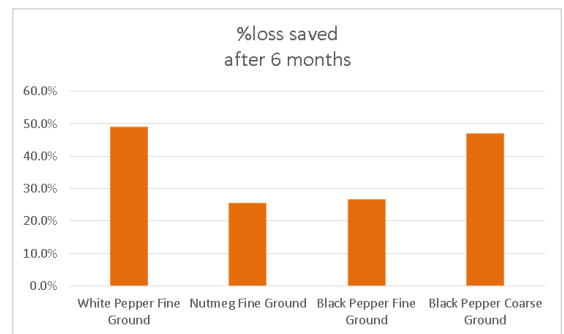


## Lower Volatile Oil Losses during Transport and Storage

### A Nedspice Solution

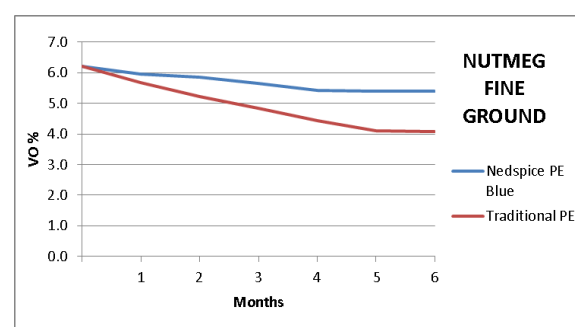
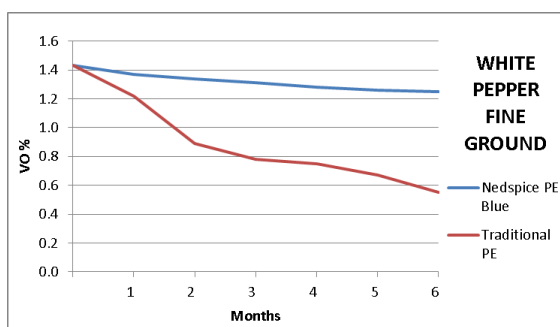
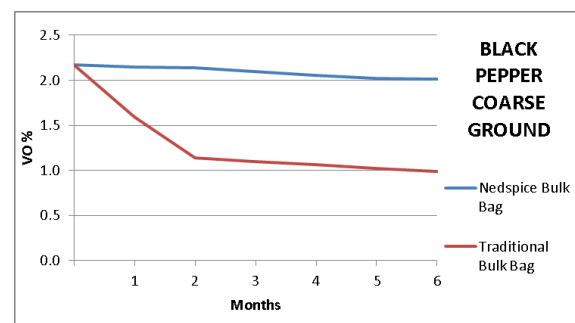
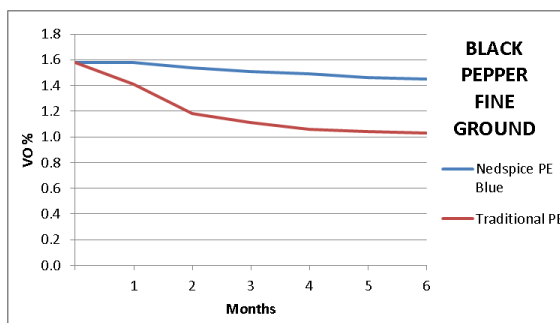
#### Volatile Oils

When transporting and storing spices it is important to retain the volatile oils to the greatest possible extent, since these substances, together with other constituents, determine the fragrance and flavour, thus, quality of the spices. The essential oils are readily volatilized and the seasoning action of the spices is consequently reduced. Therefore packaging and storage conditions of spices are extremely important. Spices packed in traditional paper/polyethylene bags can lose a substantial amount of volatile oils (VO). Ocean transport from origin countries to the customer can take several weeks to months and very often pass through different climatic zones. Especially during this period losses in VO can be significant, whilst further storage will add to this. As can be seen from the graphs below, when using typical PE bags, VO levels in ground black pepper and ground nutmeg can drop by as much as 35% over a 6 month period. For ground white pepper this loss can be even as high as 61%.



Over the last two years Nedspice has been working on development of a PE bag that will better retain VO levels over an extended period of time. Test results show significant improvements of up to 41% on 25kg bags and 53% for bulk bags. Results for individual product can be seen in the graphs and the table below.

#### VO Levels



The new Nedspice Blue bag consists of 7 layers with no perforations and is heat sealed; an innovative solution to freshness loss!



As of 1 March 2015 Nedspice will start to use the 'Nedspice Blue' bag on selected products and destinations. Our sales team will contact you to discuss whether and over what period products can be shipped in the new bag. We are committed to providing our customers with the best product and service.

Nedspice

'The Carefree Part of Your Product'

Type of packaging	Sample containing	Initial (%)	Volatile Oil %						%loss after 1 month	%loss after 2 months	%loss after 3 months	%loss after 4 months	%loss after 5 months	%loss after 6 months
			After 1 Month	After 2 Months	After 3 Months	After 4 Months	After 5 Months	After 6 Months						
Nedspice PE Blue	White Pepper Fine Ground	1.43	1.37	1.34	1.31	1.28	1.26	1.25	4.2%	6.3%	8.4%	10.5%	11.9%	12.6%
Traditional PE	White Pepper Fine Ground	1.43	1.22	0.89	0.78	0.75	0.67	0.55	14.7%	37.8%	45.5%	47.6%	53.1%	61.5%
Total saving	White Pepper Fine Ground								10.5%	31.5%	37.1%	37.1%	41.3%	49.0%
Nedspice PE Blue	Nutmeg Fine Ground	6.21	5.95	5.85	5.64	5.42	5.40	5.39	4.2%	5.8%	9.2%	12.7%	13.0%	13.2%
Traditional PE	Nutmeg Fine Ground	6.21	5.67	5.23	4.84	4.44	4.09	4.08	8.7%	15.8%	22.1%	28.5%	34.1%	34.3%
Total saving	Nutmeg Fine Ground								4.5%	10.0%	12.9%	15.8%	21.1%	21.1%
Nedspice PE Blue	Black Pepper Fine Ground	1.58	1.58	1.54	1.51	1.49	1.46	1.45	0.0%	2.5%	4.4%	5.7%	7.6%	8.2%
Traditional PE	Black Pepper Fine Ground	1.58	1.41	1.18	1.11	1.06	1.04	1.03	10.8%	25.3%	29.7%	32.9%	34.2%	34.8%
Total saving	Black Pepper Fine Ground								10.8%	22.8%	25.3%	27.2%	26.6%	26.6%
Nedspice Bulk Bag	Black Pepper Coarse Ground	2.17	2.15	2.14	2.1	2.05	2.02	2.01	0.9%	1.4%	3.2%	5.5%	6.9%	7.4%
Traditional Bulk Bag	Black Pepper Coarse Ground	2.17	1.59	1.14	1.1	1.06	1.02	0.99	26.7%	47.5%	49.3%	51.2%	53.0%	54.4%
Total saving	Black Pepper Coarse Cracked								25.8%	46.1%	46.1%	45.6%	46.1%	47.0%

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