



## **Standardization of Palagarai Parpam – A Herbo mineral Siddha drug**

**R. Madhavan\*<sup>1</sup> G. Sumaiya Jabeen<sup>2</sup>**

<sup>1</sup>HOD In-Charge, Dept. of Nanju Maruthuvam, National Institute of Siddha, Chennai.

<sup>2</sup>AMO, Govt. Hospital, Anaicut, Vellore Dt

Corresponding Author: \* **R.Madhavan,**

Lecturer, HOD In - Charge, Dept of Nanju Maruthuvam, National Institute of Siddha,

E-mail: [drmadhavanji@gmail.com](mailto:drmadhavanji@gmail.com)

**S**

### **Abstract**

Siddha System of Medicine is a one among the Traditional system of Indian Medicine. Palagarai is a important drug in Siddha literature. In this study Palagarai is purified with Thamaratham pazha Charu and standardized with sophisticated instruments. Organoleptic characters also analysed. Organoleptic charecters indicates purification procedure is hygienic and SEM analysis indicates the absorption is possible while prepared as a Medicine and ICP OES analysis indicates Heavy metals are not deducted and other minerals are responsible for medicinal property. Calcium is in higher concentration and XRD analysis shows a peak. Standardization shows the Purification of palagarai increases its medicinal value and if this drug taken for preparation of medicine it fulfill it's medicinal value as mentioned in the Siddha Literature.

**Keywords:** Siddha Medicine, Palagarai, Organoleptic characters, SEM analysis, ICP OES analysis, XRD analysis.

### **Introduction**

Siddha system of medicine is the most antique system of medicine. This system was formulated and established about more than millennium back by the eminent siddhars and hence retained the name „siddha medicine“. Siddha medicine includes the herbal products, inorganic substances and animal products lead to different formulations ranging from plant decoctions to herbomineral drugs like parpam, chenduram, chunnam, etc. <sup>1</sup> According to siddha doctrines, everything found in nature has two qualities, good and bad. When they are utilized for any purpose, they have two actions, especially in medicine. Therefore when any matter in nature has to be utilized for medicine, the properties which may cause bad

effects should be neutralised or eliminated.<sup>2</sup> Sea is the richest natural source of minerals like calcium, phosphorus, iron and some other trace elements. Marine organisms which contribute the bioactive products are having profound application in pharmaceuticals and cosmeceuticals. <sup>3</sup> Palagarai is one among the marine resources as mentioned in siddha literatures (kadalpadu draviyangal).<sup>4</sup>

In view of siddha toxicology, palagarai plays an important role in treatment as an anti-dote for various poisons. Detoxification is a common phenomenon for any given drug to increase their therapeutic potency thereby minimising the toxicity, popularly known as “suddhi muraigal”. Thus, no medicinal preparation is done without prior suddhi process.<sup>5</sup>

In present scenario, scientific validation is necessary to prove the said facts in Literatures.

Standardisation is the process of implementing and developing technical standards. Standardisation helps to maximise, compatibility, interoperability, safety, repeatability or quality. It can facilitate commoditization of formerly custom process.<sup>6</sup> In this study we standardize the purification procedures mentioned for Palagarai in Siddha literature.

## Materials and Methods

### Purification of Palagarai:

1 palam (35gm) of Palagarai has to be soaked in 10 palam (380 ml) of Thamaratham pazha charu (Star fruit juice) and placed under sunlight from sunrise to sunset. This same process was repeated for another 14 days. Then at the end of 15th day, the remaining juice was drained and Palagarai was separated. Then the Palagarai was washed thoroughly with water and dried well.<sup>7</sup>

For the purpose of the study, 250 gm of Palagarai was taken and soaked in 2750 ml of Thamaratham pazha charu for 15 consecutive days. At the end of the 15th day, it was washed and made dried.

### Organoleptic Characters:

Palagarai parpam was evaluated for the organoleptic characters like Colour, Alcohol soluble extractive, Odour, Loss on drying at 105 C, Determination of pH, Total Ash, Water soluble extractive, Acid Insoluble Ash.

