

## CLINICAL TESTING OF «ALBUFAN», AND «GLUCOFAN» — INDICATOR PAPERS FOR PROTEIN AND SUGAR DEMONSTRATION IN THE URINE

T. Shipkov, V. Malchev, N. Todorova

The application of indicator papers in urinary investigation has a number of advantages as compared to classical methods, namely, it is time-saving, economical in terms of chemicals, rapid, specific, sensitive, simple in execution etc. Unfortunately, as yet, these paper types are hard to obtain for the vast majority of clinical laboratories throughout the country.

In this experiment we set out to carry out a comparative study of the results obtained during investigation of the urine for proteins with «Albufan», and for sugar — with «Glucofan» — indicator papers produced by Lachema — Czechoslovakia, with the results of classical methods on patients of the internal department of the clinic.

### Material and Method

Investigation of the urine was performed on a series of 100 patients, admitted for treatment at the clinic of facultative therapy, based in the First Internal Department of the City Hospital in Varna. The cases were taken at random by including each newly admitted patient to the projected investigation in both units simultaneously — the biochemical laboratory of the Chair of Facultative Therapy — Higher Medical Institute, Varna (with Albufan and Glucofan\*) and the clinical laboratory of the City Hospital in Varna (using the classical method with sulfosalicylic acid and Fehling's method, for the determination of protein and sugar respectively).

The investigations were so organized that the results obtained in one laboratory were not known to those performing the tests in the other. The results were compared at weekly intervals and, on the basis of past history of the disease and data, an explanation was sought for eventual discrepancies. In accordance with the results with Albufan and Glucofan, the factors affecting the reaction — strongly alkaline urine and high vitamin C concentration — were invariably taken into consideration. The cases lacking compatibility due to the effects of factors disturbing the normal course of the reaction, were not included in the review.

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\* The authors wish to express their deep gratitude to the Magister Pharmaciae *Gregorek* from «Lachema» Works, for the quantities of Albufan and Glucofan made available for use in their experiments.

## Results and Discussion

The results of the investigation are presented in Table 1.

Table 1

No.	Patient's name	Albufan	Sulfosalicylic acid method	Glucofan	Fehling	No.	Patient's name	Albufan	Sulfosalicylic acid method	Glucofan	Fehling
1	PK	traces	—	—	—	51	VY	traces	—	—	—
2	IM	++	++	—	—	52	DG	traces	—	—	—
3	FG	—	—	—	—	53	VB	—	—	—	—
4	GI	—	—	—	—	54	MG	—	—	—	—
5	TY	++	++	—	—	55	IG	traces	—	—	—
6	SH	—	—	—	—	56	ZS	traces	—	—	—
7	RH	tr.	tr.	+	+	57	KY	traces	—	—	—
8	ZA	++	tr.	+	—	58	HM	—	—	—	—
9	KI	traces	—	—	—	59	MG	traces	—	—	—
10	TT	—	—	—	—	60	ZD	traces	—	—	—
11	MT	traces	—	—	—	61	KA	—	—	+	+
12	VI	traces	—	—	—	62	DG	—	—	—	—
13	NT	—	traces	—	—	63	MK	—	—	—	—
14	GI	traces	—	—	—	64	EN	—	—	—	—
15	SV	—	—	—	—	65	GA	++	++	—	—
16	AH	—	—	—	—	66	IG	tr.	tr.	—	—
17	EM	traces	—	—	—	67	BI	+	traces	—	—
18	ZK	traces	—	—	—	68	ID	++	+	—	—
19	MI	+	traces	—	—	69	JD	tr.	—	+	—
20	NN	traces	—	—	—	70	PS	tr.	—	—	—
21	SJ	—	—	—	—	71	TB	tr.	—	—	—
22	ZK	—	—	—	—	72	DS	tr.	—	—	—
23	KH	traces	—	—	—	73	IA	++	++	—	—
24	AP	+	—	+	—	74	GH	+	++	—	—
25	RK	++	++	—	—	75	DS	++	++	—	—
26	AA	tr.	tr.	+	+	76	IH	+	+	—	—
27	AS	+	+	+	+	77	VA	traces	—	—	—
28	MJ	—	—	—	—	78	ZS	—	—	—	—
29	DI	—	—	—	—	79	YV	—	—	—	—
30	SS	—	—	—	—	80	IG	—	—	—	—
31	SA	++	+	+	+	81	VJ	—	—	—	—
32	DN	—	—	—	—	82	ZT	—	—	—	—
33	IT	—	—	—	—	83	ZG	traces	tr.	—	—
34	KN	tr.	tr.	—	—	84	DP	—	—	—	—
35	SI	—	—	—	—	85	DS	+	traces	—	—
36	PI	—	—	—	—	86	DH	++	traces	—	—
37	KD	—	—	—	—	87	VJ	+	+	—	—
38	EH	traces	—	—	—	88	IT	—	+	—	—
39	NI	traces	—	—	—	89	II	—	—	—	—
40	VK	++	++	—	—	90	AN	—	—	—	—
41	SA	—	—	—	—	91	ZH	—	traces	—	—
42	NY	—	—	—	—	92	PD	traces	—	+	—
43	PH	—	—	—	—	93	SA	—	—	—	—
44	MD	—	—	—	—	94	MI	—	—	—	—
45	ET	—	—	—	—	95	EA	—	—	—	—
46	KP	—	—	—	—	96	PT	traces	—	—	—
47	TE	traces	—	—	—	97	GG	—	—	—	—
48	EB	++	traces	—	—	98	DP	—	—	—	—
49	TP	—	—	—	—	99	EV	tr.	tr.	—	—
50	AH	—	—	—	—	100	RI	tr.	tr.	—	—



