

THE LEVEL OF THE ASCORBIC ACID FROM THE TABLETS OF DIFFERENT ORIGIN

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Summary

The present study aims at determining the content of the ascorbic acid from the tablets of different origins and different vitamin C content, aromatized and non – aromatized, and at interpreting the statistic differences between the means with the same vitamin C concentration.

The determination method was the potassium iodide tetramer method described in F.R. 10th edition.

We could notice that the aromatized tablets (with the exception of the strawberry ones) have a content very close to the ideal content (over 99mg %) while the strawberry flavor has a lower content, of only 93, 4 mg % (a smaller value than the minimum allowed by F.R. 10th edition).

The non-aromatized tablets both of 80 mg and 200 mg have C vitamin contents in quantities which range within the limits allowed by FR 10th edition. (95 -105mg %)

Key words: tablets, aromas, ascorbic acid

Although the insufficient infusion of ascorbic acid is signaled especially in the species capable of having their own synthesis (people, monkeys, guinea pigs), a need for supplementing this vitamin was observed in all animal species irrespective of age and under different conditions such as: stress, gestation, lactation, diseases (infectious, parasites), in surgical, hepatic, intestinal, kidney and limited proteic ratios A, E, and B hypovitaminosis [11].

In cattle populations, scurvy manifestations were signalled during the lactation period: anemia, gingivitis, loss of teeth, sterility. The calves suffered from crusty dermatitis around the head and neck region, associated alopecia, waxy muscular degeneration as well as all the other scurvy related manifestations. [2]

In swine, dog and rabbit populations the infantile anemia scurvy was described (the Möller – Barlow disease), cutaneous and mucosa hemorrhages, haematoma, haematuria, epistaxis, joint deformities associated with limping especially at carpal and tarsal joints. [3].

Because the cow milk lacks vitamin C (20-25 mg/l) the milk substitutes for calves and piglets must contain at least 10 times the quantity, namely 250-500 mg/l [7].

Favorable results were observed in the calves' ompha, peritonitis, respiratory and digestive illnesses after administering a dose of 1.25g-2.5g/ calf/day [12].

Vitamin C has a favorable effect when administered to lambs suffering from pneumonia, enteritis and other infections if administered in a dosage of 0, 1 – 0, 3 g / day and associated with anti-infectious therapy and A, D3, E supplements.

Vitamin C is known to increase the sperm fecundity, up to a plus of 10-40mg vitamin C / 100 ml diluted sperm and ameliorates the sperm conservation due to its antioxidant properties. [5]

If 200mg/kg of vitamin C are administered with fodder, for 3-5 days before ablactation a decrease in ablactation mortality can be noticed. It also reduces the scurvy symptoms in Landrace piglets that are known to suffer from a genetic incapacity of synthesizing vitamin C. [1]

In dog related illnesses (Carre's disease, parvovirus, contagious hepatitis, acute hepatitis) a dosage of 1, 5 – 2, 5 g/day for 3 days lead to a clinical amelioration of the illnesses. After surgery, in pyrometer and painful states, a dosage of 30-50mg/kg insures good body saturation [6]. In the reproductive period a daily intake of 100-200mg for large dogs and one of 50 mg/kg for smaller dogs is recommended [5]. In cases on malnutrition it is advisable that a dose of 10-20 mg/kg be taken at 2-3 days intervals. A supplementation of vitamin C is necessary in the prophylaxis of pulmonary cancer for dogs that live with a smoking owner. The supplement is necessary for all second-hand smoking animals living with their owners (cats, dogs, cage birds). In the case of German Shepherds 3-4 g/day can be administered to pregnant females for preventing the hip dysplasia in puppies. The treatment must be than continued in puppies with a daily intake of 100 mg/day in the fourth month and 1-2g/day by the age of 2 years. In the case of artificially fed puppies, the milk substitute must contain 150 mg of vitamin C/l [4].

In the case of the cat's infectious diseases (panleucopenia, rhinotracheitis), painful states, after surgery and for second-hand smoking cats a dosage of 50 mg/animal is advisable.

In the case of the egg-laying hens in order to increase the percentage of hatching a dosage of 75-100 mg vitamin C/kg of fodder is known to have a favorable effect even in the case of heat induced stress. [13]

In minks 2,5 – 5 mg/day/animal of vitamin C can be administered in renal lithiasis, with good results.