**Inductively coupled plasma optical emission spectrometry (ICP-OES) Analysis:** Analysis was performed using Optima 5300 DV ICP- OES equipped with a Sea Spray concentric nebulizer (Glass Expansion, Pocasset, MA) and cyclonic spray chamber. Following parameters were introduced: nebulizer flow, 0.8 l min<sup>-1</sup>; radiofrequency power, 1450 W; sample introduction, 1.5 ml min<sup>-1</sup>; flush time, 20 s; delay time, 10 s; read time, 10 s; wash time, 30 s; and replicates, three. Standards were prepared by dilution of 1000 mg l<sup>-1</sup> stock solutions and the calibration curve was obtained using five to ten points including the blank.<sup>8</sup>

**X ray diffraction study (XRD) Analysis:** The powder XRD patterns of the solid samples were recorded on X'pert pro analytical X-ray diffractometer using CuK $\alpha$  radiation filtered by a nickel foil over the range of diffraction angle 10-70°. The wave length of the radiation used was 1.5405Å.<sup>5,9</sup>

**Scanning electron Microscope – Energy dispersive X ray spectrometry (SEM) Analysis:** Powder property of the samples was determined by JEOL ASM 3500 SEM with EDAX. A representative portion of each sample was sprinkled onto a double side carbon tape and mounted on aluminium stubs, in order to get a higher quality secondary electron image for SEM examination.<sup>8</sup>

### FTIR Analysis:

Raw materials were powdered and the infrared spectral characterization was obtained by using Perkin-Elmer FTIR Spectrophotometer in the region (4000-450 cm<sup>-1</sup>) by KBr pellet method.<sup>10</sup>



Figure 1: Raw drug Palagarai



Figure 2: Purified Raw drug Palagarai



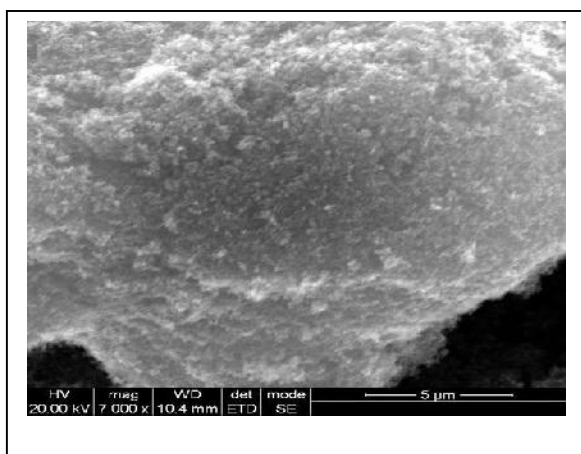
Figure 3 : Thamaratham Pazham

## Results

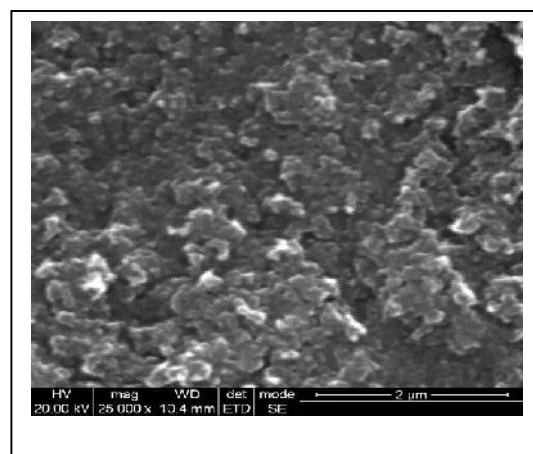
### Organoleptic characters:

S.no	Physico- chemical Parameter	Before purification % in w/w (mg/g)	After purification % in w/w (mg/g)
1	Appearance	Dull White coarse powder	Dull White fine Powder
2.	pH at 25° C (1% w/w solution)	7.64	6.98
3.	Loss on Drying at 105°C	19.71 % w/w	0.3938 % w/w
4.	Total Ash	26.04 % w/w	24.91 % w/w
5.	Acid Insoluble Ash	1.302 % w/w	0.9427 % w/w
6.	Water Soluble Extractive	0.6543 % w/w	0.6924 % w/w
7.	Alcohol Soluble Extractive	0.5495 % w/w	0.2797 % w/w
8.	Colour	Dull White	Fine white

