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National Peanut Board Project –Final Report

“Improving shelf life of roasted and salted inshell peanuts using high oleic acid chemistry”
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Roasted In-shell

High (variety – AgraTech V-C 2) and normal oleic (variety – VA 98R) large-seeded, Virginia-type, inshell peanuts from the 2000 crop were obtained from a commercial sheller (Golden Peanut Company). They were sized into fancy inshell grade using equipment and personnel at the Tidewater Agricultural Research and Extension Center. After sizing the peanuts were put in cold storage (40 °F and 65-70% RH) on April 9, 2001. Peanuts from the 2001 crop needed for this experiment were grown at the Tidewater Center, sized into fancy inshell grade and prepared for processing. They were never put in cold storage. The peanuts in cold storage were taken out two days ahead of processing in order to equalize in temperature before roasting. Peanuts from both the 2000 and 2001 crop year were roasted inshell at a commercial roasting facility (Jimbo Jumbo’s) on February 12, 2002, packaged in 2-mil cellophane bags, sealed, and stored in a room at ambient temperature. Three replicate samples were taken the day of roasting and then every two weeks for 12 weeks. After 12 weeks samples were taken at four-week intervals through 36 weeks. After sampling, all samples were stored in a freezer at -20° C until peroxide values (PV) could be run to determine shelf life based on rancidity. Peroxide values were determined using the American Oil Chemists' Society Official method Cd 8-53. Sensory panels have shown that a PV around 10meq/kg indicates that the product has noticeable oxidation and by 20meq/kg has reached unacceptable levels of rancidity (Braddock et al., 1995).

Peroxide value (PV) results indicate that normal oleic acid (50% range) peanuts reach a PV of 20 by the end of four weeks of storage. This was true with both the 2000 and 2001 crop years. On the other hand the high oleic acid (80% range) peanuts do not reach a value of 20 until week 28 for the 2000 crop and week 36 for the 2001 crop. This difference in the time between the two years is believed to be due to the 2000 crop being in cold storage for ten months, which led to some oxidation.

Storage Weeks

	<u>0</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>16</u>	<u>20</u>	<u>24</u>	<u>28</u>	<u>32</u>	<u>36</u>
<u>Normal Oleic</u>													
VA 98R – 2000	12.0	17.5	20.5	22.5	25.4	24.8	25.7	32.5	48.7	60.7	61.4	79.9	103.7
VA 98R - 2001	8.8	13.9	21.3	32.3	26.9	28.5	32.1	39.9	56.5	65.4	84.8	84.4	86.6
<u>High Oleic</u>													
VC 2 - 2000	1.4	2.8	2.9	3.7	4.2	5.8	5.8	7.8	11.3	13.1	20.1	22.3	28.5
VC 2 - 2001	0.6	0.9	1.1	1.6	1.7	2.2	2.8	3.6	4.6	7.5	11.2	16.4	22.2

These results show the advantage of high oleic acid peanuts for extending shelf life of large-seeded, Virginia-type roasted inshell peanuts.

Salted Inshell

The same two varieties of normal and high oleic acid peanuts were used for the salted inshell process as used for the roasted inshell described above. They were grown, sized and stored the same as for roasted inshell except the samples from the 2001 crop were put in cold storage on March 22, 2002 and stored until August 23, 2002. A commercial processor could not do the salting inshell, since 20,000-pound lots were needed to perform the salting process. Therefore we constructed stainless steel equipment whereby we could pull a vacuum to inject the salt solution in small lots of peanuts (12 pounds). The saturated salt solution used was obtained from a commercial processor. The peanuts were salted inshell on August 28, removed from the salt solution to drain, dried in a force air drier for four days to reduce the moisture to approximately 9%, and put in wire mesh bags and roasted on September 4, 2002 at a commercial roasting facility (Northampton Peanut Co.). After roasting they were packaged in 3-mil cellophane bags, sealed, and stored in a room at ambient temperature. Three replicate samples were taken the day of roasting and then every two weeks for 12 weeks and then every four weeks through week 28. After sampling, all samples were stored in a freezer at -15° C until peroxide values (PV) could be run to determine shelf life based on rancidity. This procedure was the same as used for the roasted inshell mentioned above.

	<u>Storage Weeks</u>										
	<u>0</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>16</u>	<u>20</u>	<u>24</u>	<u>28</u>
<u>Normal Oleic</u>											
VA 98R - 2000	6.9	80.4	117.8	132.0	152.7	145.8	142.3	126.2	116.8	108.3	123.0
VA 98R - 2001	10.1	87.8	116.3	125.7	147.8	121.0	124.3	113.5	127.3	117.0	124.8
<u>High Oleic</u>											
VC 2 - 2000	0.6	1.1	1.1	4.5	1.1	6.8	4.8	9.2	11.3	11.6	10.2
VC 2 - 2001	0.5	0.5	0.7	0.7	1.2	1.1	2.4	4.0	4.4	4.6	4.6

These data clearly show that the normal oleic acid peanuts rapidly pass the PV of 20 before the second week whereas the high oleic acid peanuts still have not reached a PV of 20 after 28 weeks of storage. These data are also interesting in that the salted inshell normal oleic acid peanuts become rancid must more rapidly than the roasted inshell whereas the high oleic acid peanuts seem to oxidize at about the same rate whether roasted inshell or salted inshell. This could be of tremendous benefit to the inshell industry to have peanuts that had extended shelf life as shown from this research.

