

EVALUATION OF EMERGING AND EXISTING TASTE MASKING TECHNOLOGIES FOR PAEDIATRIC DRUG DEVELOPMENT

Eunice Afriyie¹, Hannah Batchelor¹ and Marcel De Matas²

¹Pharmacy and Therapeutics, University of Birmingham, Birmingham, B15 2TT, UK.

²SEDA Pharmaceutical Development Services, The Biohub at Alderley Park, Alderley Edge, Cheshire, SK10 4TG



INTRODUCTION

Oral medicines are often reported to have unpleasant tastes resulting in decreased acceptability within paediatric patient populations. Novel technologies that provide taste masked formulations offer numerous advantages both commercially and for patients. Many diverse taste masking technologies have been reported however, a robust comparison of technologies has not been reported to date. Critical independent evaluation of these technologies enhances the understanding of value of each technology, particularly with respect to industrial application and patient need.

AIM: To compare taste masking technologies for paediatric medicines according to a pre-defined critical quality attribute scoring template to inform future paediatric medicines development.

METHODS AND MATERIALS

- Define CQA's for paediatric taste masked technologies
- Identify taste masking technologies
- Score each technology according to the CQAs
- Undertake Kepner Tregoe analysis to determine which is the best technology

21 taste-masking technologies were identified for further work out of 24 technologies. CQAs were defined by the authors for paediatric medicines and the scoring system in table 2 was applied to each technology. Information was sourced from company literature, patents and peer reviewed publications.

CQA	Score = 3	Score = 2	Score = 1
Regulatory Excipients	Excipients approved for use in paediatrics	Excipients approved for use in medicines	Novel excipients
TRL (Technology Readiness Level)	Technology on the systematic TRL scale between 7—9	Technology on the systematic TRL scale between 4—6	Technology on the systematic TRL scale between 1—3
Complexity and manufacturing cost	Low excipient load; simple manufacturing process	High excipients and complex manufacturing process	Change in API chemistry; novel process
Dosage forms	Suitable for use with solid and liquid products	Only limited products available yet appropriate for paediatric use	Only single dosage form available; typically used in adults (e.g. tablets)
Independent evaluation	Information available in peer-reviewed journal	Information available in sources outside the company	Information limited to patent and company web pages

RESULTS

Technology name/description	Provider	Brief details	Availability (0 = no; 1 = yes)	REGULATORY/EXCIPIENTS	TRL	COMPLEXITY/COST	DOSAGE FORMS	INDEPENDENT EVALUATION	Overall
OXPzero	Oxford Pharmascience Group PLC	Novel salt coupled with encapsulation inside layered matrix	1	3	3	3	3	3	16
Bio-Dar Microencapsulation for Taste Masking	BioDar Pharmaceuticals	Microencapsulation using polymers in soft, sweet matrix	1	2	2	2	3	1	11
INSTEK	Inventia Healthcare	Conventional melt/ODT with taste making using fumed silica	1	3	3	2	2	2	13
aaiPharma Taste Masking Technology	AAI Pharma Services	Formation of an absorbate	1	3	1	2	2	1	10
Cima Taste Masking Technology	Cima Labs	Polymeric coating	1	3	3	2	2	3	14
Elan Cyclodextrin Based Taste Masking Technology	Alkermes	Blending of drugs with cyclodextrins	0	3	2	3	2	1	11
Gattefosse Lipid Based Taste Masking Technology	Gattefosse	High-melting point lipid based coating	1	3	1	2	2	3	12
SRI Taste Masking Technology	Southern Research Institute	Solvent based microencapsulation	0	1	1	1	1	1	5
Capricorn Taste Masking	Capricorn Pharma Inc.	Microencapsulated products	1	1	2	1	1	1	7
Panacea Taste Masked Fast Melt	Panacea Biotec Ltd	Non-sugar sweetener in copolymer matrix	1	3	3	3	2	3	15
Redpoint Taste Masking Technology	Redpoint Bio corporation	TRPM5 taste receptor inhibitors comprising nucleotides	0	1	1	2	3	2	8
Panacea (buccoadhesive)	Panacea Biotec Ltd	Cyclodextrin as taste-masking agent .	1	2	2	3	1	1	10
Prolamine Coatings or Taste Masking	Abbott Laboratories Inc.	A uniform dispersion in aqueous medium	1	3	3	3	3	3	16
Aventis Taste Masking Composition	Sanofi	Active substance mixed with glycerol ester/ fatty acid	0	3	3	2	2	2	12
Eisai Taste Masking	Eisai Co Ltd	Complexation of basic drugs with anionic polymers	1	3	3	2	3	1	13
LTS Taste Masked Buccal Wafers	LTS Lohmann Threapie-Systeme	Ion exchange resin as a primary taste mask	0	3	1	1	1	2	8
Takeda Taste Masked ODT-1	Takeda Pharmaceutical Co. Ltd	Comprises oil + bitterness-relieving agent	1	3	3	3	2	1	13
Bend Research Lipid multiparticulates (LMPs)	Bend Research	Lipid multiparticulates. Additional coating (multiple layers) – via fluid bed coating	1	3	3	2	2	2	13
Super-critical fluids	Crystec Pharma	Particle formation w/ supercritical fluids to apply a coating drug particulates.	0	3	1	2	2	1	9
Exines	Sporomex	Plant pollens / spores to encapsulate tastant	1	1	3	1	2	1	9

The technologies that scored the highest in the basic analysis were Panacea taste-masked fast melt ,Prolamine coatings and OXPzero for taste masking. Other superior technologies include Cima taste masking technology as well as several other technologies that work by encapsulation of the API.

If analysis of the top technologies is weighted to select those that are able to cope with a wide range of dosage forms the top three are: Prolamine coatings; Eisai taste masking and Redpoint TMT. Analysis weighted to select technologies with the highest score in complexity/cost of manufacture reveals that OXPzero; Takeda ODT and Eisai are the most promising technologies.

CONCLUSION AND FURTHER WORK

This ranking allows a direct and independent evaluation of a range of taste masking technologies .

The data set is limited to information available in the public domain. Further work is required to update this as more information becomes available and to ensure all technologies are included within the analysis.

There is a need for taste-masking technologies that are appropriate for use with liquid formulations as this application is limited to only 4 technologies listed.

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