### HR SEM Analysis:



Unpurified Palagarai



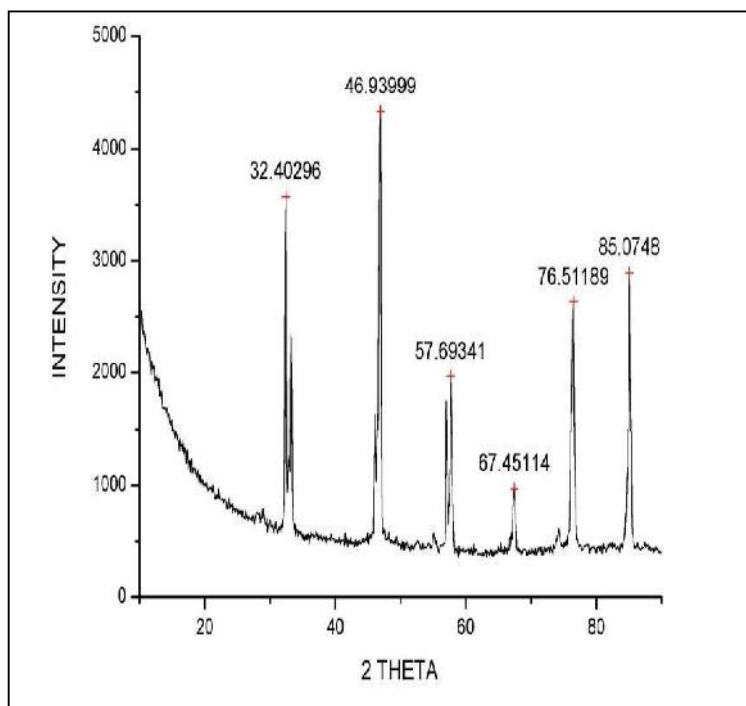
Purified Palagarai

**ICP OES Analysis:**

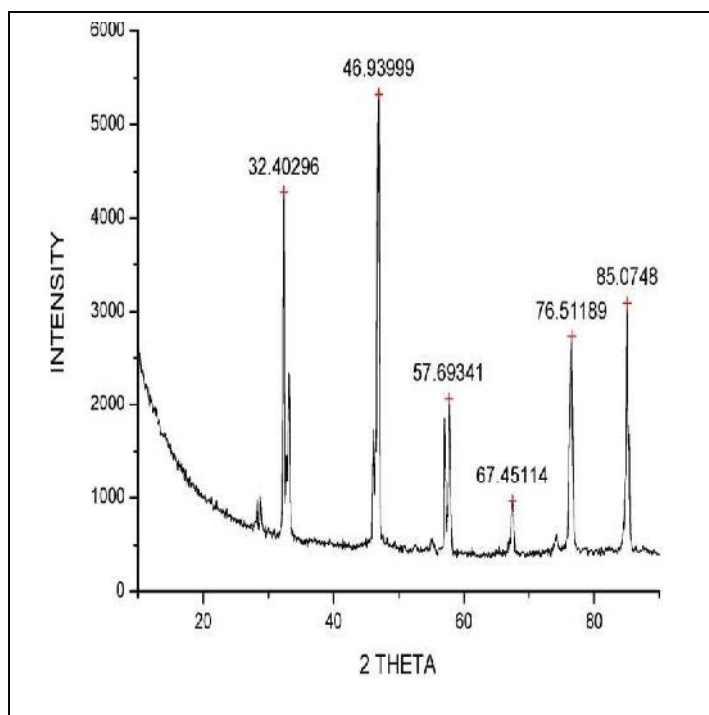
BDL- Below Detectable Limit PPM – Parts Per Million.

S.no	Elements	Wave length In nm	Before purification In mg/l (ppm)	After purification In mg/l (ppm)
1.	Arsenic	As 188.979	BDL	BDL
2.	Calcium	Ca 315.807	210.658	252.324
3.	Cadmium	Cd 228.802	BDL	BDL
4.	Copper	Cu 327.393	BDL	BDL
5.	Mercury	Hg 253.652	BDL	BDL
6.	Magnesium	Mg 285.213	23.824	25.324
7.	Sodium	Na 589.592	50.183	51.123
8.	Nickel	Ni 231.604	BDL	BDL
9.	Lead	Pb 220.353	BDL	BDL
10.	Phosphorus	P 213.617	75.041	73.251
11.	Sulphur	S 180.731	BDL	BDL

