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### **KING-TIGER® Astragalus Extract Products Can Fully Meet the Requirements of EU Regulations on PAHs**

Polycyclic aromatic hydrocarbons (PAHs) refer to those compounds containing two or more benzene rings.

PAHs are recognized as the main organic pollutants affecting human health, due to its toxicity, genotoxicity, mutagenicity and carcinogenicity, which can cause a variety of harm to human body, such as damage to respiratory system, circulatory system, nervous system, liver and kidney.

The sources of PAHs are divided into natural sources and artificial sources. Natural sources are mainly formed in the biosynthetic process of land, aquatic plants and microorganisms. Besides, PAHs are also existed in volcanic eruptions, fossil fuels, lignin and sediment of natural fires of forest and grassland, which constitute the natural background value of PAHs. Generally, the background value of PAH in soil is 100-1000  $\mu\text{g}/\text{kg}$ , and that in atmosphere is 0.1-0.5 $\text{ng}/\text{m}^3$ . Artificial sources are mainly formed by incomplete combustion of various fossil fuels (such as coal, oil and natural gas), wood, paper and other hydrocarbons or pyrolysis under reduction conditions.

Due to the influence of soil, atmospheric environment and self metabolism in the process of planting and production, plants contain not only the main functional components, but also traces of harmful substances, such as PAHs, which have attracted more and more attention from people in the food industry, as human's continuous pursuit of healthy quality to life. The "COMMISSION REGULATION (EU) 2015/1933 of 27 October 2015" issued by the European Union in 2015 made new regulations regard to the maximum levels of PAHs in food additives containing plant extracts, in which required level of Benzo(a)pyrene, one main compound of PAHs, shall not exceed 10 $\mu\text{g}/\text{kg}$ , and the total amount of PAHs shall not exceed 50 $\mu\text{g}/\text{kg}$  (Fig. 1).

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COMMISSION REGULATION (EU) 2015/1933

of 27 October 2015

amending Regulation (EC) No 1881/2006 as regards maximum levels for polycyclic aromatic hydrocarbons in cocoa fibre, banana chips, food supplements, dried herbs and dried spices

(Text with EEA relevance)

6.1.13	Food supplements containing botanicals and their preparations <sup>(28)</sup> (*) (**)	10,0	50,0
	Food supplements containing propolis, royal jelly, spirulina or their preparations <sup>(29)</sup>		

Fig. 1: Requirement in COMMISSION REGULATION (EU) 2015/1933 for the maximum level of PAHs in food additives

As PAHs compounds appear widely in soil and atmospheric environment, some of them may be mixed with solvent and enter the extract while extracting, thus polluting the plant extract.

In view of the above mentioned, we developed a treatment aiming to remove the harmful components including PAHs, which has been verified strictly by methodology and by which the level of PAHs is compliant with the EU standards in the premise of ensuring the natural active ingredients of astragalus extract are free from loss.

We compared the PAHs level of the astragalus extract sold in the market and the extract processed by our company. See the difference of results as the Fig.2 and Fig.3.



Analytical Report

Sample Code	502-2019-00010838	Report date	03-Mar-2019
Certificate No.	AR-19-SU-011570-01-EN		

	Results	Unit	LOQ	LOD
☆ JC00U PAH 4 Method: Internal, GC-MS Accreditation: EN ISO/IEC 17025:2005 DAKKS D-PL-14602-01-00				
Benzo(a)anthracene	72.7	µg/kg	0.5	
Benzo(a)pyrene	36.2	µg/kg	0.5	
Benzo(b)fluoranthene	45.5	µg/kg	0.5	
Chrysene	85.0	µg/kg	0.5	
Sum PAH 4	239.4	µg/kg		

Fig. 2: Result of PAHs level in the astragalus extract sold in the market (Without PAHs-removing Processing)

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From the Fig. 2, Benzo(a)pyrene in the extract is 36.2µg/kg (maximum level in EU regulation is 10µg/kg), PAHs is 239.4µg/kg (maximum level in EU regulation is 50µg/kg), which is 3 to 5 times higher than the limitation.



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### Analytical Report

Sample Code	502-2019-00010840	Report date	03-Mar-2019
Certificate No.	AR-19-SU-011572-01-EN		

	Results	Unit	LOQ	LOD
☆ JC00U PAH 4 Method: Internal, GC-MS Accreditation: EN ISO/IEC 17025:2005 DAKKS D-PL-14602-01-00				
Benz(a)anthracene	<0.5	µg/kg	0.5	
Benzo(a)pyrene	<0.5	µg/kg	0.5	
Benzo(b)fluoranthene	0.7	µg/kg	0.5	
Chrysene	<0.5	µg/kg	0.5	
Sum PAH 4	0.7	µg/kg		

Fig.3: Result of PAHs level in our astragalus extract (With PAHs-removing Pocessing)

From the Fig. 3, Benzo(a)pyrene in the extract is lower than 0.5µg/kg (maximum level in EU regulation is 10µg/kg), PAHs is 0.7µg/kg (maximum level in EU regulation is 50µg/kg), which is compliant with the standard in Regulation 2015/1933 (EU).

### References

1. Xie Xin, ORGANIC CHEMISTRY: Chongqing University Press, 2015: 71-75
2. Wang Xiuling, Cui Ying. ENVIRONMENTAL CHEMISTRY: East China University of Science and Technology Press, 2013: P150-151
3. COMMISSION REGULATION (EU) 2015/1933 of 27 October 2015 amending Regulation (EC) No 1881/2006 as regards maximum levels for polycyclic aromatic hydrocarbons in cocoa fibre, banana chips, food supplements, dried herbs and dried spices
4. COMMISSION REGULATION (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs

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