The structural distribution of the results of the compared methods is given in Tables 2 and 3.

Table 2

Comparative study of results				Comparative study of results			
ALBUFAN method		SULFOSALICYLIC A. method		SULFOSALICYLIC A. method		ALBUFAN method	
Negative	47	Negative	46	Negative	71	Negative	46
		Traces	1			Traces	25
Traces	32	Negative	25	Traces	15	Negative	1
		Traces	7			Traces	7
						Positive	4
						Strongly positive	3
Positive	9	Traces	4	Positive	6	Positive	4
		Positive	4			Strongly positive	2
		Strongly positive	1				
Strongly positive	12	Traces	3	Strongly positive	8	Positive	1
		Positive	2			Strongly positive	7
		Strongly positive	7				

Table 3

Comparative study of results				Comparative study of results			
GLUCOFAN method		FEHLING method		FEHLING method		GLUCOFAN	
Negative	92	Negative	92	Negative	95	Positive	3
						Negative	92
Positive	8	Positive	5	Positive	5	Positive	5
		Negative	3				

Complete equality of the results of urinary investigations for sugar by means of Glucofan and Fehling's method was established in 97% of the examinations performed. In three cases opposite results were obtained — positive with Glucofan and negative by Fehling's method. In one of these, massive hematuria was present. The accurate comparison of results, produced with Albufan and sulfosalicylic acid is rendered difficult by the recording which is by its very nature, to a certain extent for both methods subjective. Nevertheless, in 64% fully corresponding results were obtained, whilst in 33% a difference was present but only of contiguous estimates — negative: traces: traces: positive etc. and merely in 3% the results were disparate. The fact that in 25 cases, protein traces with Albufan are matched with a negative result according to the sulfosalicylic method is worth of notice. In order to clarify the issue whether in this case it is a question of higher sensitivity or of false positive results or participation of side factors, future investigations will be carried out by means of studies of descending protein stan-

dard quantities applying both methods. Again, one of the cases related to massive hematuria, and the strong positive result with Albufan corresponds to the traces with the sulfosalicylic method. It should be emphasized that in the present investigation, in all instances of disparity, the positive Albufan and Glucofan results correspond to negative results of the classical methods, or, in other words, the application of the indicator papers has not caused the omission of positive results in comparison with classical method and lack of coincidence may be explained by their greater specificity.

### Inferences

1. The substantial coincidence between the results obtained during work with indicator papers «Albufan» and «Glucofan», and the results of urinary investigations for protein and sugar, according to classical methods, their specificity, economy and simplicity of execution justify their adoption in the routine laboratory practice in this country.

2. Additional studies are required in order to clarify the reading with Albufan and Glucofan in cases with massive hematuria and also for the determination of the comparative sensitivity of the methods.

### REFERENCES

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### КЛИНИЧЕСКОЕ ИСПЫТАНИЕ «АЛБУФАН'а» И «ГЛЮКОФАН'а» — ИНДИКАТОРНЫХ БУМАЖЕК ДЛЯ ОПРЕДЕЛЕНИЯ БЕЛКА И САХАРА В МОЧЕ

Т. Шипков, В. Малчев, Н. Тодорова

### РЕЗЮМЕ

Сравнены результаты исследования мочи на белок и сахар при помощи индикаторных бумажек «Албуфан» и «Глюкофан» и сульфосалицилового метода и метода Фелинга соответствующе у ста больных, леченных в клинике.

В значительном проценте случаев наблюдалось совпадение полученных результатов, что дает основание рекомендовать проведение более широкого испытания и применения индикаторных бумажек «Албуфан» и «Глюкофан» в клинических лабораториях у нас.