**XRD Analysis:**

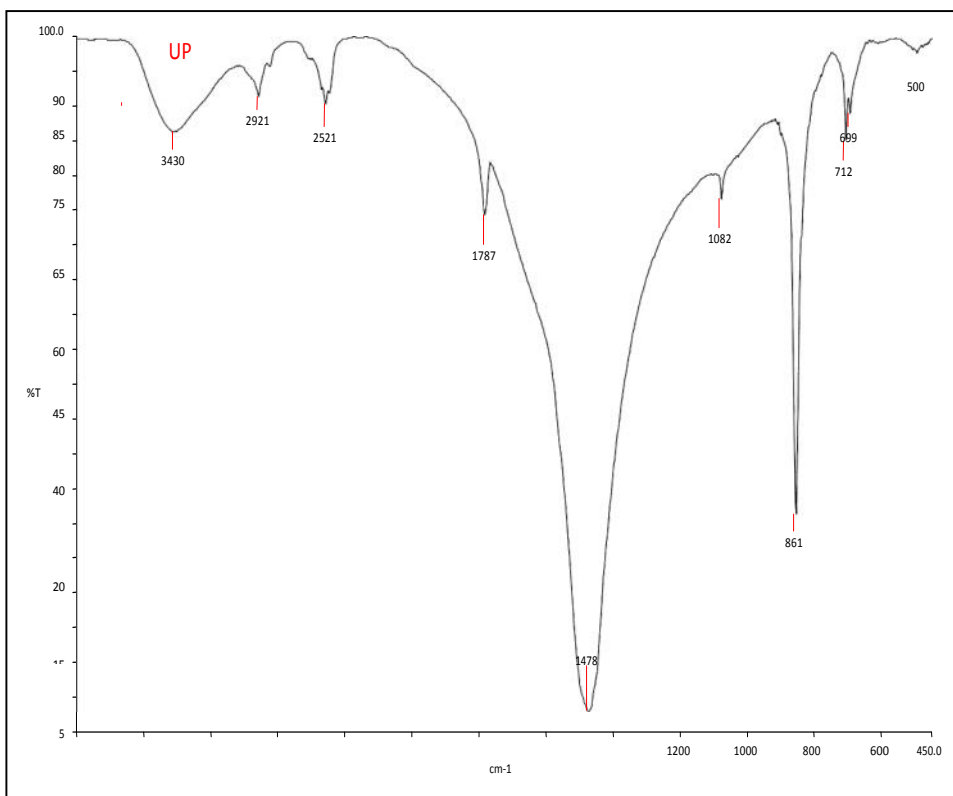


Diffractogram showing peaks of crystalline phase of unpurified raw drug Palagarai.

