



TUWAI SPECIALTIES

Applied industrial chemistry

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CERTIFICATE OF ANALYSIS

SAMPLE DESCRIPTION: Range of 11 x Washing Machine cleaning products - available in Supermarkets
Customer: Rubbedin Pty Ltd
Sample Reference Number: NA (samples purchased from major supermarkets)
Sample Dates: May 2021 – May 2024

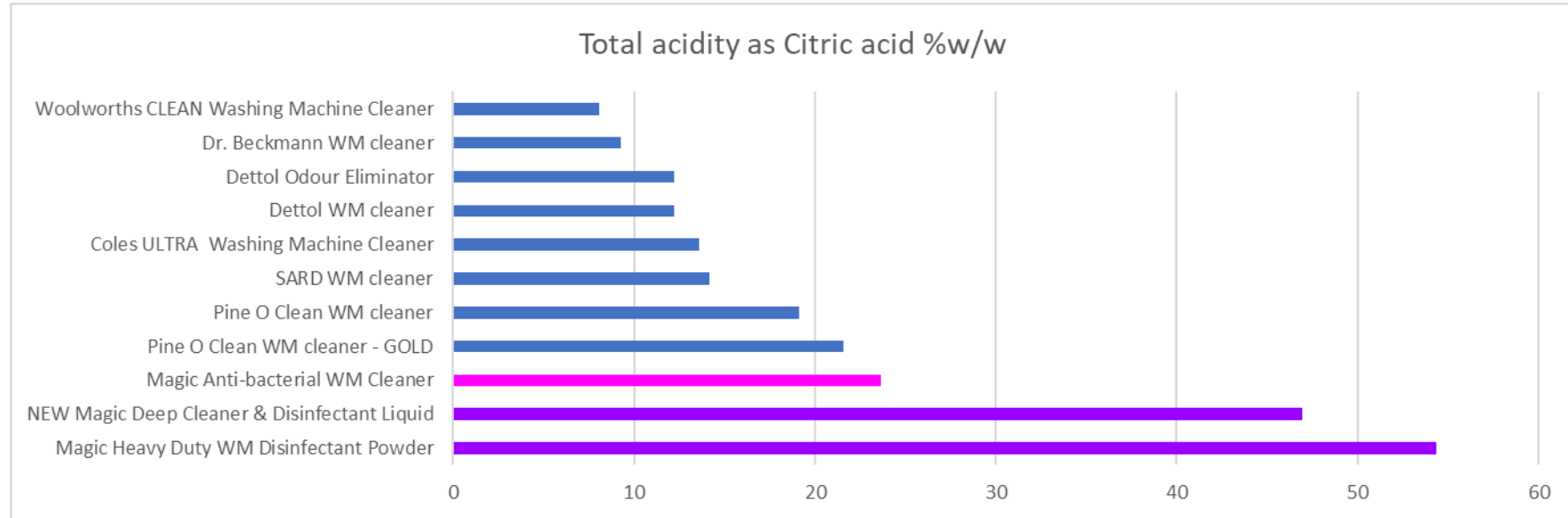
Product (WM = Washing Machine)	Made in	Form & Pack Size	Dose g / mL for Front Loader	Dose g / mL for Front Loader	Classification	Colour	Odour	pH neat	pH @1%	Refractive Index % w/w actives	% w/w actives	'Active acidity' as Citric acid %w/w	'Total acidity' as Citric acid %w/w	Ranking by Total Acidity
Method	label	visual	label	label	label	visual	scent	pH meter	pH meter	Refractometer	NA	LM007 - Titration with 0.1N NaOH to pH 3.8	LM007 - Titration with 0.1N NaOH to pH 8.1	Acid strength
Magic Heavy Duty WM Disinfectant	Australia	Powder 250g	250	2 x 250	S5 Caution NDG	white	Bio Fresh	PDR	1.75	NA	99g/kg Sulfamic acid 500g/kg citric acid	24.748	54.374	1
NEW Magic Deep Cleaner & Disinfectant Liquid	Australia	Liquid 250mL	250	2 x 250	S5 Caution NDG	straw	Bio Fresh	1.65	1.80	NA	50g/L Sulfamic acid 500g/L citric acid	16.100	46.950	2
Magic Anti-bacterial WM Cleaner	Australia	Powder 100g	100	2 x 100	S5 Caution NDG	white	Bio Fresh	PDR	1.85	NA	99g/kg Sulfamic acid 200g/kg citric acid	13.485	23.642	3
Pine O Clean GOLD WM cleaner	Portugal	Liquid 250mL	250	2 x 250	DG 8	Blue	Floral	2.31	2.82	27	Citric acid 10-30% Lactic acid 4% Quats 1.5%	5.155	21.59	4
Pine O Clean WM cleaner	Portugal	liquid 250mL	250	2 x 250	NA	green	floral	1.50	2.57	21	Dual quats <3%	6.673	19.110	5
SARD WM cleaner	Not stated	Powder 2x75g sachets	75	75	S6 Poison DG 8	white	floral	PDR	1.5	NA	200g/kg sulfamic acid	11.85	14.170	6
Coles ULTRA WM Cleaner	Australia	Liquid 250mL	250	250	NA	green	citrus	2.18	3.15	19	Not available	5.952	13.588	7
Dettol WM cleaner	Portugal	Viscous liquid 250mL	250	250	NA	green	floral	2.56	2.85	18	9.99% lactic acid, 2.25% quat 0.13% dodecylamine	3.605	12.233	8
Dettol Odour Eliminator	Portugal	Viscous liquid 250mL	250	2 x 250	NA	green	floral	2.56	2.85	18	9.99% lactic acid, 2.25% quat 0.13% dodecylamine	3.605	12.233	9
Dr. Beckmann WM cleaner	Germany	Gel 250mL	250	250	NA	blue with black specks	floral	2.50	2.87	13	<5% nonionic surfactants	2.467	9.251	10
Woolworths CLEAN WM Cleaner	Australia	Liquid 250mL	250	2 x 250	NA	green	citrus	1.87	2.88	10.5	10.0% lactic acid, 2.25% Quat.	5.140	8.060	11



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Results:

Washing machine cleaning products utilize surfactants and various acidic actives in order to remove built-up deposits, scale, and micro-organisms from washing machines.

Based upon 'Total Acidity' (the total amount of an acid present when neutralised with a standard base – sodium hydroxide) the various washing machine cleaning products are listed from strongest to weakest above.

Wayne M.Thomas (B.App.Sc.-App.Chem.)

27/05/2024



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Testing Method (LM-007):

The laboratory method used to assay all the various supermarket washing machine cleaners was 'TOTAL AND ACTIVE ACIDITY VIA SODIUM HYDROXIDE TITRATION'.

- A quantity of each product is weighed accurately into a flask and diluted with some water.
- A pH probe is inserted, and the product stirred on a magnetic stirrer.
- A standardised solution of SODIUM HYDROXIDE is added via a burette until a pH of 3.8 is achieved. The dose of sodium hydroxide is then used to calculate ACTIVE ACIDITY.
- Further SODIUM HYDROXIDE is then added until a pH of 8.1 is achieved – this is calculated as TOTAL ACIDITY.

This test compares all the various products, regardless of which acid was used as an active ingredient. All results are expressed as 'ACTIVE ACIDITY as CITRIC ACID' and 'TOTAL ACIDITY as CITRIC ACID'. In other words, it compares the true acid power of the products by relating back to what it would be if citric acid was used in all products.