Case Study: Mixing of Pharmaceuticals with ResonantAcoustic® Mixing (RAM) Technology

MIX TIMES 2-4 MINUTES

RSD LINE FOR MIXES THAT "READILY PASS" IN ACCORDANCE WITH FDA GUIDELINES

% RSD

Active Pharmaceutical Ingredient (API) | Excipient Combinations
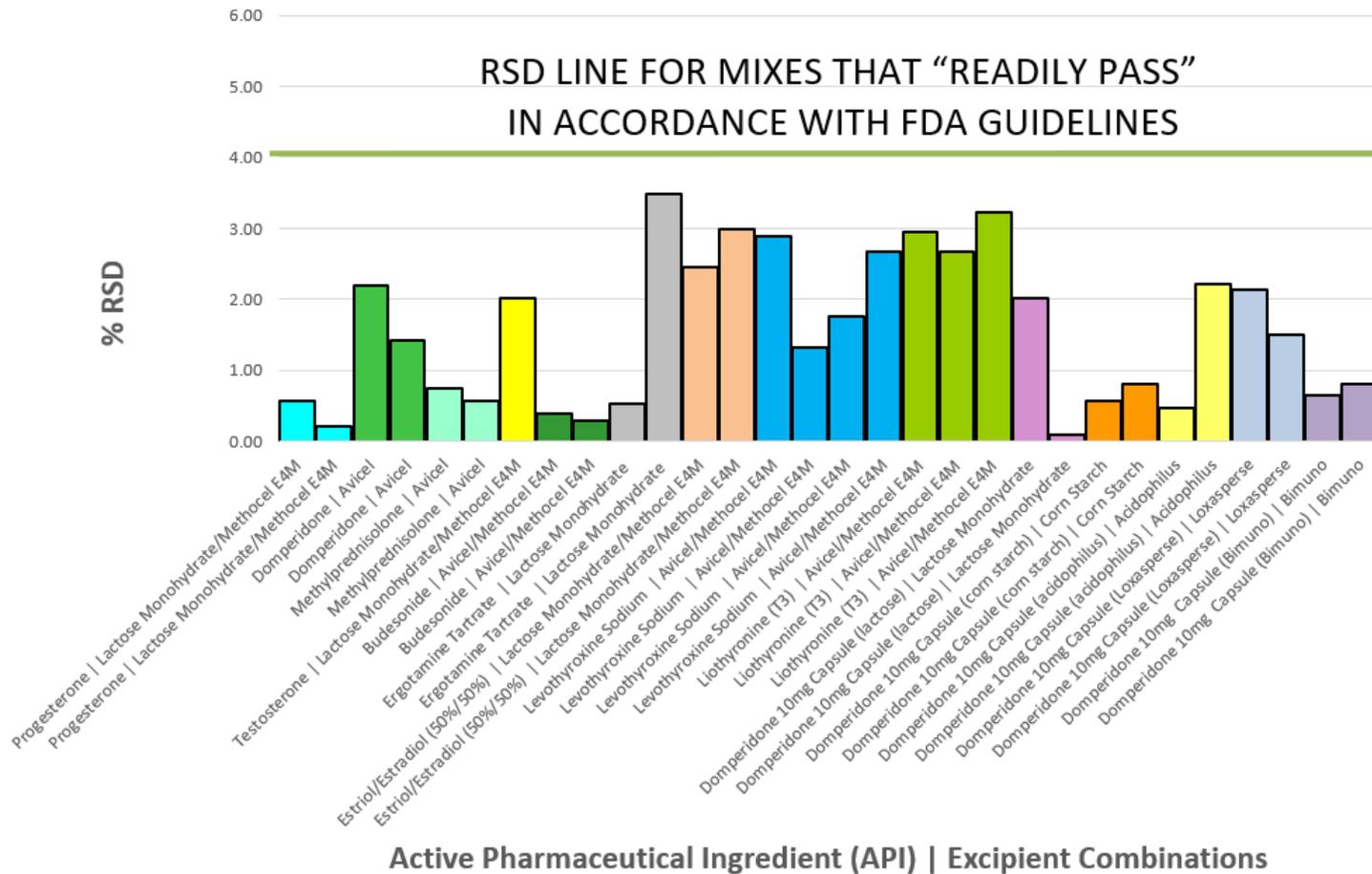
Summary:

• All mixes were well under the FDA required "readily mixed" RSD value line of 4% - RSD results repeatably less than 3%.

