.,* 2011; Hodzic *et al.,* 2009; Ahmed *et al.,* 2013). Therefore, realizing the health benefits of millets, industries are now exploring millets for product development. Therefore, specific design of foods and new products which are acceptable to the population of the region and group specifically can help in promoting the millet consumption and thereby, nutritional intake of the consumers significantly (Verma and Patel, 2013).

The minor millets are also described as gluten free nutritious grain and have received far less attention than other crops in regard of crop improvement, cultivation practices and utilization due to presence of some antinutrients (Hotz and Gibson, 2007). In view of the anti-nutritional effects of phytate, many attempts were carried to reduce it. These include activation of the indigenous enzyme phytase and/or addition of microbial phytase (Barrier *et al.,* 1996). These anti-nutrients reside in the form of tannin that hinders protein absorption, oxalates that restrict calcium absorption and the major phytic acid that restricts the minerals bioavailability, which could be eradicated by applying minimal pre- processing treatments (Singh and Hathan, 2014).

Traditional technologies available for processing of millet include, threshing, cleaning, washing, dehulling, soaking, germination, wet or dry milling and fermentation (Makuru, 1992). Traditional processing methods are widely used to decrease the content of these undesirable components, which results in enhanced acceptability and nutritional quality in addition to optimal utilisation of these millets as human food (Pradeep and Sreerema, 2015).

Soaking usually forms an integral part of processing methods such as germination, fermentation, cooking and the toasting. Because phytate is water soluble, a significant phytate reduction can be realized by discarding the soak water. Germination is a process widely used in legumes and cereals to increase their palatability and nutritional value, particularly through the breakdown of certain anti-nutrients, such as phytate and protease inhibitors (Afify *et al.,* 2011). It is a common household technique carried out at low cost without the use of any sophisticated and expensive equipment. It was observed that decrease in the anti-nutritional factors of cereal grains was a result of soaking and germination (Gupta and Sehgal, 1991). Besides lowering of anti-nutrients, germination for 72 h significantly increased HCl extractability of minerals which represents mineral bioavailability (Archana *et al.,* 1998; Pawar and Parlikar 1990; Badau *et al.,* 2005; Arora *et al.,* 2003).

Proximate analysis, nutritional, and functionality were widely studied in millets (Jaybhaye *et al.,* 2014). Nevertheless the impact of processing treatments on the amount of important nutritional compounds present in these millets is not yet clear. Therefore, the current study was taken to analyze some important biochemical composition and antioxidants in the five selected millets namely Cumbu / pearl millet, ragi / finger millet, thinai / foxtail millet, samai/ little millet, varagu / kodo millet when subjected to processing such as soaking and germination at various time periods.

Hypothesis

Null hypothesis (Ho)

Variation in soaking and germination time does not influence some of the important biochemical composition and antioxidants in the five selected millets.

Alternate hypothesis (Ha)

Variation in soaking and germination time influence the level of some important biochemical compositions and antioxidants in the five selected millets.

Objective of the present study

The present study was formulated with the following aim:

- To analyze the effect of soaking and germination at different time period on the important biochemical constituents and antioxidants in the selected five millets.