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Recommendation of appropriate operating conditions for conical TubeSpin® Bioreactors 15 / 50 mL

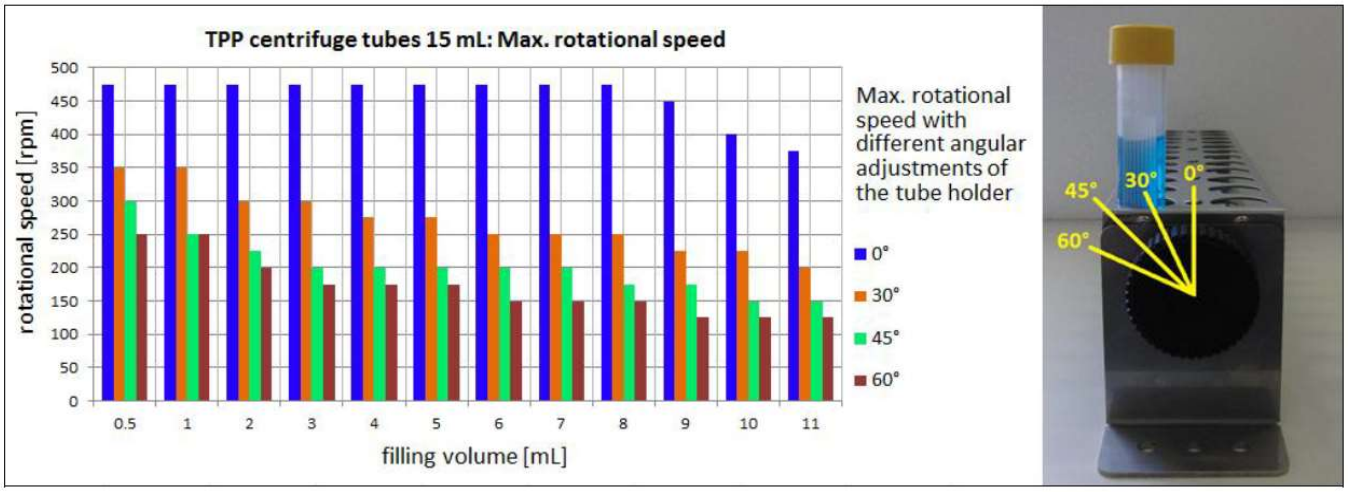
	Mammalian Cell culture		Insect Cells	Plant Cell culture
TubeSpin® bioreactor 15	**CHO**	**HEK-293**	**SF-9**	***N. tabacum* BY-2**
Shaking speed rpm	200 – 300	200 – 300	200 – 300	200 – 300
Throw mm	50	50	50	50
Working volume mL	1.5 – 6	1.5 – 6	1.5 – 6	1.5 – 6

	Mammalian Cell culture		Insect Cells	Plant Cell culture
TubeSpin® bioreactor 50	**CHO**	**HEK-293**	**SF-9**	***N. tabacum* BY-2**
Shaking speed rpm	180 – 250	180 – 250	180 – 250	180 – 250
Throw mm	50	50	50	50
Working volume mL	15 – 30	15 – 30	5 – 10	5 – 10

Max. rotational speed (50 mm shaking diameter) of different volumes of water in 15 mL TPP tubes

Timothy Bürgin [1], Dr. Tibor Anderlei[1]

Parameters:
- Different filling volumes of water (0.5 mL – 11 mL)
- Different setting angles of the tube holder (0°, 30°, 45° and 60°)
- 50 mm shaking diameter
- Measured by filming the shaking motion with high speed camera (in 25 rpm steps)



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Mixing time of different volumes of water and different shaking frequencies in 15 mL and 50 mL TPP tubes

