



Laboratory Standardization in Türkiye for Isolation Identification and Determination of Antimicrobial Susceptibility of Anaerobic Bacteria

Türkiye’de Anaerobik Bakterilerin İzolasyonu, Tanımlanması ve Antimikrobiyal Duyarlılığının Belirlenmesi İçin Laboratuvar Standardizasyonu

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Techniques for creating an anaerobic environment have become more accessible with the development of specialized culture media, thereby increasing the likelihood of successfully isolating anaerobic bacteria from clinical specimens when appropriate conditions are maintained. However, it is known that there is still no standardized approach to the isolation and identification of anaerobic bacteria in medical microbiology laboratories across Türkiye^[1].

The antibiotic susceptibility testing methods outlined in the Clinical and Laboratory Standards Institute M11 guideline (2018), along with the classification of anaerobic bacteriology laboratories into four categories based on specific criteria in the M56-A document (2014), prompted the preparation of this survey. Additionally, similar survey-based studies investigating interest in anaerobic bacteriology are rare, with only a few examples available in the literature-one conducted in Italy and another in Belgium^[2-5].

This study aims to determine the current practices of isolation, identification, and antimicrobial susceptibility testing of anaerobic bacteria in medical microbiology laboratories in

Türkiye and to contribute to the standardization of these processes.

For this purpose, a six-question survey was developed and distributed to the email groups of microbiology professionals through the Clinical Microbiology Specialist Association (KLİMUD) and the Turkish Microbiology Society, both of which are active in the field of medical microbiology in Türkiye. The responses from the medical microbiology laboratories that participated in the study were analyzed. These responses were classified and evaluated based on the type of institution and service capacity of each laboratory. Selected findings are presented in Tables 1, 2, 3, and 4.

A total of 59 institutions responded to the survey, including 22 universities, 27 training and research hospitals, four foundation universities, three private hospitals, and three public health reference laboratories (Table 1). However, the low response rate-particularly from laboratories that do not perform anaerobic bacteria isolation and identification-hindered the objective assessment of our findings.

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Table 1. Types of institutions participating in the survey

Type	Number
State university hospital	22
Foundation university hospital	4
Training and research hospital	27
Private hospital	3
Reference laboratory	3
Total	59

Despite these limitations, an evaluation of our results (Tables 2, 3) shows that the number of medical microbiology laboratories from university hospitals participating in the survey was higher than that of other institutions. This may be attributed to the fact that university hospitals are more likely to conduct studies on anaerobic bacteriology due to their advanced facilities, greater laboratory capacities, and ongoing educational activities. In contrast, the lower

Table 2. Survey question: Are anaerobic bacteria isolated and identified in the bacteriology section of the medical microbiology laboratory (or central laboratory)?

Institution	Number	Yes	No
State university hospital	22	17	5
Foundation university hospital	4	3	1
Training and research hospital	27	8	19
Private hospital	3	1	2
Reference laboratory	3	1	2
Total	59	30	29

Table 3. Survey question: Are there special transport facilities in clinics for sending specimens suspected of containing anaerobic bacteria to the laboratory?

(Yes: Special transport facilities are available. No: Specimens are accepted as sent by the clinics.)*

Institution	Yes	No
State university hospital	5	16
Foundation university hospital	3	1
Training and research hospital	4	23
Private hospital	1	2
Reference laboratory	0	3
Total	13	45

*Some laboratories that responded "No" to the question in Table 2 indicated that they accepted the samples suspected of anaerobic infection (as they came in). Therefore, the number in this table was higher than in Table 2.

Table 4. Survey question: Which method do you use to reduce the environment while isolating anaerobic bacteria from clinical samples?

Institution	Number	Simple biological and chemical methods	Anaerobic jar or bag method	Glove-box and similar advanced methods
State university hospital	17*	1	16	1
Foundation university hospital	3	0	3	0
Training and research hospital	8	0	8	0
Private hospital	1	0	1	0
Reference laboratory	1	0	1	0

*One hospital reported using two methods together.

Table 5. Survey question: Do you perform antimicrobial susceptibility testing on anaerobic bacteria that have been identified and confirmed as the infectious agent? (If yes, which methods?)

Institution	Disc diffusion	Disc elution	Microdilution	Tube dilution	Agar dilution	Gradient test
State university hospital	4	0	0	0	1	3
Foundation university hospital	3	0	0	0	0	0
Training and research hospital	3	0	0	0	0	2
Private hospital	0	0	0	0	0	
Reference laboratory	0	0	0	0	0	1
Total	10	0	0	0	1	6

participation from other institutions may reflect a lack of active studies in the field of anaerobic microbiology.

For the isolation of anaerobic bacteria from clinical samples, the anaerobic jar and bag method is the most commonly used technique for creating a reduced medium.

In terms of identification, fourteen laboratories reported using automated systems (VITEK® 2, bioMérieux, France), eleven laboratories use MALDI-TOF, and five laboratories (four universities and one reference laboratory) employ molecular methods.

For antimicrobial susceptibility testing of anaerobic bacteria confirmed as the causative agents of infection, disc diffusion, and gradient test methods are most frequently preferred.

These findings highlight the lack of standardized laboratory protocols in Türkiye for the isolation, identification, and antimicrobial susceptibility testing of anaerobic bacteria. Clinical diagnosis tends to take precedence, empirical treatment is commonly applied, and susceptibility data are limited-both in geographic distribution and comprehensiveness.

In summary, evaluation of the current survey responses indicates that there is still no standardization of laboratory practices for the isolation and identification of anaerobic bacteria across medical microbiology laboratories in hospitals throughout Türkiye. Furthermore, there appears to be insufficient interest in this field. We believe that this lack of interest may be attributed to limited economic and

technological resources, as well as the complexity and constraints of the procedures involved in anaerobic bacteriology.

CONFLICT of INTEREST

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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