Braddock, J.C., Sims, C.A., and O'Keefe, S.F. 1995. Flavor and oxidative stability of roasted high oleic peanuts. *J. Food Sci.* 60:489-493.

American Oil Chemists' Society. 1998. Official methods and recommended practices of the AOCS. 5th Ed. D. Firestone, ed.

Figure 1. Shelf-life of ROASTED In-shell Normal vs. High Oleic Peanuts

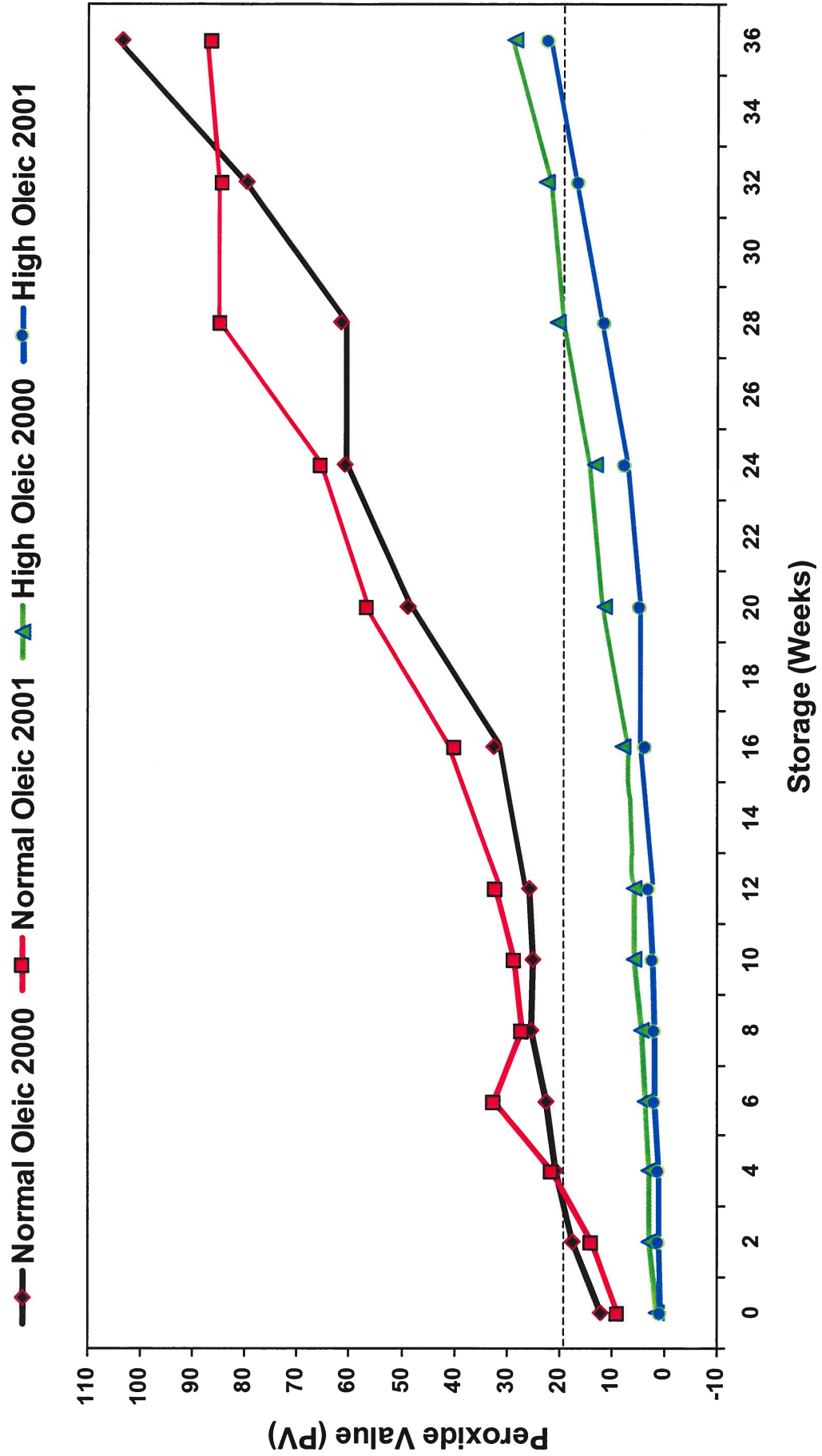


Figure 2. Shelf-life of SALTED In-shell Normal vs. High Oleic Peanuts

