Wtulich J.*, Majchrzak M., Radzanowska J., Metera A., Gajc-Wolska J.
Warsaw University of Life Sciences – SGGW
Faculty of Horticulture and Landscape Architecture
Department of Vegetable and Medicinal Plants
Nowoursynowska 159, Warsaw
http://krwil.sggw.pl
* ✉ jolanta.wtulich@wp.pl

Effect of different storage conditions on sensory quality of dill (*Anethum graveolens* L.)

INTRODUCTION

Dill (*Anethum graveolens* L.) is an annual plant with spicy odor, originally native to Mediteannean area. Fresh and dried herb is used in salads, sauces and in pickles. Dill has been used in traditional medicine for many kind of illnes and aches also. One way to obtain a high quality of dill after storage is controlled atmosphere.

The rate of changes in stored raw material is depending on gas composition of the atmosphere. Dill as a leafy vegetable can be stored in a controlled atmosphere composed of various ratio of O_2 and CO_2. Such conditions might allows to keep better quality of dill and longer storage period up to two weeks.

MATERIAL AND METHODS

The aim of the experiment was to evaluate the influence of storage conditions on the sensory quality of dill. The experiment was taken in the years 2010–2012. The experiment was carried out on the experimental field in Wilanów and then in the storage chamber of Department of Vegetables and Medicinal Plants. The study was taken three cultivars of dill 'Lukullus' 'Turkus' and 'Szmaragd'. The plants were stored for two weeks under the following conditions: NA 21,0% O_2, 0,3% CO_2, ULO 1,5% O_2, 1,5% CO_2 KA 3% O_2, 1,5% CO_2, 1,5% O_2, 1,5% CO_2. The sensory analysis were conducted after harvest and after storage. Sensory analysis was carried out using the profile method (QDA). The trained panel of ten persons evaluated dill samples according to their attributes. Statistical analysis was performed using two-way analysis of variance. Detailed comparison of means was performed by the Tukey's test at the significance level of α=0.05.

The following attributes were evaluated: smell (11 factors), flavour (6 factors), taste (4 factors) and color of herb. Statistical analysis was performed using two-way analysis of variance. Detailed comparison of means was performed by the Tukey's test at the significance level of α=0.05.

RESULTS

Figure 1. The evaluation of taste and flavour of herb of three dill cultivars depend on different storage conditions

Variety / Combination	Fresh flavour	Pungent flavour	Astringent flavour	Herbal flavour	Grassy / green flavour	Off-flavour	Sweet taste	Acid taste	Salty taste	Bitter taste
Lukullus fresh	5,53	1,39	2,31	4,22	1,91	0,00	1,82	0,99	0,81	0,94
Lukullus NA	4,49	1,58	3,40	3,61	1,85	0,00	1,66	1,32	0,86	1,12
Lukullus CA	4,43	1,54	2,76	3,79	1,76	0,04	2,07	1,43	0,84	1,13
Lukullus ULO	4,47	0,87	2,31	4,37	2,37	0,00	1,75	1,03	0,73	0,76
Szmaragd fresh	6,09	1,43	2,26	4,17	1,89	0,00	2,02	0,91	0,78	0,73
Szmaragd NA	5,21	1,22	3,13	3,42	1,80	0,00	1,95	1,45	0,71	1,23
Szmaragd CA	4,35	1,51	3,04	3,83	1,84	0,03	2,00	1,21	0,78	1,10
Szmaragd ULO	4,43	1,71	2,53	3,28	2,14	0,02	2,23	1,22	0,83	0,99
Turkus fresh	6,39	1,27	2,59	4,08	2,08	0,00	1,83	1,25	0,65	1,08
Turkus NA	4,98	1,32	3,02	3,40	1,88	0,02	1,67	1,44	0,83	1,27
Turkus CA	4,71	1,47	2,94	3,92	1,49	0,08	1,82	1,27	0,78	1,28
Turkus ULO	4,79	1,44	2,70	3,15	2,29	0,00	2,16	1,44	0,77	0,71

fresh - fresh herbs; NA - Normal Atmosphere; CA - Controlled Atmosphere; ULO - Ultra Low Oxygen

Figure 2. The evaluation of smell of herb of three dill cultivars depend on different storage conditions

