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**Mohd Abu Bakar**  
Lecturer, Department of  
Kulliyat, Jamia Tibbiya  
Deoband, GT Road Deoband,  
Saharanpur, Uttar Pradesh,  
India

**Tariq Nadeem Khan**  
Lecturer, Dept. of Kulliyat,  
National Institute of Unani  
Medicine, Kottigepalya Magadi  
Main Road, Bengaluru,  
Karnataka, India

**Shariq Shamsi**  
Lecturer, Dept. of Ilmu saidla,  
National Institute of Unani  
Medicine, Kottigepalya Magadi  
Main Road, Bengaluru,  
Karnataka, India

**Mohd Zulkifle**  
Professor, Dept. of Kulliyat,  
National Institute of Unani  
Medicine, Kottigepalya Magadi  
Main Road, Bengaluru,  
Karnataka, India

#### Correspondence

**Mohd Abu Bakar**  
Lecturer, Department of  
Kulliyat, Jamia Tibbiya  
Deoband, GT Road Deoband,  
Saharanpur, Uttar Pradesh,  
India

## Validation of *Mizaj* of brain by estimation of moisture content in vital organs of three species of animals

**Mohd Abu Bakar, Tariq Nadeem Khan, Shariq Shamsi and Mohd Zulkifle**

### Abstract

*Unani* System of Medicine (USM) holds the doctrines that, *Mawalid-e- Thalatha* (All three Creatures) are made up of four basic constituents, and the mutual combination of these four primordial substances in the constitution of creatures occurs in a specific quantity and state. Structural and functional variation denoted by *Unani* physicians in terms of *Mizaj* (temperament) which is related to dominant *Rukn* (primary constituent) present in compound. The *Mizaj* of the human body is determined by all three vital organs (Brain, Heart and Liver); hence maintenance of *Mutadil Mizaj* (appropriate temperament) of these organs warrants the healthy status of the human body. This study intended to validate the *Mizaj* of brain by estimation of moisture content in three vital organs (Brain, Heart and Liver) of three Animal species (Chicken, Goat and Buffalo). Twenty seven samples obtained, three samples of each vital organs of each species to estimate the moisture content.

**Keywords:** *Mizaj*, Brain, Vital organ, Rutubat

### 1. Introduction

*Mizaj* in USM is supposed to be responsible for health and disease of human being and also important to determine the diagnosis, treatment and prevention from diseases. Every person possesses a unique *Mizaj* which appears in physical characteristics, physiological and anatomical profile as well as in emotional state <sup>[1]</sup>.

Each individual's *Mizaj* is said to possess innate strength and deficiency to which they react differently to a given set of environmental condition and liable to get affected by particular disease; require different type of diet and life style for healthy living and even different type of drugs to get rid of disease. Everything in this world is made up of four basic constituents (*Arkan*). According to Abu Sehl Masihi when these basic constituents come together and their contrary *Kayfiyat* (qualities) interact with each other a compound is formed possessing a new *Kayfiyat* called as *Mizaj*. This *Mizaj* is most appropriate and suitable for that compound, and endowed by nature for the sake of its functions <sup>[1]</sup>. According to ancestor in four *Arkan*, *Rukn Ma* (water) is *Barid-Raqb* (cold-wet) and is exhibited with intense *Burudat*. *Rukn Hawa* (air) is *Harr-Raqb* (hot-dry) and possesses extreme *Rutubat*. *Rukn Nar* (fire) is *Harr-Yabis* (hot-dry) and exhibits intense *Hararat* (hotness), while *Rukn Arḍ* (earth) is *Barid-Yabis* (cold-dry) and possesses extreme *Yubusat* (dryness) <sup>[2-5]</sup>. Ibn Sina and other *Unani* physicians described the characteristic features of *Kayfiyat* that *Hararat* produces lightness, and *Takhalkhul* (porosity); *Burudat* causes heaviness and thickness; specific property of *Rutubat* is that it easily accept and leave different shapes, and facilitates easy movements, thus ensures softness in the organs. *Yubusat* produces hardness and firmness and strength <sup>[1, 3, 6-10]</sup>. Some organ possess hotness than other due to they have *Rukn Nar* or *Rukn Hawa* in their composition and some are colder than other due to *Rukn Ma* or *Rukn Arḍ*, some are moist due to *Rukn Ma* or *Rukn Hawa* while some are comparatively dry with *Rukn Nar* or *Rukn Arḍ*. All these specific qualities are the main cause for different specific functions performed by different organs of the body and in congruence to their natural needs <sup>[1, 3, 6-9]</sup>.

