Sprinkles: A Multiparticulate Formulation Platform for Pediatric and Geriatric Drug Delivery
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**Purpose**
Development of multiparticulate sprinkle formulations for pediatric and geriatric drug delivery.

**Methods**
Multiparticulates such as pellets and granules were developed using low dose, medium dose, and high dose drugs. Budesonide, lansoprazole, and carbamazepine were selected as low, medium and high dose drug candidates respectively. Multiparticulate formulations were developed targeting critical quality attributes such as particle size, taste, and swallowability for patient compliance in pediatric and geriatric populations. Multiparticle with modified release characteristics were developed using selected drug candidates. The drug loading and modified release coatings were conducted using fluid bed coating process for budesonide and lansoprazole. High shear granulation method was used for carbamazepine modified release granules. The coated or granulated product was dried to remove residual solvents. The dried blend was mixed with suitable excipients such as sweeteners and flavors for palatability enhancement. The developed multi-particulates were filled into capsules and sachets. Unit dose capsules and sachets contain single dose for oral application. Multiparticulates can be suitably swallowed orally or can be sprinkled over food or fruit juices.

**Results**
Budesonide multi-particles shows controlled release up to 8 hrs in 0.05M pH 6.8 phosphate buffer, 900mL, paddle, 75 rpm. Lansoprazole delayed-release Multi-particles shows acid resistance up to 2 hrs in 0.1N HCl media and shows complete drug release within 60 minutes in 0.05M pH 6.8 phosphate buffer, 900mL, paddle, 75 rpm. Carbamazepine extended release granules show extended-release up to 12 hrs in 0.05M pH 6.8 phosphate buffer with 0.1% SLS, 900mL, paddle, 75 rpm. The particle size of Multiparticulates ranges up to 710 microns. Hence considering the size of particles, the multi-particulates shall be sprinkled over food and swallowed or directly swallowed without crushing.

**Conclusion**
Modified release multi-particulate formulations using drug candidates with low to high dose were developed and evaluated for drug release studies. The developed formulations show complete taste making and desired target drug release profiles. Modified drug release with target drug release profile was obtained by coating with enteric polymers and pH independent polymer solution. The developed multi-particulates can be suitably sprinkled over food or juices and consumed. Alternatively, multi-particulates can be filled into oral syringes and administered to patients by dispersing in water.