Hypervitaminosis was observed in captive fish, where it manifested itself in growth stagnation, anorexia, lethargy, skeleton deformation, hemorrhages, anemia, tail erosion, brachial arcs deformation, vertebra fractures, discolored spots on the spinal fin, poor cicatrisation of plagues, low fagocitosis.

The reproduction role, the antitoxic role and the role of vitamin C in maintaining bony and collagen structures [1] in fish recommend it to be administered to trout in a dosage of 600 mg vitamin C/ kg of fodder for fry and in a dosage of 115 mg/kg of fodder in the adult population, resulting in an improvement of hatchings. In the case of catfish (*ictalurus punctatus*) it is recommended a dosage of 200mg vitamin C/kg of fodder for assuring a normal development. [1]

Materials and methods

For the study of the quantities of ascorbic acid seven lots, each of 20 aromatized "Ascovit" tablet samples were analyzed during February 2007. The "Ascovit 100" tablets are produced by Europharm S.A. and include different flavors: strawberry, currant, grapefruit, lemon, peach, orange and strawberry. An analysis was also conducted on 4 non-aromatized 180mg lots: "Sicovit C 180 mg" (Sicomed), "Vitamin C" (Ozone), "Vitamin C" (Mark), "Vitamin C" (Aesculap) as well as on two lots of 20 non-aromatized tablets "Ascovit 200" (Europharm S.A.) and "Ascovit 200" (Pharmamit). The characteristic of the vitamin C tablets are shown in table 1.

Table 1

The characteristic of examined C vitamin tablets

Name	Producer	Product serial	Expiration date	Observations (packaging)
STRAWBERRY	EUROPHARM S.A.	06 B 02 RA	01.2008	White plastic recipient, thread cap and safety mechanism for preventing the breaking of the recipients inside cardboard boxes
CURRANT	EUROPHARM S.A.	06 A 17 RA	12.2007	
GRAPEFRUIT	EUROPHARM S.A.	06 A 10 RA	12.2007	
LEMON	EUROPHARM S.A.	06 B 16 RA	01.2008	
PEACH	EUROPHARM S.A.	06 C 10 RA	02.2008	
ORANGE	EUROPHARM S.A.	06 D 12 RA	03.2008	
RASPBERRY	EUROPHARM S.A.	06 B 07 RA	01.2008	
SICOVIT C 180 mg	SICOMED	2060806	07.2008	Transparent foil covered blisters, inside cardboard boxes, orange - pinkish tablets
VITAMIN C OZONE	MARK PHARMACEUTICS Pt.OZONE Laboratories Ltd	049.11.06	11.2008	Non-transparent, white foil covered blister, inside cardboard boxes, white tablets
VITAMIN C	MARK PHARMA CEUTICS IASI	004.07.08	07.2008	Non-transparent, white foil covered blister, inside cardboard boxes, yellowish tablets
VITAMIN C	AESFULAP	039.01.07	Val.2 years	Transparent foil covered blister, inside cardboard boxes, white tablets
ASCOVIT 200	EUROPHARM	06K01RA	10.2007	Transparent foil, black foil covered blister, inside cardboard boxes, white tablets
VITAMIN C ²⁰⁰	PHARMAMIT	61.0606	06.2008	White plastic recipient, thread

				cap and safety mechanism for preventing the breaking of the recipients inside cardboard boxes, without cotton. White tablets.
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The determination of the ascorbic acid was carried out in compliance with "Farmacopeea Romana 10th ed.", chapter VIII "Individual monographs for substances, vegetal products and pharmaceutical concoctions and general monographs pharmaceutical concoctions" and according to the dosage method described in the monograph "Ascorbic acid tablets" [15].

The packaging way for all the analyzed substances was in compliance with the stipulation of "Farmacopeea Romana 10th ed.", which mentions that the ascorbic acid must be kept in "tightly sealed recipients, away from light".

"Farmacopeea Romana" allows the use of some aromas and stipulates that the ascorbic acid content should range between 95% and 105% limits from the declared value.

Results and discussions

After analyzing the mean, the dispersion factors and the statistical differences [14] between the tested means, with the aid of the "t" test the following aspects are revealed: (table 2).

