

## ABSTRACT

Jamun (*Syzygium cumini* L.), a type of berry with attractive colour and taste, is available mainly in tropical and sub-tropical parts of the world. The pulp (with thin adherent skin) and seed of jamun fruit possess high therapeutic values. However due to its short seasonal availability and highly perishable nature, jamun remains underutilized. Development of shelf-stable dehydrated jamun, in powder form, may widen the scope of its utility. The present work aimed to develop jamun powder (JP) containing both pulp and seed kernel. The development included the steps: i) drying of jamun pulp by different methods and selection of a particular one to retain maximum functionality in the dried product, ii) addition of drying aids to produce free flowing jamun pulp powder (JPP) by the selected drying method, and iii) mixing of JPP with appropriate amount of seed kernel powder (SKP) to obtain JP. The final product, JP, was characterized with respect to (w.r.t.) its composition, functionality, physical, thermal and optical properties, moisture sorption characteristics, storability and applicability.

Microwave-convective hot air drying (70 °C, 1 Watt/g and 0.5 m/s air velocity) was selected as the most suitable method for jamun pulp. The total phenolics content (TPC), monomeric anthocyanin content (MAC) and antioxidant activity (AA), per gram of dried sample (on dry basis, db), under this condition were 31.52 mg gallic acid equivalent (GAE), 11.99 mg malvidin-3-glucoside (M3G) and 28.63 mg butylated hydroxyanisole (BHA), respectively. The drying aids, viz., maltodextrin (MD), tricalcium phosphate (TCP) and glycerol monostearate (GMS) at the optimum level (% db of pulp) of 12.2, 0.4 and 1.4, respectively, produced free flowing JPP, for which the hygroscopicity, rate of moisture sorption, and flow time were reduced by 29.67%, 45.24%, and 60%, in that order, compared to the control powder (without aids). To formulate JP based on sensory analysis, mixing of 2% (w/w, db) microwave-convective hot air dried (60 °C, 2 Watt/g and 0.5 m/s air velocity) SKP with 98% JPP was most desirable. The JP had high antioxidant potential with 88.58%, 97.17% and 20.32% increase in TPC, AA and MAC, respectively w.r.t. fresh jamun paste. The JP (less the effect of glucose from contained MD) also displayed impressive antidiabetic activity. Within the range of 25-45 °C, the limit of 11-7% moisture was considered safe for JP stability. The shelf-life of vacuum packed JP was about three months under refrigerated (4±1 °C) storage. The JP having attractive colour, when added in milk (10%, w/w of milk) resulted in a palatable curd with good appearance, pleasant aroma and enhanced TPC and AA.

**Keywords:** *Syzygium cumini*, microwave-convective hot air drying, drying aids, jamun powder, antioxidant potential, antidiabetic potential.