According to the Jalinus *Mizaj* of Heart and Liver are *Harr-Raqb*, so in these organ there should be dominance of *Rukn Ma* and *Rukn Hawa*. *Mizaj* of Brain is *Barid-Raqb*, therefore in this organ there should be dominance of *Rukn Ma* and *Rukn Arḍ*. The moisture of organs is due to *Rukn Hawa* and *Rukn Ma* present in them. This study intended to validate the *Mizaj* of brain by quantification of *Rutubat* in terms of Moisture content.

### 2. Material and Methods

Fresh samples of three species (buffalo, goat and chicken) were obtained from registered butcher shop and poultry farm of Bengaluru.

Moisture content was determined in accordance with the procedure established by the

International Standard for determination of Moisture content of meat and meat products; with reference no ISO 1442:1997(E) [11].

**3. Procedure**

**3.1. Preparation of acid washed sand**

Sand was obtained from the market and filtered through the sieve of aperture 1.4 mm i.e. No 40 and again that sand was filtered through 250 µm i.e. No 80, those sand particles which stayed on the sieve No 80 was collected for experiment [11,12]. Thereafter sand was washed with running water and boiled with dilute hydrochloric acid, ρ<sub>20</sub>=1.19g/ml, diluted (1+1), for half an hour and stirred continuously. This boiling process was repeated with another test tube of hydrochloric acid until the acid was turned yellow after boiling. Again sand was washed with distilled water, until the chloride test was found negative. After that this sand was dried at 150 °C to 160 °C and was stored in air tight bottle. All the samples i.e. Liver, Heart and Brain of Goat, Buffalo and Chicken were washed and cut into very small pieces. After the preparation of sample, petridish, glass rod and prepared processed sand was weigh. Test sample was put in petridish and mixed with sand by glass rod. Then the petridish with test sample with glass rod was transferred into hot air oven for two hours at 103 °C ±

2 °C. After two hours of heating the petridish with test sample was removed from oven and put into the desiccator for cooling. Thereafter petridish was weigh. This process was repeated three times and readings were same in last two sittings.

Total moisture content of the test sample of vital organs were calculated by the formula,

$$w = \frac{m_1 - m_2}{m_1 - m_0} \times 100$$

Where m<sub>0</sub> is the mass of petridish and rod with sand, m<sub>1</sub> is the mass of petridish containing test sample and rod with sand before drying, m<sub>2</sub> is the mass of petridish containing test sample and rod with sand after drying.

**4. Result**

The mean value of moisture contents in chicken's Brain was 80.09%, of Heart was 77.86% and of Liver was 71.70%. The mean value of moisture contents of Goat's Brain was 79.09%, of Heart was 78.13% and of Liver was 68.04%. The mean value of moisture contents in Buffalo's Brain was 80.87%, of Heart was 79.47% and of Liver was 72.72% (Table 1). The comparison of mean value of moisture content in three vital organs of three species i.e. chicken, Goat and Buffalo are presented in Table No 2.

