

Development of processed products from cladodes in Morocco

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Why processed products from cactus?

- To give an added value to cactus
- To profit from medicinal properties of cactus (presence of phytochemicals as mucilage, fibers, pigments and antioxydants)
 - + Cladodes (treatment of gastric ulcer, hypocholesterolemic and hypoglycemic effects)
 - + Flowers (prevent prostate cancer)
 - + Fruit (prevent ovarian cancer)

Processed products from cactus

Since, 1997 INRA has developed a research program on the agro-industrial valorization of cactus (fruits, cladodes and flower)

-Processed products from fruits



-Processed products from flower



Processed products from cladodes

Objective: to develop and identify technologies to make processed products from cladodes

Two groups:

- Spine varieties
- spineless varieties

Spineless cladodes more interesting for food industry

50 spineless varieties



MATERIAL AND METHODS

Vegetable

The study was conducted on 24 samples taken in three different localities. For each locality and each variety (Issa and Moussa), the samples of cladodes were studied for four different levels of age.

Analysis

The analysis carried out are acidity, pH, dry matter , total proteins, vitamin C (ascorbic acid), ashes, minerals and fibers.



Analysis	Variety	Locality	Age				
			A1	A2	A3	A4	
Dry matter	A	L1	8,19	8,00	13,17	14,24	
		L2	7,86	7,94	7,611	11,83	
		L3	7,90	8,37	11,13	11,29	
pH		L1	4,1	4,1	4,1	4,2	
		L2	4	4,1	4,1	4,2	
		L3	4,2	4,1	4,1	4,3	
Acidity		I	L1	0,63	0,69	0,53	0,5
			L2	0,7	0,74	0,7	0,57
			L3	0,74	0,73	0,55	0,4
Ash %DM		S	L1	14,83	15,66	12,75	10,95
			L2	14,85	16,59	15,47	15,92
			L3	14,68	14,5	13,15	10,21
Protein (%)	A	L1	0,9	0,82	0,32	0,32	
		L2	0,77	0,74	0,75	0,49	
		L3	1,03	0,87	0,43	0,37	
Vitamin C (mg)		L1	2,8	2,8	2,49	2,18	
		L2	2,8	3,12	3,43	3,12	
		L3	2,8	2,49	2,49	2,18	
Magnesium %		L1	1	0,9	0,9	0,75	
		L2	1,4	1,45	1,35	1,35	
		L3	1,4	1,35	1,5	1,35	
Calcium (%)		L1	2,41	2,71	4,3	4,95	
		L2	2,42	2,68	2,88	6,57	
		L3	2,28	2,66	3,73	4,00	
Potassium %		L1	5,67	6,57	2,32	1,33	
		L2	3,6	5,49	3,29	2,1	
		L3	5,76	3,55	1,92	1,4	



Analysis	Variety	Locality	Age			
			A1	A2	A3	A4
Dry matter	M O U S S A	L1	9.42	9.37	11.40	14.91
		L2	7.86	7,51	12,26	13,01
		L3	8,70	7,81	12,24	10,79
pH		L1	4,0	4,1	4,3	4,4
		L2	4,2	4,3	4,3	4,3
		L3	4,2	4,2	4,1	4,4
Acidity		L1	0,62	0,76	0,41	0,40
		L2	0,53	0,52	0,68	0,50
		L3	0,58	0,57	0,56	0,56
Ash %DM		L1	12,49	13,62	11,00	10,59
		L2	13,46	14,23	12,12	12,61
		L3	13,47	13,19	14,01	13,47
Protein (%)	L1	0,78	0,72	0,34	0,34	
	L2	0,75	0,69	0,40	0,40	
	L3	0,82	0,62	0,36	0,37	
Vitamin C (mg)	L1	2,18	2,49	1,87	1,87	
	L2	2,49	2,18	1,87	1,56	
	L3	2,18	1,87	1,87	1,87	
Magnesium %	L1	0,85	1,35	1,15	1,35	
	L2	1,10	1,00	1,55	1,40	
	L3	1,30	1,20	1,25	1,20	
Calcium (%)	L1	2,05	2,40	3,84	4,35	
	L2	2,00	2,50	4,01	5,05	
	L3	1,95	1,98	4,44	5,11	
Potassium %	L1	3,35	3,33	2,19	1,08	
	L2	4,95	5,40	2,16	1,38	
	L3	3,46	3,46	2,57	2,16	

Processed products from cladodes



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Cosmetic products from cladodes



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Cosmetic products from cladodes



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Studies on mucilage properties as a water purifier

- Reduce Oxygène Chemical Demande
- Remove metals (Fe, Al, Mn)
- Remove fecal coliforms
- Water without bad odor

Project INRA-OCP



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Thank you