There are significant statistic differences between the strawberry flavor tablets and all the other aromas, which can be considered not favorable for the strawberry flavor, which is not within the limits stipulated by the "Farmacopeea Romana 10th ed.", namely 95mg %.

All the other flavors are within the limits stipulated by the "Farmacopeea Romana 10th ed.", with ascorbic acid contents very close to the ideal one of over 99%, fact which is proven statistically, through the non-existence of statistically significant differences between the means.

The student "t" test applied for differentiating means illustrates in the case of 180mg vitamin C tablets (table 3) a non-significant difference of 9, 202 mg in favor of vitamin C Sicovit as compared to the mean of vitamin C Ozone.

The mathematical difference of 3.654 mg of vitamin C in favor of Sicovit C as against vitamin C Mark is statistically non-significant. This is also the case of the Sicovit C and Aesculap C vitamins (a non significant difference of 9, 819 mg).

However there is a statistically significant difference of 5, 548 mg in the case of vitamin C Ozone and vitamin C Mark.

There is no statistically significant difference between vitamin C ozone and vitamin C Aesculap.

There is a very statistically significant difference of 10, 611 mg in favor of the vitamin C produced by Europharm SA when comparing it with the 200 mg ascorbic acid (table 4) content lot. This recommends it for use against the illnesses above mentioned.

Table 2

The mean, the differences and the statistical significance in the "Ascovit 100" sample
The differences and their meaning

The flavour	n	$\bar{X} \pm s \bar{x}$	s	Strawberry	Currant	Grapefruit	Lemon	Peach	Orange	Raspberry
Strawberry	20	93.414±2.455	2.294	-	-6.259 xxx	-5.618 xxx	-6.358 xxx	-6.457 xxx	-6.056 xxx	-5.669 xxx
Currant	20	99.673±1.568	1.536	-	-	0.641 n.s.	-0.099 n.s.	-0.198 n.s.	0.203 n.s.	0.590 n.s.
Grapefruit	20	99.032±1.940	1.922	-	-	-	-0.740 n.s.	-0.839 n.s.	-0.438 n.s.	-0.051 n.s.
Lemon	20	99.772±1.756	1.752	-	-	-	-	-0.099 n.s.	0.302 n.s.	0.689 n.s.
Peach	20	99.871±2.858	2.855	-	-	-	-	-	0.401 n.s.	0.788 n.s.
Orange	20	99.470±2.778	2.764	-	-	-	-	-	-	0.387 n.s.
Raspberry	20	99.083±2.972	2.945	-	-	-	-	-	-	-

Table 3

The mean, the differences and the statistical significance in the samples with a content of 180 mg of vitamin C
The differences and their meaning

	n	$\bar{X} \pm s \bar{x}$	s	Sicovit C	Vitamin C Ozone	Vitamin C Mark	Vitamin C Aesculap
Sicovit C	20	182.196±4.426	8.065	-	9.202 xxx	3.654 n.s.	9.819 xxx
Vitamin C Ozone	20	172.994±4.475	7.743	-	-	-5.548 x	0.616 n.s.
Vitamin C Mark	20	178.542±4.352	7.771	-	-	-	6.165 xx
Vitamin C Aesculap	20	172.337±3.424	5.903	-	-	-	-

Table 4

The mean, the differences and the statistical significance in the samples with a content of 200 mg of vitamin C
The differences and their meaning

	n	$\bar{X} \pm s \bar{x}$	s	Vitamin C Europharm	Vitamin C Pharmamit
Vitamin C Europharm	20	203.815±2.257	4.602	-	10.611 xxx
Vitamin C Pharmamit	20	193.204±3.629	7.012	-	-

p ≤ 0,05 x = significative

p ≤ 0,01 xx = distinct significative

p ≤ 0,001 xxx = very significative

Conclusions

The supplementing of food with ascorbic acid requires an easy intake technique as well as a mild dosage especially in the case of fry.

Of all the "Ascovit 100" tablets investigated we would recommend any flavor except the strawberry one, which lacks the minimum required ascorbic acid content.

Both the 180 mg and 200mg tablets can be used as a vitamin C supplement. We would recommend the use of Sicovit C 180 mg and the Europharm C 200 mg tablets which have produced the highest levels of ascorbic acid.

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