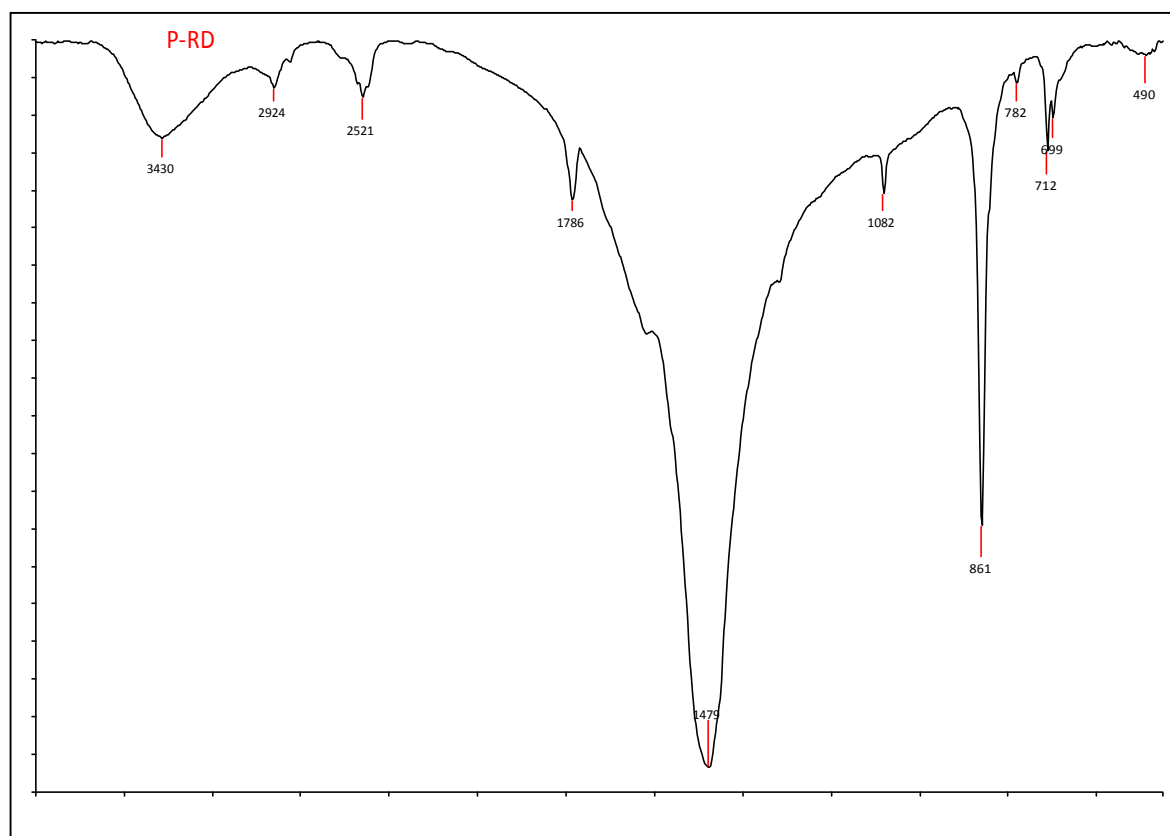


Diffractiongram showing peaks of crystalline phase of purified raw drug Palagarai

**FTIR Analysis:**



IR absorption frequencies of Organic Functional Groups for unpurified raw drug Palagarai.



IR absorption frequencies of purified raw drug Palagarai treated with Thamaratham pazha charu.

## Discussion

In this study Palagarai was purified with Thamaratham pazhacharu. The Palagarai parpam prepared from purified palagarai is indicated as an antidote to various types of poisons of animals and other living creatures. Therefore, exploration about this natural resource drug at this time will be economically beneficial as huge amount of fund has been required to develop a synthetic antidote from poison itself.<sup>11</sup> The pH of the drug Palagarai before purification was 7.64, which is slightly alkaline<sup>12</sup> The pH of the raw drug Palagarai after purification was changed to 6.98, which is slightly acidic. In oral administration, the acidic nature of the drug, enhances rapid absorption in the stomach<sup>13,14</sup>. The percentage of loss on drying of rawdrug Palagarai before and after purification was changed from 19.71% w/w to 0.3938 %w/w. The drastic change in loss on drying from before to after purification process depicts the extensive shelf life of the drug<sup>15</sup>.

The Total ash values of Palagarai for before and after purification process was 26.04%w/w and 14.91%w/w respectively. As the Total ash value is much reduced in after purification, it implies that the inorganic constituents are much reduced after purification. The acid - insoluble ash limit test is to measure the amount

of ash insoluble to diluted hydrochloric acid<sup>43</sup>. Acid-insoluble ash value of Palagarai before and after purification were 1.302 %w/w and 0.9457 %w/w respectively. This indicates the greater physiologic availability of the drug<sup>15</sup> and also indicates the purity of the drug after purification.

The HR SEM analysis shows agglomerates of various shapes and sizes in reduction with increase in magnification from before to after purification. The agglomerates were found leaving pores in between which would permit the circulation of body fluid throughout the coating, when it is used as a medicine.

The ICP-OES analysis of raw drug Palagarai before and after purification showed that the presence of physiologically important minerals like Calcium, Magnesium, Sodium and Phosphorus. Heavy metals such as Mercury, Lead, Arsenic and Cadmium were found below the detectable limit.

The X-Ray Diffraction analysis of the drug samples shows intensity peaks of various places. The peaks were identified as crystalline peaks<sup>18</sup> The XRD analysis results depicts clearly that the crystalline phase is increased with increase in intensity, which indicates that purified Palagarai is attributed for better bioavailability and dissolution rate.

The FTIR analysis of Palagarai purified with Thamaratham pazha charu shows the presence of vibrational band observation around ~ 1420 to 1500 cm<sup>-1</sup> and 860 to 875 cm<sup>-1</sup> confirms is attributed to the presence of calcium carbonate<sup>16</sup> Also shows the presence of functional groups such as Alcohol, Amine, Amide, Acid, Alkene, Alkyl Halide, Ester and Ether groups<sup>17</sup>.