**Table 1:** Moisture content of Three Vital organs

Species	Organs	Sample	Mass of glass rod (g) [b]	Mass of sand (g) [c]			Initial Mass of Sample (g) [d]	Mass of Petridish, glass rod, sand with sample (g) m <sub>1</sub> =[a+b+c+d]	Mass of petridish, glass rod, sand with sample (g) after 2 hrs. drying in an oven at ± 105 °C m <sub>2</sub>	Final Mass of sample after 2hrs. drying in an oven at ± 105 °C (g)	Loss on drying =Initial Mass-Final Mass of Sample (g)	Moisture content %	Mean percentage
Chicken	Brain	sample-1	126.517	13.496	6.002	2.006	148.021	146.442	0.427	1.579	78.71	80.09 %	
		sample-2	110.257	13.468	6.006	2.004	131.735	130.153	0.422	1.582	78.94		
		sample-3	115.389	12.813	6.002	2.005	136.209	134.552	0.348	1.657	82.64		
	Heart	sample-1	94.664	12.810	15.008	5.005	127.487	123.551	1.069	3.936	78.64	77.86 %	
		sample-2	128.407	13.468	15.006	5.008	161.889	158.000	1.119	3.889	77.65		
		sample-3	105.396	13.235	15.004	5.006	138.641	134.771	1.136	3.870	77.30		
	Liver	sample-1	126.516	13.194	15.005	5.004	159.719	156.194	1.479	3.525	70.44	71.70 %	
		sample-2	110.265	13.175	15.009	5.007	143.456	139.877	1.428	3.579	71.47		
		sample-3	118.488	13.500	15.000	5.001	151.989	148.329	1.341	3.660	73.20		
Goat	Brain	sample-1	94.663	12.811	15.002	5.009	127.485	123.521	1.045	3.964	79.13	79.09 %	
		sample-2	106.557	13.193	15.002	5.001	139.753	135.830	1.078	3.923	78.44		
		sample-3	116.707	13.469	15.006	5.009	150.191	146.198	1.016	3.993	79.72		
	Heart	sample-1	94.659	13.486	15.009	5.002	128.156	124.206	1.052	3.950	78.97	78.13 %	
		sample-2	128.408	13.430	15.011	5.000	161.849	157.941	1.092	3.908	78.16		
		sample-3	105.393	13.201	15.003	5.002	138.599	134.734	1.137	3.865	77.27		
	Liver	sample-1	126.513	13.185	15.007	5.002	159.707	156.382	1.677	3.325	66.47	68.04 %	
		sample-2	110.255	13.170	15.006	5.001	143.432	140.031	1.600	3.401	68.01		
		sample-3	118.482	12.801	15.007	5.001	151.291	147.809	1.519	3.482	69.63		
Buffalo	Brain	sample-1	128.408	13.235	15.002	5.002	161.647	157.580	0.935	4.067	81.32	80.87 %	
		sample-2	105.396	12.811	15.007	5.001	138.215	134.140	0.926	4.075	81.47		
		sample-3	118.495	13.195	15.002	5.007	151.699	147.702	1.010	3.997	79.82		
	Heart	sample-1	118.485	13.175	15.002	5.003	151.665	147.668	1.006	3.997	79.89	79.47 %	
		sample-2	94.666	13.189	15.007	5.006	127.868	123.874	1.012	3.994	79.78		
		sample-3	110.267	13.500	15.009	5.000	143.776	139.839	1.063	3.937	78.74		
	Liver	sample-1	126.517	13.500	15.005	5.001	160.023	156.441	1.419	3.582	71.63	72.72 %	
		sample-2	110.259	13.468	15.001	5.006	143.738	140.122	1.390	3.616	72.23		
		sample-3	92.976	13.192	15.000	5.007	126.175	122.455	1.287	3.720	74.29		

**Table 2:** Comparison of Mean Fraction of Moisture Content

	Chicken	Goat	Buffalo
Brain	80.09%	79.09%	80.87%
Heart	77.86%	78.13%	79.47%
Liver	71.70%	68.04%	72.72%

