8. Conclusion

Coffee as a vehicle for iron fortification was tested. The work was aimed at reducing the anti-nutrient levels in the coffee beans to improve the absorption of fortified iron. It was found that coffee beans roasted at medium roast degree and subsequently subjected to 6 kGy irradiation dosage had reduced anti-nutrient levels and lower iron binding ability. The levels of anti-nutrients: polyphenols and phytates dropped by 24% and 76% respectively, reducing the iron binding by coffee polyphenols and the total iron binding ability by 35% and 25%. These pre-treated coffee beans were used in making iron fortified spray dried and freeze dried instant coffee powder mix containing a mixture of coffee and milk solids such that the product can be dissolved in hot water with required amount of sugar during consumption. Ferrous pyrophosphate was chosen as the compound for fortification. *In vitro* iron dialyzability test was done and it showed that 80% of the fortified iron was absorbable as opposed to 30% absorption in non-irradiated samples with no added ascorbic acid. Thus a cheaper form of fortificant was made highly absorbable in the food vehicle, eliminating the need to use novel, costly forms of iron, thereby cutting down cost. The developed product was shelf stable up to a period of eight months stored at ambient temperature in multi-layered pouches (Paper- Foil- Plastic). *In vitro* bioavailability values show that by consuming the fortified product at two servings per day (30 g powder dissolved in 120 ml water containing 3.5 mg iron), 26% (approximately 1/4th) of RDA for women will be met. Regular consumption of the product will result in considerable improvement in iron status of the target group. Future scope of the work would be testing the developed product using animal and human studies. Also other forms of iron fortificants such as micronized and nano forms can be tested in the developed product. Applications of irradiation as a means of reducing anti-nutrient levels can be extended do other food vehicles.