ABSTRACT

Handwa is a popular fermented and baked food of Gujarat prepared out of a combination of cereal-pulse flour. Since the major food groups (i.e. cereals, pulses, fats and vegetables) are included in its preparation, the scope of extending its use to suit to the nutritional needs of various target populations was explored.

Studies on handwa were conducted with the broad objectives of (a) surveying the Gujarati households in Baroda for handwa consumption, preparation and storage practices, (b) standardising and characterising the product in terms of its preparation and shelflife, (g) studying the various technological modifications in handwa preparation, and (d) preparation of nutritionally balanced handwas.

The survey results indicated that wide variations existed amongst the Gujarati households belonging to low middle and high income groups with respect to their handwa consumption, preparation and storage practices. Almost 85% of the families took handwa in the form of a major meal and was found to be consumed along with oil, tea, buttermilk, ketchup or chutney. The most popular mix (used by 30% of the families) comprised approximately 60% rice, 20% bengal gram dal and 20% red gram dal flour. Lactic fermentation of the batter prepared out of this mix was more
popular (75% families) than the natural fermentation. Baking practices involved, use of traditional handwa oven (80% families) to be kept on gas or kerosine stove, and the duration of baking ranged from 30 min to 90 min. The most desirable handwa was reported to have a soft crumb texture, golden brown crust and the characteristic sour and spicy flavours.

Handwa was then standardised in the laboratory using this popular mix with respect to mix meshsize, batter moisture level, fermentation and baking. Desirable quality handwas could be prepared using the mix with mesh size in the range of 25-75u, using 75 ml water per 50 g mix to prepare batter. The optimum batter fermentation time was found to be 10 h to 14 h, with 2.5% added natural culture, developed in the laboratory by the 'back-slopping' method. Baking of the handwa batter, standardised for a sand bath oven, involved 90 min of total baking time by keeping the flame high for initial 10 min and reducing it for the rest of the baking time.

The gross composition of handwa, standardised in the above phase comprised 47% moisture, 10.3% protein, 25% fat, 61.8% carbohydrates, 2.48% ash and 2.04% fibre on dry matter basis. These handwas could be stored for 18 days at room temperature and for 5 months at refrigerated temperature without significantly affecting microbial qualities. Loss of moisture during storage of these handwas resulted in low sensory and overall acceptability scores.
A variety of pulses could be incorporated in the standard handwa mix upto 25% without bringing any significant change in the sensory qualities of handwa. Wheat and pearl millet could be incorporated only upto 10%, whereas, maize and sorghum could be incorporated upto 50%. Combination of three cereals such as wheat (20%), Jowar (40%) and rice (40%) however resulted in handwas that were comparable to the controls.

Both solar and microwave ovens were found to be suitable for baking handwas, however, without the golden brown crust formation in them. Steaming of handwa batters for 10 min followed by baking for 50 min reduced the 90 min handwa cooking time by 30 min.

The ready-to-bake handwa mixes developed in the laboratory could be stored in the polyethylene (300 gauge) and aluminized pouches for a period of one year at room temperature.

Handwas prepared from balanced handwa mix formulations calculated for adult man, adolescent boys and school goers were less acceptable. Blending of these balanced formulations with standard mix formulations upto 20% for adolescent boys, 40% for school age children, and 60% for adult man resulted in handwas with acceptable sensory qualities.