• Thorough mixing of various excipients and actives resulted from short mixing times in the RAM mixer — consistently 2 to 4 minutes.

• RAM mixing typically outperforms all conventional pharmaceutical mixing processes.

• RAM has demonstrated substantial value-add for mixing pharmaceutical powder products.

Note: Values in the graph are color-coded to correspond with the materials on the reverse side.

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Case Study (Continued): Mixing of Pharmaceuticals with ResonantAcoustic® Mixing (RAM) Technology

Sample	Active Ingredient	Excipient	Acceleration g	Time minutes	% RSD
1	Progesterone	Lactose Monohydrate/Methocel E4M	71	4	0.57
2	Progesterone	Lactose Monohydrate/Methocel E4M	35	2	0.21
3	Domperidone	Avicel	60	4	2.19
4	Domperidone	Avicel	70	2	1.43
5	Methylprednisolone	Avicel	60	4	0.74
6	Methylprednisolone	Avicel	65	2	0.57
7	Testosterone	Lactose Monohydrate/Methocel E4M	70	3	2.02
8	Budesonide	Avicel/Methocel E4M	70	4	0.39
9	Budesonide	Avicel/Methocel E4M	70	2	0.29
10	Ergotamine Tartrate	Lactose Monohydrate	100	6	0.53
11	Ergotamine Tartrate	Lactose Monohydrate	60	4	3.49
12	Estriol/Estradiol (50%/50%)	Lactose Monohydrate/Methocel E4M	35	2	2.45
13	Estriol/Estradiol (50%/50%)	Lactose Monohydrate/Methocel E4M	35	4	2.98
14	Levothyroxine Sodium	Avicel/Methocel E4M	35	2	2.88
15	Levothyroxine Sodium	Avicel/Methocel E4M	35	2	1.32
16	Levothyroxine Sodium	Avicel/Methocel E4M	35	2	1.76
17	Levothyroxine Sodium	Avicel/Methocel E4M	35	4	2.67
18	Liothyronine (T3)	Avicel/Methocel E4M	35	4	2.95
19	Liothyronine (T3)	Avicel/Methocel E4M	70	2	2.67
20	Liothyronine (T3)	Avicel/Methocel E4M	35	4	3.23
21	Domperidone 10mg Capsule (lactose)	Lactose Monohydrate	35	4	2.02
22	Domperidone 10mg Capsule (lactose)	Lactose Monohydrate	35	4	0.09
23	Domperidone 10mg Capsule (corn starch)	Corn Starch	70	6	0.57
24	Domperidone 10mg Capsule (corn starch)	Corn Starch	69	4	0.80
25	Domperidone 10mg Capsule (acidophilus)	Acidophilus	35	2	0.46
26	Domperidone 10mg Capsule (acidophilus)	Acidophilus	35	2	2.21
27	Domperidone 10mg Capsule (Loxasperse)	Loxasperse	70	2	2.14
28	Domperidone 10mg Capsule (Loxasperse)	Loxasperse	70	2	1.49
29	Domperidone 10mg Capsule (Bimuno)	Bimuno	100	6	0.64
30	Domperidone 10mg Capsule (Bimuno)	Bimuno	60	4	0.81

Facts about RAM:

- Mix 10-100 times faster than traditional mixers.

- Fast, thorough and consistent mixing.

- Eliminate cross-contamination

- Mix in a variety of different vessels of your choice – glass, plastic or metal.

- Additional features such as vacuum and temperature measurement/control are available with a jacketed vessel system.

- Mix at vacuum or pressure

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