## 5. Discussion

*Mizaj* of all individuals of the world is different and that particular *Mizaj* is *Mu'tadil* for them. All the bodily functions of individual are performed normally at this *Mu'tadil Mizaj*. All the living beings are born normal to their functions and instincts such as rabbit is *Barid* in *Mizaj*, with light-weight body with intense fear in order to run away very fast; tiger, being brave and bold has *Harr Mizaj* with heavy built in order to catch his prey [1, 8, 9, 13]. Among all the animals, the human being is comparatively the most *Mu'tadil* creature of this world. Moreover, he is bestowed with the precious quality of talking, thinking and understanding which make him distinct from other animals [1, 4, 5, 7, 9]. The human body is constituted from the organs which are made up of varying amount of four basic constituents; their qualities depend upon the amount and properties of these constituents [1, 3, 4, 6, 8, 9]. An organ having the *Harr Mizaj* is dominated by the presence of *Rukn Nar*; the *Barid Mizaj* exhibits the dominance of *Rukn Ma*; the *Raṭb Mizaj* indicates predominance of *Rukn Hawa*, whereas *Yabis* depicts the influence of *Rukn Arḍ* as the constituent substance [1, 4-6, 8, 9]. Heart and Liver possess more *Hararat* than Brain because Heart is the organ where *Ruḥ* (pneuma) is formed by inspired air and *Akhlat Latifa* (volatile humors), whereas Liver is a kitchen of our body *Akhlat* and all other essential things are formed in the Liver and these function of Liver and Heart need more *Hararat* instead of *Burudat* or *Ruṭubat*, so nature provide them excess *Hararat* as per their need [1, 3, 4, 6, 7, 14, 15]. When these organs possess the *Mu'tadil Mizaj*, their functions are normally discharged. All the bodily functions are primarily governed by three important *Quwa* (faculties): *Quwwat Tabiyya* (natural faculty), *Quwwat Haiwaniya* (vital faculty), and *Quwwat Nafsaniya* (psychic faculty) and have distinct centres of their actions. [1, 4, 5, 8, 9] The centre of *Quwwat Tabiyya* is located in the liver, and subordinate organs are mouth, oesophagus, stomach and intestines; these organs render the food such a suitable form which is easily transformed into the blood under the influence of *Hararat* of liver. The centre of *Quwwat Haiwaniya* is heart where the generation of *Ruḥ* is ensued, and its subordinate organs are lungs, and pulmonary arteries. The centre of *Quwwat Nafsaniya* is the brain and its subordinate organs are the nerves aided by eyes, ears, nose, tongue and the skin; the main functions served are sensory, motor, and cognitive functions [1, 4, 5, 8, 9]. As per *Unani* System of Medicine the organs of human body consist of primary constituents and mixture of all these four primary constituents i.e. *Rukn Nar*, *Rukn Hawa*, *Rukn Ma* and *Rukn Arḍ*. The end point where interaction ceases, amongst reactive and passive constituents, gives rise to specific *Mizaj* to the organ. Compounding of primary builders occurs in presence of heat metamorphosis (changes) and ultimately a shape is evolved out which determines qualities and state of organs. Thus it is evident that the state by which an organ performs its normal function and reacts to stimuli is nothing but temperamental quality and shape. As a temperamental obligation every organ acquires some capacities to perform its various functions and to respond to various stimuli. These capacities are mainly concern with assimilation of blood, elimination of waste, supply of energy and mental function. The various functions

of the body are the expression of inherent capacities of the various components-organs. These capacities are not alike in all individuals and at all phase of life in the same individual that is why different functions of the body exhibit a grading from minimal to maximal to desirable. Psychic and behavioural traits are also temperamental so every person reacts and behaves differently to the same situation. Characters such as honesty, boldness, decisiveness, cheating, thinking, pessimism, optimism, activeness, memory and delinquency are presented different in every individual. Thus the functions of organ specially Brain due to its specific shape and dominance of *Ruṭubat*.

Present study intended to determine the moisture content in the form of *Ruṭubat* in vital organs for the validation of *Mizaj* of Brain. The mean value of moisture content of Brain in three species i.e. Chicken, Goat and Buffalo were found 80.09 %, 79.09% and 80.87% respectively. (Table no 2) The mean of Moisture content of Brain was found maximum as compared to Heart and Liver. It indicates that Brain has more *Ruṭubat* as compared to Heart and liver. Among the three vital organs; the brain possesses the more *Ruṭubat* which indicates *Raṭb Mizaj*. Due to predominance of *Ruṭubat* it has soft consistency, and accepts the different shapes easily which facilitates the cognitive functions properly [4, 6-8]. If the structure of the brain is analysed, there are lots of convolutions in it which are formed by the water contents which are very soft and delicate in consistency and the softness or delicacy is ensued inevitably due to *Ruṭubat*. If there had been less *Ruṭubat*, the cognitive functions might have been hampered. Similarly, there is a cascade of shapes and forms of the things which are being visualized by the brain and are omitted the second time, must be the function of the *Ruṭubat* which is denoted by the *Ajza Maiyya* [4-9].

## 6. Conclusion

In this study moisture content was found maximum in Brain; it shows that Brain has maximum *Ruṭubat* as compared to Heart and Liver. Since structure of brain has many convolutions, soft consistency and *Ruṭubat* and *Burudat* is necessary in Brain for facilitation of its cognitive functions. As per *Unani* System of Medicine *Burudat* always protects the *Ruṭubat*, that's why all *Barid A'da* should be *Raṭb*, so Brain is *Barid-Raṭb* in *Mizaj*. Subsequently water content is *Barid-Raṭb* and maximum in Brain, therefore Brain should be *Barid-Raṭb*. This study validates that Brain is *Barid-Raṭb* in accordance with its structure and functions as described by *Unani* physicians.

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