## Conclusion

Palagarai purified with Thamaratham pazha charu, has a medicinal value identified from abovesaid standardization techniques. Thus the purification method is valuable one and Palagarai parpam prepared from the purified palagarai will fulfill it's medicinal claim. Further more pharmacological studies accomplish the medicinal value of the drug .

## References

1. Dr.Thiagarajan.R, Siddha Materia Medica (Mineral and Animal kingdom), Dept. of Indian medicine and Homeopathy, Chennai-106, 1<sup>st</sup> edition, 2008, 1, 5, 483, 484-489.
2. Dr.Chidambarathanu Pillai. S, Siddha System of Toxicology, Siddha Medical Literature Research Centre, Madras -102, 1<sup>st</sup> Edition 1993, 1.
3. Vikas Saroch and Neetika Kundailala, A review on marine originated drug tradition in Ayurveda, Ayurpharm Int. Jour. Ayur. Alli. Sci.,vol-3, No.9, 2014, 241-247.
4. Dr.Thiagarajan. R, Gunapadam Thathu jeeva Vaguppu, Dept. of Indian Medicine and Homeopathy, Chennai -106, 2<sup>nd</sup> edition, 1968, 674, 676-682
5. Dr.Pulok K. Mukherjee, Quality Control Herbal Drugs, Buisness Horizons, New Delhi, 1st edition, page no.8 .
6. [http:// en.wikipedia.org / wiki / Standardization](http://en.wikipedia.org/wiki/Standardization).
7. Anonymous, Theraiyar emaga venba, Dept. of Indian Medicine and Homeopathy, Chennai-106, 2<sup>nd</sup> Edition, 2003, 1<sup>st</sup> part, 162.
8. Mahalakshmi Gopal, Sathish Raja Thinakaran and Poorna Pushkala Venkat subramanian, Quality Assessment of a Traditional Siddha Drug "Mupooru Chendurum", American Journal of Phytomedicine and Clinical Therapeutics, [2][5][2014]571-579
9. A.Saraswathy,S.Ruckmani, Arun mozhi devi, S.Ariyanathan, Chemical Analysis of Vanga Bhasma, Int.J.Res.Ayurveda Pharm.4(5), sep-oct 2013 (676-679).
10. Sudha A, Murthy VS, Chandra TS. Standardization of Metal-Based Herbal Medicines. Am J Infec Dis, 5:2009; 193-9.
11. <http://www.popularmechanics.com/science/health/g561/how-to-make-antivenom>
12. Indian Pharmacopoeia, Department of AYUSH, Volume -1, edition 2014, 169, 98, 162, 277.
13. Padmaja Udhayakumar, Medical Pharmacology, CBS Publishersvand distributors pvt Ltd, 4<sup>th</sup> Edition, 2013, 17
14. Tripathi K.D., Essentials of medical pharmacology, Jaypee publishers, 5<sup>th</sup> Edition, 2004, 14.
15. Chitra et al, Characterizatio of a Siddha drug (Purna cantrirotaya centuram): an approach to standardization, Int. J. Pharm. Sci, 2015 Jan; 6(1):566-576.
16. Prabhakaran et al, Bull. Mater. Sci. Vol. 28(2): 115-119 (2005).
17. Petsh et al, Tables of Spectra Data for Structure Determination of Organic Compounds, Lind, Spriger-Verlag, Hong Kong (1989).
18. Ashish Chauhan and Priyanka Chauhan, Powder XRD Technique and its applications in science and Technology, Journal of Analytical and Bioanalytical Techniques, ISSN 2155-9872.

### How to cite this article:

R. Madhavan, G. Sumaiya Jabeen. (2018). Standardization of Palagarai Parpam – A Herbo mineral Siddha drug. Int. J. Adv. Res. Biol. Sci. 5(3): 210-216.

DOI: <http://dx.doi.org/10.22192/ijarbs.2018.05.03.022>

### Access this Article in Online



Website:  
[www.ijarbs.com](http://www.ijarbs.com)

Subject:  
Siddha medicine

Quick Response  
Code

DOI:[10.22192/ijarbs.2018.05.03.022](http://dx.doi.org/10.22192/ijarbs.2018.05.03.022)