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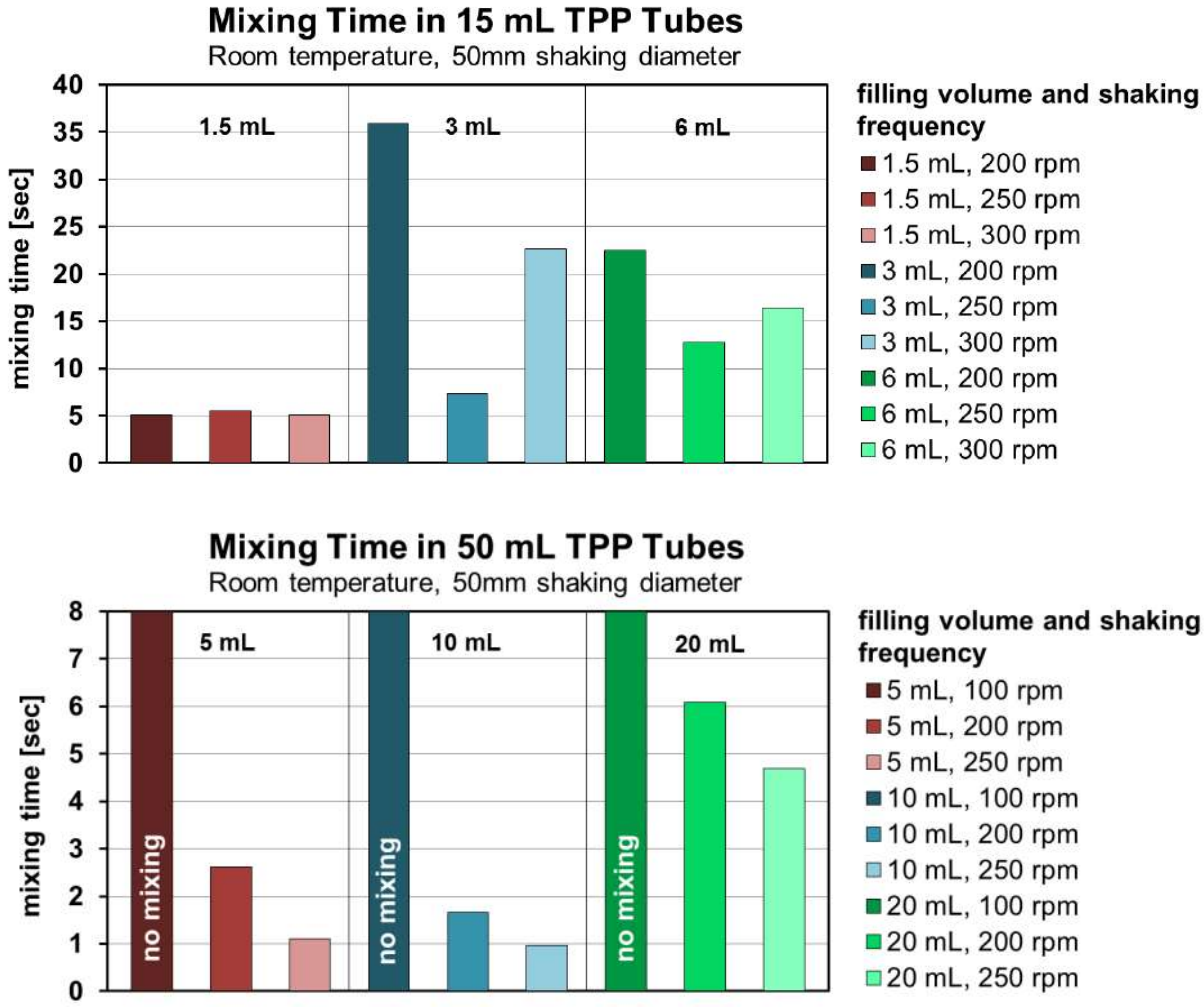
Method: Discoloration (with sodium thiosulfate) of amylum solution colored with Lugol's iodine.



[1] Kuhner AG, Birsfelden (Switzerland)

Methods from the Literature

Reference	Working Volume mL	Throw/Orbit mm	Shaking Speed rpm	TubeSpin® Bioreactor	Cells
Strnad (2010), Biotechnol. Prog.: Vol. 26 (3);pp 653-663	14 – 34	50	180 – 300	50	CHO
Xie (2011), Cytotechnology: Vol. 63 (4); pp 345-350	10 – 35	n.s	160 – 200	50	CHO
Stettler (2007), Biotechnol. Prog.: Vol. 23 (6); pp 1340-1346	5 – 10	50	140	50	CHO
De Jesus (2004), Biochem. Eng. Journal: Vol 17, No. 3; pp 217-223	5	25	200	50	CHO
Shen (2011), BMC Proc.: 5 (Suppl 8); P37	10 – 35	n.s	160 – 200	50	Sf-9
Xie (2011) Biotechnol. Letters Vol 33, pages897–902	10	n.s	75 – 90	50	Sf-9
Hacker (2018) Methods Mol Biol; 1850:123-131	10	50	180	50	CHO/HEK293
Blessing (2019) Mol Ther Methods Clin Dev. 13:14-26.	5 – 10	50	180	50	HEK293

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