Variety / Combination	Overall odour ntensity	Fresh smell	Cooling and refreshing smell	Pungent smell	"Sweet" / floral smell	"Bitter" smell	Herbal smell	Grassy / green smell	"Sour" / fruity smell	Vegetable smell	Off-odour	Colour intensity
Lukullus fresh	6,75	5,38	3,32	1,76	2,03	1,27	2,54	2,29	1,40	2,99	0,00	3,26
Lukullus NA	5,62	2,36	1,56	1,32	1,34	0,68	2,00	1,69	1,24	2,55	0,31	5,50
Lukullus CA	5,85	2,68	1,78	1,55	1,72	0,72	2,17	1,46	1,04	4,01	0,02	4,46
Lukullus ULO	5,99	3,01	1,76	1,51	1,83	0,73	2,46	1,41	1,75	4,06	0,00	2,55
Szmaragd fresh	6,51	4,95	2,83	1,73	1,98	0,85	2,52	2,40	0,84	3,21	0,00	3,45
Szmaragd NA	6,16	3,45	2,17	1,63	2,06	0,79	2,14	2,16	1,56	4,06	0,00	4,50
Szmaragd CA	5,13	2,86	1,55	1,05	1,75	0,64	2,17	1,28	1,18	3,27	0,03	3,62
Szmar agd ULO	4,97	2,56	1,66	1,30	1,45	0,72	2,30	1,05	0,93	3,64	0,21	3,83
Turkus fresh	6,30	5,01	2,45	1,54	1,60	0,86	2,64	2,13	1,18	3,00	0,00	3,23
Turkus NA	5,98	3,23	1,79	1,60	1,50	0,76	2,35	2,09	1,87	4,09	0,00	5,16
Turkus CA	5,97	2,96	2,18	1,47	1,78	0,78	2,44	1,70	1,40	3,84	0,03	4,43
Turkus ULO	6,03	3,09	1,56	1,47	1,48	0,75	2,18	1,45	1,45	3,73	0,08	3,66

fresh - fresh herbs; NA - Normal Atmosphere; CA - Controlled Atmosphere; ULO - Ultra Low Oxygen

Photo 1. Fresh Dill 'Szmaragd' variety

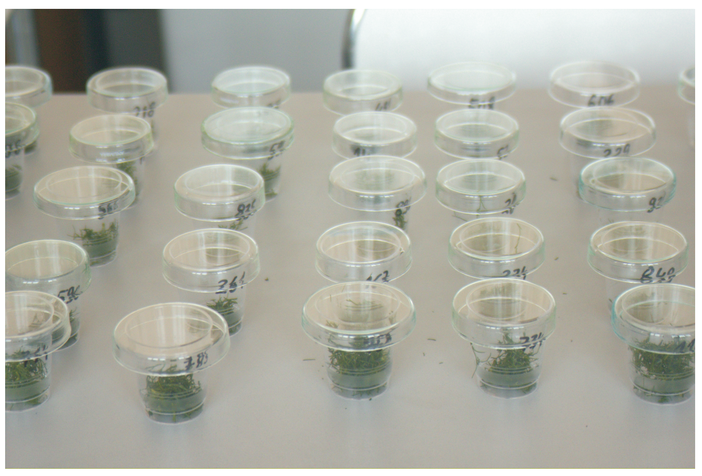

Photo 2. Samples prepared for sensory smell and flavour evaluation

Photo 3. Samples prepared for sensory taste evaluation

CONCLUSIONS

1. Results shows that the all conditions of storage resulted in high sensory quality.
2. The best storage conditions for following attributes such as smell, flavour of dill are the natural atmosphere as well as controlled atmosphere.
3. Normal atmosphere conditions significantly affecting the intensity of the smell factors especially on sweet/floral smell and pungent smell and colour intensity.
4. Fresh herb has a higher intensity of fresh flavour and overall odour intensity compared to the stored raw material.

LITERATURE

1. Agte V. V., Tarwadi K. V., Mengale S., Chiplonkar S. A. 2000: Potential of traditionally cooked green leafy vegetables as natural sources for supplementation of eight micronutrients in vegetarian diets. Journal of Food Composition and Analysis, 13: 885-891.
2. Jana S., Shekhawat G. S. 2010: *Anethum graveolens*: An Indian traditional medicinal herb and spice. Pharmacognosy Reviews, 4(8).
3. Zenoozian M. S. 2011: Effect of modified atmosphere packaging on quality changes of fresh parsley, spinach and dill. 2nd International Conference on Environmental Science and Technology IPCBEE vol. 6 IACSIT Press, Singapore.